Charge and Scope of Work

Nontidal Wetland Creation, Enhancement and Rehabilitation Phase 6.0 BMP Expert Panel

Prepared by the Chesapeake Bay Program Partnership's Wetland Workgroup

September 22, 2017

Background

The Chesapeake Bay Program (CBP) partnership's Wetland Workgroup convened an expert panel in 2014 to recommend improved definitions for effectiveness estimates for wetland Best Management Practices (BMPs) and new wetland land uses for the Phase 6 Chesapeake Bay Watershed Model (CBWM). The expert panel concluded at the end of 2016, establishing four categories of wetland BMPs that states can report for credit in the Phase 6 CBWM, however, three of the categories – creation, enhancement and rehabilitation – required further investigation by a new expert panel to evaluate the effectiveness of the practices to reduce nitrogen, phosphorus and sediment loads. This document describes the charge and scope of work given to the new expert panel by the Wetland Workgroup.

While conducting its review, the panel shall follow the procedures and process outlined in the Water Quality Goal Implementation Team's *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*, hereafter referred to as the BMP Protocol. [1]

Recommendations for Expert Panel Member Expertise

The BMP Protocol, requires that each expert panel is to include at least six members, one of whom serves as the Panel Chair. The panel members are supported by a Panel Coordinator and one non-voting representative each from the Watershed Technical Workgroup (WTWG) and Chesapeake Bay Program modeling team. An additional representative from the EPA Region III office is recommended in cases where implementation of the BMPs evaluated by the panel are associated with federal permitting processes. Panels are expected to include three recognized topic (wetland) experts and three individuals with expertise in environmental and water quality-related issues. A representative of USDA who is familiar with relevant USDA-Natural Resources Conservation Service (NRCS) conservation practice standards should be included as one of the six individuals who have topic- or other expertise. Panelists' areas of expertise may overlap.

In accordance with the BMP protocol, 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

[1] http://www.chesapeakebay.net/publications/title/bmp_review_protocol

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.

It is recommended that the Phase 6.0 Wetland Creation, Enhancement and Rehabilitation (CER) BMP Expert Panel should include members with the following areas of expertise:

- Familiarity with nontidal wetland hydrology and knowledge of wetlands in agricultural settings.
- Knowledge of soil science and pathways associated with nutrients and sediment in wetland systems.
- Understanding of regulatory programs or state permitting programs.
- Knowledge of how BMPs are tracked and reported, and the Chesapeake Bay Program partnership's modeling tools.
- Knowledge of relevant NRCS practice codes or standards or knowledge of similar programs that fund implementation of wetland practices.

The panel composition will ideally have two individuals for each of the above areas of technical expertise; an individual panel member may be considered an expert in multiple areas based on their CV. It is recommended that one member is selected who also served on the previous Wetland Expert Panel that concluded in 2016. A total of ten (10) panel members is the recommended maximum, which does not include the Panel Coordinator or supporting representatives of the Modeling Team and Watershed Technical Workgroup. Proposed panel membership will be distributed to the Wetland Workgroup, Agriculture Workgroup, WQGIT and other relevant CBP partnership groups for feedback as described in the BMP Protocol. Panel membership will be approved by the Wetland Workgroup.

Expert Panel Scope of Work

The panel will build off the Phase 6 BMP definitions developed by the previous expert panel for nontidal wetland creation (establishment), wetland enhancement and wetland rehabilitation, which are summarized in Table 1 below. The new panel will recommend effectiveness estimates for the creation, enhancement and rehabilitation BMP categories in nontidal areas. Recommended effectiveness estimates for nitrogen, phosphorus and sediment will be used to simulate reduced loads for those pollutants in the Phase 6 Chesapeake Bay Watershed Model.

Table 1 - CBP Wetland BMP Category Definitions for the Phase 6 Watershed Model

BMP Category	CBP Definition	CBP will count the BMP acres as...	Practice and Project Examples
Restoration	Re-establish The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former wetland.	Acreage gain *(toward Watershed Agreement outcome of 85,000 acre wetland gain and in Phase 6 annual progress runs)*	Restore hydrology to prior-converted agricultural land (cropland or pasture); elevate subsided marsh and re-vegetate; ditch plugging on cropland; Legacy Sediment Removal NRCS Practice 657

BMP Category	CBP Definition	CBP will count the BMP acres as...	Practice and Project Examples
Creation	Establish (or Create) The manipulation of the physical, chemical, or biological characteristics present to develop a wetland that did not previously exist at a site.	Acreage gain *(toward Watershed Agreement outcome of 85,000 acre wetland gain and in Phase 6 progress runs)*	Modifications to shallow waters or uplands to create new wetlands. Placement of fill material or excavation of upland to establish proper elevations for wetlands; Hydrologic measures such as impoundment, water diversion and/or excavation of upland to establish nontidal wetlands NRCS Practice 658
Enhancement	Enhance The manipulation of the physical, chemical, or biological characteristics of a wetland to heighten, intensify, or improve a specific function(s).	Function gain *(toward 150,000 acre outcome and Phase 6 annual progress runs)*	Flood seasonal wetland for waterfowl benefit; regulate flow velocity for increased nutrient uptake; NRCS Practice 659
Rehabilitation	Rehabilitate The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded wetland.	Function gain *(toward 150,000 acre outcome and Phase 6 annual progress runs)*	Restore flow to degraded wetland; ditch plugging in a forested wetland area; moist soil management*; invasive species removal; floodplain reconnection; re-establishing needed vegetation on cropland with wetland hydrology; native wetland meadow planting; May include some NRCS Code 657 practices. *Moist soil management should only be counted if there are predominantly native wetland plants; and site can sustain itself as wetland without active management, meaning whether water control structure is operated or not.

The Panel shall identify specific types of practices which should receive credit and new assigned efficiencies for wetland creation, rehabilitation, or enhancement. When developing its recommendations, the panel should work to provide reasonable criteria and examples to clarify when specific practices in the right-hand column fit best into which specific categories, or when a practice may not qualify as a wetland BMP as defined in Table 1. The Panel will provide recommendations for other existing BMPs which may receive credit under another BMP category, and how the practice should be reported if there are additional wetland credits which

may be assigned. For example, livestock exclusion fencing may or may not qualify as wetland enhancement or rehabilitation, Invasive species removal is another practice which may qualify as rehabilitation or enhancement, but currently does not have a BMP efficiency.

The panel will work within established partnership constraints associated with crediting practices, including the guidelines listed below. The Panel Coordinator and CBP Modeling Team representative will notify the panel of any additional guidelines as may be needed for panel recommendations to conform with partnership decisions.

Guidelines

- The panel may first consider if the water quality benefits of wetland creation are different than wetland restoration as defined by the previous expert panel and, if so, to what degree. Both practices are understood as land use change BMPs that also provide treatment of upgradient land uses.
    - This evaluation should consider the long-term capabilities of created and restored wetlands to remove nitrogen, phosphorus and sediment on average, through time and spatial areas.
    - If there is a quantifiable difference in water quality benefits, the panel will deliberate how best to apply the gathered scientific evidence consistent with the BMP Protocol, and agree to defensible numbers that reflect the degree to which water quality benefits of creation differ from restoration, if at all.
- For wetland enhancement and wetland rehabilitation, the degree to which these activities yield nutrient and sediment reductions should be relative to the benefits of restoration and creation. Enhancement and rehabilitation are not simulated as a change in land use, but can provide water quality benefits by treating wetland or upgradient land uses.
    - Non-tidal wetlands are simulated as specific landuses in the Phase 6 modeling tools (as “Floodplain” and “Other”) with loading rates equal to pristine forest, which has the lowest nutrient and sediment loading rates among all Phase 6 landuses.
    - The benefits of enhancement and rehabilitation need to apply to landuse types that exist in the current models. No new land uses can be created for the Phase 6 modeling tools. There is no landuse for degraded wetlands.
- Current placeholder values exist to simulate the water quality benefits for the wetland creation, enhancement and rehabilitation BMPs in Phase 6. However, there is no substantive documentation supporting these placeholder values so the panel should not base its recommendations off those placeholder numbers.
- Within the extent of the BMP Protocol and their assigned Charge and Scope of Work, the panel will consider potential ancillary benefits and unintended consequences associated with the wetland creation, enhancement and rehabilitation BMPs. The panel will work to describe qualifying conditions that can reduce the risk of unintended impacts on other wetland or ecosystem functions – e.g., habitat or toxic contaminants – when implementing these BMPs for nitrogen, phosphorus and sediment water quality benefits.

The panel will consult peer-reviewed literature and any regionally-appropriate published data sources on created, enhanced or rehabilitated wetlands. Additionally, the panel should consider

studies of natural wetlands to assist in describing an efficiency to be assigned to rehabilitated sites. Some studies – e.g., studies of forested riparian floodplain areas – may also be useful resources even if not associated with "wetlands" as a keyword. In developing its recommendations the panel will follow the data characterization approach described in Table 1 of the BMP Protocol (see Attachment 1). The panel is encouraged to utilize and build upon the framework and literature reviews of the previous wetland panel:

- Wetland Expert Panel. (*2016*). *Wetlands and Wetland Restoration: Recommendations of the Wetland Expert Panel for the incorporation of nontidal wetland best management practices and land uses in the Phase 6 Chesapeake Bay Watershed Model*. Hanson, J., and A. Molloy, Editors. Approved by CBP WQGIT, December 2016. http://www.chesapeakebay.net/publications/title/24978

The panel will develop a report that includes information as described in the Water Quality Goal Implementation Team's *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*, known as the BMP Protocol.[2] The elements of the report required under the BMP Protocol are listed here, but more details are available in the full Protocol.

- Identity and expertise of panel members
- Name or title of the practice(s)
- Detailed definition of the practice(s)
- Recommended N, P and TSS loading or effectiveness estimates
- Justification of selected effectiveness estimates
    - List of data sources considered and description of how each data source was considered
    - Identify data sources that were considered, but not used in determining practice effectiveness estimate
    - Documentation of uncertainties in the published literature
    - Documentation of how the Panel addressed negative results or no pollution reduction as a result of implementation of a specific practice
- Description of how best professional judgment was used, if applicable, to determine effectiveness estimates
- Land uses to which BMP is applied
- Load sources that the BMP will address and potential interactions with other practices
- Description of pre-practice and post-practice circumstances, including the baseline conditions for individual practices
- Conditions under which the practice performs as intended/designed
- Temporal performance of BMP including lag times between establishment and full functioning
- Unit of measure
- Locations in CB watershed where the practice applies
- Useful life; practice performance over time
- Cumulative or annual practice
- Recommended description of how practice could be tracked, reported, and verified

[2] http://www.chesapeakebay.net/documents/CBP_BMP_Expert_Panel_Protocol_WQGIT_approved_7.13.15.pdf

- Guidance on BMP verification
- Description of how the practice may be used to relocate pollutants to a different location
- Suggestion for review timeline; when will additional information be available that may warrant a re-evaluation of the practice effectiveness estimates
- Identification of any unintended consequences or ancillary benefits associated with a practice
- Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any
- Documentation of dissenting opinion(s) if consensus cannot be reached
- Operation and Maintenance requirements and how neglect alters the practice effectiveness estimates
- A brief summary of BMP implementation and maintenance costs estimates, when this data is available through existing literature

While the panel is active the Panel Chair and Panel Coordinator will provide updates on the panel's progress to the Wetland and Agriculture Workgroups as described in the BMP Protocol.

As the panel drafts its report for release the Panel Chair and Panel Coordinator will work with the CBP modeling team and Watershed Technical Workgroup to develop a technical appendix for incorporating the recommended BMPs into Scenario Builder and the Watershed Model. Coordination with the panel's WTWG and Modeling Team representatives throughout the process will help to ensure the panel's recommendations fit within the overall model framework.

As described in the BMP Protocol, the Panel Chair and Panel Coordinator will facilitate the partnership review, comment and approval process on behalf of the panel, updating and seeking input from panel members as needed. The Chair and Coordinator will respond to partnership comments and make edits or revisions to the report, seeking panel input on substantive revisions. The panel is dismissed following partnership approval of the final report (as amended).

Timeline/Deliverables
The panel should deliver its draft report within 12 months after the panel's first meeting or conference call. An additional 3-6 months is typically needed for partnership review, comment and approval.

Phase 6.0 BMP Verification Recommendations

The panel will utilize the Partnership approved *Wetland Workgroup's BMP Verification Guidance*[3] as the basis for developing BMP verification guidance recommendations that are specific to the BMPs being evaluated. The panel's verification guidance will provide relevant supplemental details and specific examples to provide the Partnership with recommended potential options for how jurisdictions and partners can verify recommended creation, enhancement and rehabilitation BMPs in accordance with the Partnership's approved guidance.

[3] http://www.chesapeakebay.net/documents/Appendix%20B%20Wetlands%20BMP%20verification%20guidance.pdf

Attachment 1: Table 1 – Data Source Characterization (source: BMP Protocol)

	High Quality	Medium Quality	Low Quality
Extent of Replication	Clearly documented and well-controlled past work that has since been replicated or strongly supported by the preponderance of other work; recent (< 5-year old) work that was clearly documented and conducted under well-controlled conditions and thus conducive to possible future replication	Clearly documented older (>5-yr old) work that has not yet been replicated or strongly supported by other studies, but which has also not been contraindicated or disputed	Work that was not clearly documented and cannot be reproduced, or older (>5-yr old) work for which results have been contraindicated or disputed by more recent results in peer-reviewed publication or by other studies that are at least equally well documented and reproducible
Applicability	Purpose/scope of research/publication matches information/data need	Limited application	Does not apply
Study location	Within Chesapeake Bay	Characteristic of CB, but outside of watershed	Outside of CB watershed and characteristics of study location not representative
Data collection & analysis methods	Approved state or federal methods used; statistically relevant	Other approved protocol and methods; analysis done but lacks significance testing	Methods not documented; insufficient data collected
Conclusions	Scientific method evident; conclusions supported by statistical analysis	Conclusions reasonable but not supported by data; inferences based on data	Inconclusive; insufficient evidence
References	Majority peer-review	Some peer-review	Minimal to none peer-review

Appendix A: Panel Charge and Statement of Work

Nontidal Wetland Rehabilitation, Enhancement and Creation BMP Expert Panel

The Center for Watershed Protection, Inc. (the Center) in partnership with The Nature Conservancy (TNC). submits the following scope of work to Virginia Tech to assemble an Expert Panel to evaluate the nutrient and sediment removal and runoff reduction benefits associated with nontidal wetland rehabilitation, enhancement and creation. This panel will build on work completed by the Wetland Panel (the 2016 Panel Report; CBP, 2016). The proposed scope and charge of the panel includes developing performance credits for the Creation, Rehabilitation and Enhancement of Wetlands in relation to the Chesapeake Bay Program (CBP)'s established total maximum daily loads (TMDLs) for nitrogen, phosphorus, and sediment.

The Center has extensive experience with the CBP Expert Panel Process, and have been directly involved in the previous (2015-2016) Wetland Expert Panel (WEP). The Center has also conducted comprehensive reviews of the literature on development impacts to wetlands, benefits and functions of wetlands and wetland buffers, as well as a review of federal and state policies on wetland protection through three cooperative agreements with EPA to integrate wetlands in watershed planning. A partnership with TNC will strengthen the Center's capacity to establish science-based performance metrics for the Bay Program. Through their leadership to the Wetlands Workgroup, TNC has extensive knowledge of and experience in working through CBP expert panel process. In addition, TNC brings strong experience in watershed modeling, wetland restoration, and research and monitoring of wetland function. Currently, TNC is working with partners including USDA NRCS and USFWS, to restore more than 3,000 acres of strategically targeted wetlands across the Delmarva Peninsula, and is collaborating with USGS to measure water storage and nutrient retention among enhanced floodplains along a major tributary to the Chesapeake Bay.

The proposed Expert Panel Chair, Membership, Scope of Work, and Timeline are provided below.

Expert Panel Chair:
Neely L. Law, PhD, Director of Education and Training at the Center for Watershed Protection, will chair the Expert Panel. Neely led the Chesapeake Bay Program (CBP) Expert Panels on Filter Strips/Stream Buffer Upgrades and Urban Tree Canopy, and participated on the Urban Nutrient Management, Enhanced Erosion and Sediment Control, Street Sweeping, Catch Basin and Storm Drain Cleaning Expert Panels, as well as the 2015-16 Wetland Panel. Neely was also a Sediment Reduction and Stream Restoration Coordinator for the CBP from 2012-2015. Her CV is provided as an attachment to this statement of work (SOW).

Expert Panel Membership:
Table 1 presents the individuals who have been invited to participate on the Expert Panel. These are recognized topic experts and have expertise in environmental and water quality related issues. Panelists who have indicated their commitment to serve on the Panel have provided letters of support, which are attachments to this scope of work. CVs for all invited Panelists are also provided as an attachment.

Table 1. Membership for Nontidal Wetland Rehabilitation, Enhancement and Creation BMP Expert Panel

Panelist	Affiliation	Area of Expertise	Status
Neely L. Law, PhD, Panel Chair	The Center for Watershed Protection	Water quality, BMPs, previous expert panel chair(s) and member	Confirmed
Kathleen Boomer, PhD	The Nature Conservancy	Wetland eco-hydrology, modeling and landscape ecology, previous wetland panel member	Confirmed
Jeanne Christie	Association of State Wetland Managers	Regulatory and state permitting programs, including wetland mitigation	Confirmed
Greg Noe, PhD	U.S. Geological Survey	Wetland hydrology, groundwater, landscape modeling, familiarity with CBP process	Confirmed
Erin MacLaughlin	Maryland DNR	Wetlands and water quality, previous wetland panel member	Confirmed

Solange Filoso, PhD	Chesapeake Biological Lab	Best management practice performance, ecosystem ecology, biogeochemistry	Confirmed
Denise Wardrop, PhD, PE	Penn State	Nutrients and wetlands, wetland assessment	Confirmed
Scott Jackson	University of Massachusetts	Wetland creation, wetland ecology, wetland assessment	Confirmed
Steve Strano	NRCS	Agriculture BMPs and Farm Bill programs, previous wetland panel member	Confirmed
Rob Roseen, PhD, PE, D.WRE	Waterstone Engineering	Nutrients and water quality, watershed management	Confirmed
Ralph Spagnolo	EPA Region 3	Permitting programs, wetland ecology and biology, previous wetland panel member	Confirmed

In addition to the topic experts, the Panel membership will include a representative from the CBP Watershed Technical Work Group (WTWG) and a representative from the CBP modeling team, to be assigned by the CBP. An additional regulatory support person will be provided by EPA Region III. All Panel members will be asked to disclose any potential conflicts of interest prior to serving on the Panel.

Scope of Work:
The specific tasks to accomplish the project objectives are described below.

Task 1. Assemble Expert Panel
The Center will work with the Panel Coordinator to finalize the charge, scope, and membership of the Panel. Recommendations will be available to the source sector Workgroups, the Water Quality Goal Implementation Team (GIT) Chair and Vice Chair, and the other GITs with direct interest in the WEP's findings, as well as the Scientific and Technical Advisory Committee (STAC), for their review and approval.

The Center will revise the Panel scope and charge and membership based on input from these various stakeholders and will contact approved panelists about moving forward. A brief description of the key Panel roles is provided below:

- Panel Coordinator: The Panel coordinator will provide logistical support (scheduling calls/meetings, operating webinar and conference lines, etc.) and strategic guidance on the expert panel process. He/she will also serve as liaison between the Expert Panel and the wider CBP partnership.
- Panel Chair: The Chair will be the chief strategist and panel lead. The Chair will work with the Coordinator and Panel members to assign specific tasks and ensure the Panel is on schedule. The Chair will use his/her expertise to facilitate productive technical discussions among the panelists. The Panel Chair and Panel members are responsible for developing the Expert Panel report that conforms in form and content with the *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model* (CBP BMP Protocol).
- Panel Members: The Expert Panel is responsible for following the specific charge of the Panel, as well as adhering to the BMP Protocol. Panelists will participate and offer their own unbiased expertise and best professional judgment throughout the process, and will perform assigned or voluntary tasks that assist the development of the final Panel report.
- Modeling Team Representative: The modeling team representative will serve as liaison between the CBP modeling team and the Expert Panel, relaying and responding to questions that the Panel has for the modeling team regarding the simulation or incorporation of the BMP(s) into Phase 6 of the CBP Watershed Model. He/she will also assist with the development of the Technical Appendix, which accompanies each Panel report.
- WTWG Representative: The WTWG representative serves as a Panel participant to offer his/her expertise with BMP tracking and reporting, which is crucial for the Panel's final report and the development of the Technical Appendix.
- EPA Region III Representative: This representative will serve as a resource for regulatory questions that may arise during the Panel's work.

In addition to these key Panel roles, the following staff will support this project:

- Kathleen Boomer, PhD, Watershed Scientist for The Nature Conservancy, will provide technical capacity for developing the literature review and synthesizing report materials. As both a voting panelist and a staff team member, Boomer can ensure that feedback from the full panel membership is captured and technical challenges throughout the project period are addressed. Boomer served on the previous Wetlands Expert Panel and co-authored the report, "Wetlands and Wetland Restoration: Recommendations of the Wetland Expert Panel for the incorporation of non-tidal wetland best management practices (BMPs) and land uses in the Phase 6 Chesapeake Bay Watershed Model." She will contribute her knowledge and apply her expertise in watershed modeling and wetland biogeochemistry to synthesize information contributed by the Panel and to help develop a conceptual framework that can be fully integrated with the CBP's watershed model.
- Bill Stack, Deputy Director of the Center will act as a technical reviewer for the Center. Bill is a professional engineer with more than 35 years of experience in water resources management. As the Sediment Reduction and Stream Restoration Coordinator for the CBP from 2012-2015, Bill co-led the Expert Panel on Stream Restoration, led the development of revised recommendations on Stream Restoration for the "test drive period," chaired the Urban Shoreline Erosion Control Expert Panel, and participated on the Urban Stormwater Retrofits and Nutrient Discharges from Grey Infrastructure Expert Panels. He also chaired the Impervious Disconnection Expert Panel.
- Lisa Fraley-McNeal and Deb Caraco of the Center will provide technical assistance with literature review and synthesis, and statistical and GIS analysis.

Task 2. Literature Review and Synthesis

The proposed Expert Panel will build upon the findings and recommendations provided by the most recently published WEP report (2016). The report highlighted the importance of wetland type and watershed condition as primary controls of wetland water quality functions and presented a framework to evaluate wetland water quality benefits based on hydrogeologic and hydrogeomorphic settings. The recommendations have been adopted by the CBP mainly to account for water quality benefits associated with restoring prior converted wetlands (i.e., wetlands that were converted from a non-agricultural use to production of a commodity crop prior to December 23, 1985). Due to time constraints imposed by the CBP 2017 Mid-Point Assessment, the 2016 WEP requested that a future panel expand the science-based framework to relativize estimated water quality benefits across a broader range of wetland condition and wetland BMPs. Accordingly, the proposed WEP will build upon the current literature review 1) to evaluate and compare water quality benefits associated with rehabilitated, enhanced, and created wetlands, as well as natural, intact wetlands to provide comparability amongst different wetland conditions; and 2) to inform a crediting framework and resultant methods that best align with the scientific reporting and professional understanding of wetland functions.

The Expert Panel chair will coordinate a review and synthesis of the literature, including the 2016 WEP report, peer-reviewed publications and technical reports, and "gray" literature to address the following research questions:

1) *How do rehabilitated, enhanced, and created wetland water quality functions differ from those of restored wetlands?*
2) *How do rehabilitated, enhanced, created, and restored wetland water quality functions compare with those of intact, natural wetlands? Importantly, the findings will be evaluated using the current CBP adopted framework, specifically with consideration to hydrogeologic and geomorphic setting (i.e., physiographic province, watershed position, watershed condition, and climate).*
3) *To what extent have the water quality benefits of wetland rehabilitation or enhancement been directly documented?*
4) *What are critical research opportunities (i.e., knowledge gaps) essential to predicting wetland function at a local and regional scale, based on condition, location, and climate trends?*

These questions are in addition to the elements listed in the BMP Protocol and the Charge provided to the Panel by the Wetland Workgroup. The above questions provide additional guidance for the literature review for the Panel members to assess the nutrient and sediment functions of the BMPs.

Importantly, the proposed WEP will build upon work by the previous expert panel to provide improved clarity for wetland BMP function and their associated nutrient and sediment reduction benefits with associated qualifications to receive credit. To do so, similar to the past WEP, a conceptual framework to quantify the benefits of wetland BMPs will be created leveraging knowledge from past work of Jordan et al (2007) used in the Phase 5.3.2 model, but modified for wetland restoration, along with frameworks that provided a way to categorize wetland performance (e.g. by hydrogeomorphic classification). Further, the WEP will consider findings and recommendations provided by previous expert panels related to the current panel charge. For example, the proposed WEP will consider a report developed by a CBP Stream Restoration Expert Panel (2013) and a STAC workshop report that provided a comprehensive review of nutrient reduction rates associated with wetland restoration projects in rural areas (CBP, 2008). Most of the research reviewed in these previous reports focused on restored wetlands that received stormflow and in some cases groundwater, as opposed to engineered or created wetlands.

Task 3. Panel Meetings

The Panel Chair will facilitate productive technical discussions among the panelists by convening up to twelve WEP meetings, including a stakeholder forum. At least two and as many as three meetings will be organized as in-person meetings and held in the Annapolis-Baltimore area, including an early introductory stakeholder meeting (meeting #2), and a mid-point assessment meeting (meeting #6). If needed, a third in-person meeting may be organized to finalize a summary of findings and recommendations (meeting #11 or 12). The remaining (nine or ten) meetings will be held by telephone conference. At least one WEP meeting will be dedicated to review/discussion of the literature review results and one meeting will be centered around preliminary (strawman) recommendations for developing effectiveness estimates. All meetings will be shared through Webex or a similar platform to ensure full participation by distant panel members. Panel members may also participate in up to two meetings in-person as the travel expenses allow. The Panel Chair will prepare materials for presentation at each Panel meeting to highlight key discussion questions, identify critical decisions, summarize outcomes, and confirm task assignments.

The second Panel meeting will be dedicated to an open stakeholder forum where interested parties, other than the Expert Panel members, can share and present scientific data with the Panel members. The intent is to provide an open exchange of information that may help inform the Panel as it moves forward with its deliberations. Working with the Panel Coordinator, the Center will co-lead the Forum, which will be a half day meeting to be held at the CBP in Annapolis. At this meeting, the Panel Chair will present the charge of the Panel and will solicit feedback from attendees on specific issues to address with the Panel and relevant resources and research. The first part of the meeting will be open to stakeholders and the second part will constitute just the Panel members.

Efficiently approaching the panel meetings will be paramount for this panel, since the panel is tasked with quantifying the benefits of three practices (Wetland Rehabilitation, Wetland Enhancement, and Wetland Creation), which will likely have different benefits depending on the region in which they are implemented and their location (i.e., floodplain versus upland). Consequently, the first Panel meeting will focus on practice definitions and other overarching issues that the Panel will address throughout the project period. Specific items in the first meeting will include the following:

1) *Are current definitions of wetland BMPs adequate for assessing local and cumulative water quality benefits within the CBP watershed modeling framework (e.g., what is the distinction between Wetland Rehabilitation and Wetland Enhancement)?* Notes from the 2015-16 Panel discussed differences between these two practices, and there was some discussion of possibly combining them. The Expert Panel will explore the range of definitions and decide how best to describe different wetland types and conditions in the context of the Bay model and the TMDL accounting framework. The panel will be asked to address this question early in the process, because this decision will help guide both the Literature Review and the Panel process.
2) *How should we account for functional differences between Created versus Restored and Natural Wetlands?* This question will be a major focus on the literature review, and the Expert Panel will provide early guidance to inform this research.

3) *Should the same geophysical regions defined in the 2016 Panel Report be used by this Expert Panel?* The 2016 Panel Report defined nine Physiographic Subregions to refine the estimated nutrient reduction of wetlands. The Panel members will review these subregions and determine their applicability as part the BMP recommendations, recognizing modifications to the classifications would be limited to aggregation.
4) *Should the Expert Panel Report address the Wetland Restoration Credit Recommendations?* Currently, water quality benefits of existing wetlands are reflected through low pollutant loading rates also assigned to forested land use; no additional retention benefits are considered. In contrast, wetland restoration BMPs are assigned the same low loading rate, plus an additional coefficient is applied to reflect the unique capacity of restored wetlands to provide water quality benefits. The 2016 WEP raised concerns that this results in an unequal accounting framework that may lead to a disincentive for wetland preservation and conservation; however, the available time did not allow for development of a more equitable framework. While the Expert Panel scope will not explicitly revisit the restoration wetland credit, recommendations resulting from the three other wetland BMPs may require Panel recommendations for future updates to the CBWM to ensure there is consistency, or alignment, or relative comparability with the nutrient and sediment reduction benefits.
5) *What recent research could better inform the work of the Expert Panel?* This discussion will be used to identify speakers for the second panel meeting.

Task 4. Develop Report

Based on their findings, in part supported by expanding the WEP 2016 literature review, the proposed WEP will provide recommendations for improving upon the CBP modeling and accounting framework. The final report will include all the required elements described in the *Protocol for the Development, Review and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*.

Task 5. Approval Process

The Panel Chair will work with the Panel Coordinator to go through the CBP review and approval process. This will involve presenting the draft recommendations to the Wetlands Work Group (WWG), WTWG and the WQGIT and addressing and responding to any comments received during the comment period. The budget and schedule assume only one meeting with each workgroup plus two additional meetings with the Modeling Team if needed. Any additional meetings would be subject to additional expenses and an extension of the timeline. The Chair will seek the Panel's input in the event that significant comments are made, or major revisions are requested, as the report is reviewed by the CBP partnership. 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, as appropriate.

Project Timeline:

The project will be completed over an 18-month timeframe as shown in Table 2. Month 1 represents September 2017 if the Wetland Workgroup approves the panel membership following partnership review and feedback.

Table 2. Project Timeline

Task	Key Deliverables	Completion Date (Months from Award)
Task 1. Assemble Panel	Final panel charge and membership	Month 1
Task 2. Literature Review and Synthesis	Draft tabularized summary of research studies studying retention benefits of rehabilitated, enhanced, created, and natural wetlands.	Month 4
Task 3. Panel Meetings	1st WEP meeting - prioritize panel questions 2nd WEP meeting - stakeholder forum 3rd WEP meeting - define panel strategies, tasks 4th WEP meeting - review lit review updates 5th WEP meeting - review panel contributions	Month 2 Month 3 Month 4 Month 5 Month 6

Table 2. Project Timeline		
Task	**Key Deliverables**	**Completion Date (Months from Award)**
	6th WEP meeting - midpoint assessment 7th WEP meeting - adjust strategies, as needed 8th WEP meeting - review panel contributions 9th WEP meeting - discuss preliminary findings 10th WEP meeting - outline final report 11th WEP meeting - review remaining report tasks 12th WEP meeting - approve draft WEP report Minutes from the Panel meetings	Month 7 Month 8 Month 9 Month 10 Month 11 Month 12 Month 14 Months 2-14
Task 4. Develop Report	Complete technical review and editing of draft WEP report, including finalized tabular summary of published wetland studies.	Month 13
Task 5. Approval Process	Review and approval by WWG Review and approval by WTWG Review and approval by WQ GIT Final approved report with recommendations	Month 15 Month 16 Month 17 Month 18

References:

Chesapeake Bay Program (CBP). 2008. STAC Responsive Workshop: Quantifying the role of wetlands in achieving nutrient and sediment reductions in Chesapeake Bay. Annapolis, MD. STAC Publication 08-006.

Chesapeake Bay Program (CBP). 2016. Wetlands and Wetland Restoration; Recommendations of the wetland expert panel for the incorporation of non-tidal wetland best management practices (BMPs) and land uses in the Phase 6 Chesapeake Bay Watershed Model. Annapolis, MD. CBP/TRS-314-16.

Jordan, T. 2007. Wetland restoration and creation best management practice (agricultural). Definition of nutrient and sediment reduction efficiencies for use in calibration of the phase 5.0 Chesapeake Bay Program Watershed Model. Smithsonian Environmental Research Center. Edgewater, MD.