Chesapeake Bay TMDL Midpoint Assessment and Watershed Implementation Plan Support Contract

Contract Summary and CBP Task Leads Prepared for the
Chesapeake Bay Program Partnership's
Water Quality Goal Implementation Team
June 13, 2013

BACKGROUND

EPA has recently awarded a new 5-year Bay TMDL/WIP implementation support contract to Tetra Tech. This contract, be managed out of the Chesapeake Bay Program Office in Annapolis, replaces the prior Tetra Tech contract put in place back in 2008 to support development of the Bay TMDL and WIP and managed out of the Region 3 office in Philadelphia.

CURRENT STATUS

This contract has been specifically structured to provide direct support to the priority work of the Partnership through the Water Quality Goal Implementation Team and its technical workgroups. Other Goal Implementation Teams can also seek contractor support for work on BMP expert panels working through the WQGIT.

To ensure effective and efficient use of these contractor resources and the allocated EPA funds to support the work, CBPO technical lead(s) has been assigned to each task as the Partnership's point(s) of contact for work on that task. We have also assigned Partnership leads for each task to work with the technical leads on prioritizing work under that task, as needed, and for reviewing the resultant work products and deliverables.

Our jurisdictional partners can access the contract to support implementation of their respective watershed implementation plans, through Task 4, using funds awarded through their Chesapeake Bay Regulatory and Accountability Grants. EPA will work with each jurisdictional partner to develop specific technical direction to support their requested work.

KEY POINTS OF CONTACT

Tim Roberts has responsibility for all contract administration related actions and tasks, working directly with the EPA contract officer. This includes issuing all technical direction of the contractor.

Lucinda Power has the overall programmatic responsibility for the use of the contract by the Partnership, working directly with each of the assigned CBPO technical leads. She is the partnership's go to person if a need or concern can't be resolved working with the appropriate CBPO technical lead for a task.

FISCAL YEAR 2013 FUNDING LEVELS BY TASK

Once the Chesapeake Bay Program Office receives its final FY2013 budget, the WQGIT will be informed about the funds allocated by task. Please note that EPA is not allocating funds for Task 4: Support Implementation of the Jurisdictions' Watershed Implementation Plans (WIPs). Funds for supporting work under that task need to be provided by the jurisdiction from their Chesapeake Bay Regulatory and Accountability Grant.

Chesapeake Bay TMDL Midpoint Assessment and Watershed Implementation Plan Support Contract

Annotated Performance Work Statement

Contractor: Tetra Tech

Contract Period: May 2013 through March 2018

Task Order Project Officer (TOPO): Tim Roberts, U.S. EPA Chesapeake Bay Program Office, 410-267-5772, roberts.timothy-p@epa.gov

CBP Partners' Point of Contact: Lucinda Power, U.S. EPA Chesapeake Bay Program Office, 410-267-5722, power.lucinda@epa.gov

Background

Leading up to 2017, the Chesapeake Bay Total Maximum Daily Load (TMDL) calls for an assessment to review progress toward meeting the nutrient and sediment pollutant load reductions identified in the 2010 Chesapeake Bay TMDL and the seven watershed jurisdictions' Phase I and Phase II Watershed Implementation Plans (WIPs). The seven watershed jurisdictions are Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia. This was designed as a mid-course check on progress to allow necessary adjustments in strategies to ensure that the Chesapeake Bay Program Partnership (Partnership) could achieve its 2025 goals for putting the necessary practices in place to restore Chesapeake Bay water quality to levels achieving water quality standards. The U.S. Environmental Protection Agency (EPA) is seeking contractor assistance with the tasks described below to support work on the midpoint assessment and also support local partners in deciding how to cost-effectively implement the pollutant load reductions called for in their jurisdiction's WIPs.

Objectives

The Bay TMDL 2017 midpoint assessment has three primary objectives: 1) to gather input from the Partnership on issues and priorities for both this 2017 review as well as the post-2017 period; 2) for EPA to continue its oversight role on the implementation of the Bay TMDL and determine if the 2017 interim goal of the Bay TMDL is on track; and 3) to assist in determining what changes should be considered as the Partnership moves from the 2017 midpoint and focus on implementation of the jurisdictions' Phase III WIPs and meeting the 2025 TMDL goal.

EPA, the seven watershed jurisdictions, along with their federal agency partners, will also continue to monitor progress towards meeting the TMDL load reductions utilizing the existing accountability framework. This accountability framework, described within the Chesapeake Bay TMDL (see Section K, "References") includes the jurisdictions' WIPs, two-year milestones by jurisdictions and federal agencies, annual progress reporting and tracking, and federal actions, if needed. As part of this effort, the Partnership will need to continue to review how to simulate the nutrient and sediment controls associated with various best management practices (BMPs) using the Chesapeake Bay Program modeling tools. The Chesapeake Bay Program's (CBP's) Water Quality Goal Implementation Team (WQGIT)

and its workgroups have and will continue to convene a series of expert panels to conduct these reviews and develop recommendations.

Task 1: Kickoff Meeting, Reporting, and Communication

CBPO Programmatic Leads: Tim Roberts, Lucinda Power
CBP Partnership Lead: WQGIT

The contractor shall participate in a Kickoff Meeting with the TOPO either in person or via conference call to discuss the following: points of contact, roles and responsibilities, timelines, the schedule of benchmarks, milestones and deliverables, establish dates and times for monthly calls and quarterly technical progress reports, and general Task Order administrative information. The technical progress reports shall include status updates of all of the tasks of this PWS.

The TOPO will coordinate and set-up monthly working calls between EPA staff and the contractor's technical lead to discuss the status and progress of the work under this Task Order. The contractor shall participate in these monthly calls. The frequency of the monthly conference calls may be modified based on project status at the request of the contractor and only as approved by EPA.

The contractor shall notify the TOPO of any problems, delays or questions as soon as they arise, including immediate written notification of any Task Order delays. The contractor shall provide a written monthly status report in accordance with contract requirements which will be used for invoice review purposes.

Task 2: Support for Developing New and Evaluating Existing Source Sector-Based Best Management Practices Efficiencies and Verification of Practice Implementation

CBPO Technical Leads: Mark Dubin, Tom Schueler, Ning Zhou, Sally Claggett, Matt Johnston, Jennifer Greiner
CBP Partnership Leads: WQGIT's Agriculture, Urban Stormwater, Wastewater Treatment, and Forestry, and Watershed Technical workgroups; Habitat GIT's Wetlands and Stream Restoration workgroups

EPA requires assistance in developing the technical basis for nitrogen, phosphorus, and sediment load reduction efficiencies for new or existing best management practices (BMPs), treatments, or technologies applied to agricultural, forested, developed, wetlands, flood plains, and streamside lands, onsite septic systems, tidal shorelines and near shore environments within the Chesapeake Bay watershed. The contractor shall follow the priority lists of BMPs established by the CBP's WQGIT's source sector and technical workgroups — agriculture, stormwater, wastewater, and forestry, and watershed technical workgroups, as well as the Partnership's other Goal Implementation Teams (GITs) that are involved in this process (i.e., Fisheries GIT, Habitats GIT, and Healthy Watersheds GIT).

The contractor shall follow the CBP's WQGIT's approved protocols and procedures for the evaluation, through expert review panels, of the underlining technical data and information leading to development of approved BMP definitions and efficiencies for use in the CBP models, decision support tools, and accountability tools. The contractor shall support the

convening, staffing, and generation of technical analyses, reviews, and syntheses for the expert panels. The contractor shall provide for very specialized expertise and experts as requested by the expert panels; however, this will not require peer review.

The contractor shall assist EPA in identifying and evaluating different approaches to verifying that tracked and reported conservation practices/BMPs, treatments, and technologies have actually been implemented on the ground. The contractor shall assist in: 1) conducting a regional and national review of existing examples/methodologies for verifying tracked and reported data; 2) evaluating what factors/key components led the respective community to accept (or reject) the verification approach; and 3) evaluating whether and, if so, how these accepted methodologies could be applied to similar situations within the Chesapeake Bay watershed.

EPA will provide the prioritized list of BMPs which the contractor shall follow. For each prioritized CBP BMP/treatments/technologies or set of related BMPs/treatments/technologies identified by the CBP's WQGIT and its associated source sector, technical and land use workgroups, the contractor shall carry out the following tasks. This list is not all inclusive:

- Research, evaluate, and develop recommendations of definitions and effectiveness values for prioritized CBP BMP identified by the CBP's WQGIT and its associated source sector workgroups based on the 2010 partnership approved "*Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*", aka the "BMP Protocol" (see http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3).
- Coordinate with the CBP's WQGIT and the appropriate sector, technical, and land use workgroup(s) to convene expert review panels (at least one and no more than six each base and option period) to develop recommendations of BMP definitions, effectiveness values, tracking, verification, and reporting procedures for approval as required under the BMP Protocol process. As part of this coordination, the contractor shall convene these expert review panels and secure the necessary external experts (approximately 8-10 experts per panel). EPA anticipates two to three in-person meetings per panel each located in any Bay watershed jurisdiction, for a total of two to 18 in-person meetings per year.
- Research, evaluate, and develop scientifically defensible definitions as determined by CBP's WQGIT, nutrient and sediment reduction effectiveness values, model simulation approaches, and tracking, verification, and reporting methods through collection of technical and modeling information, scientific literature searches, and interviews/surveys.
- Compile all available information for each BMP identified by the expert review panel for recommendation, and assist the panel in developing practice definitions, effectiveness values, tracking, verification, and reporting procedures.
- Participate in respective source workgroup, watershed technical workgroup, land use workgroup, and CBP's WQGIT and other GIT meetings and conference calls during the project when invited to provide project status reports and communicate on initial findings for partnership input during the development process.
- Development of a report for each prioritized BMP/set of BMPs which fully documents the completed and approved BMP evaluations. The report shall provide documentation of the research, evaluation, and approval processes, including final definitions, effectiveness values, and recommended tracking, reporting and verification procedures for each practice. The annual documentation report shall

include the following 26 elements, where appropriate, for each BMP evaluated and approved by the Partnership under the BMP Protocol:

1. Identity the expertise of panel members.
2. Land use or practice name/title.
3. Detailed definition of the land use or practice.
4. Recommended nitrogen, phosphorus, and sediment loading or effectiveness estimates (including discussion which may include alternative modeling approaches, if appropriate to application of the recommended effectiveness estimate).
5. Justification for the selected effectiveness estimates or loading rates, including a list of references used and comparisons to relevant practices and land use loading rates in the respective source sector and in other source sectors.
6. Detailed discussion of how each reference was considered.
7. Land use(s) to which the practice is applied.
8. Load sources that the practice will address and potential interactions with other practices.
9. Description of pre-practice and post-practice circumstances, including the baseline conditions for individual practices.
10. Conditions under which the practice works: include conditions where the practice will not work, or will be less effective.
11. Any variations in practice effectiveness/practice values across the watershed due to climate, hydrogeomorphic region, soils, or other measureable factors.
12. Any variations in practice effectiveness/practice value due to design or landscape position (e.g., crop type upslope of riparian buffers, buffer width, canopy and understory species composition, age, etc.)
13. Temporal performance of the practice including lag times between establishment and full functioning (if applicable).
14. Unit of measure (e.g., feet, acres).
15. Locations within the Chesapeake Bay watershed where this practice is applicable.
16. Useful life; effectiveness of the practice over time.
17. Identify if the practice is a cumulative or annual practice.
18. Description of how the practice will be tracked, verified, and reported: include a clear indication of how this practice will be used and reported by jurisdictions.
19. Identification of any ancillary benefits (e.g., ecosystem services) or unintended consequences beyond impacts on nitrogen, phosphorus, and sediment pollutant loads.
20. Suggestion for a re-evaluation timeline — when will sufficient additional new information be available that may warrant a re-evaluation of the effectiveness or load estimate.
21. Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any.
22. Identification of all operation and maintenance requirements and how neglect alters practice performance.
23. Include negative results: where studies with negative pollution reduction data are found (i.e., the practice acted as a source of pollutants) and address how they were considered along with all other data.

24. 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.
25. Address data applicability — determining which data should be used to develop loading and effectiveness estimates is critical. In considering each source of data, provide a description, as appropriate, on how much influence each data source should have on the final estimate.
26. Documentation of review process — include a comprehensive narrative summary of review process addressing the specific Chesapeake Bay Program workgroups, teams and committees involved, independent peer reviewers, and URL links to the calendar entries of the respective meetings/conference calls posted on the CBP Partnership's web site at http://www.chesapeakebay.net.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the specific scope of the technical support identified above. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue written technical direction, which will be the sole basis for the contractor to incur billable costs.

Task 2 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

1. Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.
2. Provide immediate written notification to the TOPO of any delays in completing any activities under this task.
3. Coordinate with the TOPO to convene expert review panels and secure necessary external experts.
4. Compile all data, findings, and recommendations from each expert review panel into a concise written report, as described above, in a consistent format which facilitates review by the appropriate source sector workgroups, the Watershed Technical Workgroup, and approval by the CBP's WQGIT. A draft shall be provided to the TOPO within 45 days following the last BMP expert panel meeting for the identified priority BMPs. The contractor shall furnish a final product incorporating the TOPO's comments within seven days of receiving the TOPO's comments.
5. Compile an annual report by December 1 of each year based on the BMP Protocol requirements that documents completed and approved BMP project evaluations during the reporting period.

Task 3: Support for Developing New Pollutant Loading Estimates, Modeling Input Data, and Other Modeling Related Data and Information Needs

CBPO Technical Leads: Gary Shenk, Peter Claggett, Matt Johnston
CBP Partnership Leads: STAR Modeling Workgroup, WQGIT's Land Use and Watershed Technical workgroups

EPA requires assistance in developing the technical basis for determining nitrogen, phosphorus, and sediment loading rates from the array agricultural, forested, developed, flood plain, and streamside land uses present within the Chesapeake Bay watershed as well as other modeling input and related data and information needs. The contractor shall follow the priority land uses established by the CBP's WQGIT's Land Use Workgroup and overall modeling priorities established by the CBP's WQGIT.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the specific the scope of the technical support identified below. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue technical direction, which will be the sole basis for the contractor to incur billable costs.

EPA will provide the prioritized list of needs for the development of pollutant loading estimates, model input data and other modeling-related data, and information needs for which the contractor shall follow. For each prioritized need identified by the CBP's WQGIT and its associated land use, source sector, and technical workgroups, the contractor shall carry out the following tasks. This list is not all inclusive:

- Consult with the CBP's WQGIT, the Land Use Workgroup, Watershed Technical Workgroup, and the source sector workgroups on priority needs for further review and refinement of existing or development of new loading estimates, model data inputs, or other modeling related data and information needs. The contractor shall anticipate attending six to eight in-person CBP Partnership meetings under this task in each base and option period. These meetings will principally be located in Annapolis, Md., but they may be located in any of the seven watershed jurisdictions.
- Coordinate with the TOPO to convene expert review panels and secure necessary external experts (approximately 8-10 expert per panel) to develop recommendations to address the identified priorities needs. The contractor shall expect at least one and no more than four expert panels per base and option period. The contractor shall anticipate attending two to three in-person meetings for each panel (two to 12 total), meetings will principally be located in Annapolis, Md., but they may be located in any of the seven watershed jurisdictions.
- Follow the CBP's WQGIT's approved protocols and procedures for the evaluation, through expert review panels, of the underlining technical data and information leading to the development of approved land use pollutant loading rates and other input data and information for use in the Partnership's models and other decision support and accountability tools.
- Support the convening, staffing, and generation of technical analyses, reviews, and syntheses for the expert panels.
- Research key peer-reviewed research studies that examine the loading rates of land uses. The contractor shall provide a detailed description of data resulting from an

analysis of key peer-reviewed research studies that examine the loading rates of land uses.

- Provide for very specialized expertise and experts as requested by the expert panels, for example, spatial statistical support and expertise in developing land use estimates through sampling.
- Present the findings to the Land Use Workgroup, the Watershed Technical Workgroup, the appropriate source sector workgroups, the CBP's WQGIT, and other GITs, as appropriate, for review, feedback, and approval.

Task 3 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

(1) Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.
(2) Provide immediate written notification to the TOPO of any delays in completing any activities under this task.
(3) Research key peer-reviewed research studies that examine the loading rates of land uses.
    a. Furnish a written list of the key peer-reviewed research studies identified by the contractor to the TOPO by September 1 of each year.
    b. Upon approval of the identified research studies by the TOPO, the contractor shall furnish a written draft report by October 1 of each year.
    c. Furnish a written final report based on the TOPO's comments by December 1 of each year.
(4) Consult with the CBP's WQGIT, the Land Use Workgroup, Watershed Technical Workgroup, and the source sector workgroups at least annually on priority needs for further review and refinement of existing or development of new loading estimates, model data inputs, or other modeling related data and information needs.
(5) Consult with the TOPO prior to convening the expert review panels.
(6) Coordinate with the TOPO to convene expert review panels and secure necessary external experts to develop recommendations to address the identified priorities needs.
(7) Compile all data, findings, and recommendations from each convened expert review panel into a concise report, as described above, in a consistent format which facilitates review by the Land Use Workgroup, the appropriate source sector workgroups, and the Watershed Technical Workgroup, and approval by the CBP's WQGIT and other GITs as appropriate. A draft shall be provided to the TOPO within 45 days following the last expert panel meeting for each of the identified set of new loading estimates, model input data, or other modeling related data and information needs. The contractor shall furnish a final product incorporating the TOPO's comments within seven days of receiving the TOPO's comments.
(8) Compile an annual report by January 31 of each year that documents completed and approved set of land use loading rates, modeling input data, or other modeling related data and information need during the reporting period. The report shall provide documentation of the research, evaluation, and approval processes for each set of land use loading rates, model input data, or other modeling related data and information.

Task 4: Support Implementation of the Jurisdictions' Watershed Implementation Plans (WIPs)

CBPO Technical Lead: Lucinda Power
CBP Partnership Leads: Delaware, District of Columbia, Maryland, Pennsylvania, New York, Virginia, West Virginia

The contractor shall support EPA in assisting the seven jurisdictions with implementation of their Phase II WIPs and development of their Phase III WIPs. The work will require support, to be requested by the TOPO, for the following activities, with the specific activities dependent on the nature of the requests received by EPA throughout the base year and each option period from each of the seven jurisdictional partners. This list is not all inclusive.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the specific jurisdiction, and the scope of the technical support identified below. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue technical direction, which will be the sole basis for the contractor to incur billable costs.

It is anticipated that support shall be provided to states simultaneously or iteratively rather than in a stepwise fashion throughout each term of the period of performance. All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall provide the following support to the seven watershed jurisdictions, but not limited to:

- Evaluate new and emerging BMPs and technologies for implementation feasibility.
- Support engagement with federal facilities to better integrate their activities and commitments into the jurisdictions' WIPs.
- Develop tools and databases for tracking, verifying and reporting on BMPs.
- Review historical data and entering new data into BMP tracking and reporting systems and eliminating data no longer relevant.
- Provide staff and facilitation support for engagement of localities and local partners in WIP implementation, as well as for meetings with stakeholder groups. The contractor shall expect to attend in-person meetings in any of the seven jurisdictions. EPA anticipates zero to four in-person meetings in each jurisdiction each base and option period (one to 28 in-person meetings total in each base and option period). The number of meetings in each base and option period will be dependent on the need of the jurisdictions.
- Provide training to local partners on use and local application CBP Partnership models and decision support tools.
- Support development of the jurisdictions' Phase III WIPs.
- Support development of the jurisdictions' two-year milestones.
- Support running management scenarios through the CBP Partnership's models and decision support tools and analysis of the resultant outputs.
- Design explicit strategies to engage local entities at a small scale.
- Create several options and constructs for TMDL implementation at the local scale.
- Data analysis to support local TMDL implementation.
- Research local ordinances and laws within the seven Chesapeake Bay jurisdictions to provide models for best practices.

- Review existing ordinances and evaluate drivers of land use.
- Evaluate the effectiveness of management activities and controls.
- Support development of scenarios for evaluating different local target loads.
- Furnish technical assistance in evaluating county level/conservation district/local watershed level strategies for reducing nutrient and sediment loads.
- Develop tools for supporting decision making on selection of the most cost effective, load reduction efficient practices, treatment, and technologies.
- Development of systems to track, organize and consolidate public comments.
- Support pilot studies for evaluating how to best develop more local allocations and how to engage local municipalities in WIP implementation.
- Develop/update databases and GIS layers of regulated and non-regulated sources, locations, and loads of nutrient and sediment pollution.
- Conduct cost effective and efficiency analyses of existing, proposed, and potential federal, state, regional, and local agency programs and policies directing implementation of nutrient and sediment load reduction practices and technologies with an emphasis on nonpoint sources.
- Identify regulatory, financial, policy gaps and evaluate capacity of existing infrastructure necessary to support sustained implementation at the levels called for within the jurisdictions' respective WIPs and two-year milestones.
- Evaluate how federal, state, regional, and local governmental partner agencies, non-governmental organizations, and stakeholders have committed to offsetting the growth in nutrient and sediment loads due to continued growth and development in the watershed.
- Provide expertise and experts in program analysis, work model/work flow analysis, and financing necessary to systematically identify, understand, and determine how to overcome barriers to achieving higher levels of programmatic implementation consistent with implementation rates called for in the jurisdictions' WIPs and two-year milestones.

Task 4 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

(1) Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.
(2) Provide immediate written notification to the TOPO of any delays in completing any activities under this task.
(3) Provide draft products (e.g. documents, databases) to the TOPO as delineated in written technical directions furnished by the TOPO. After EPA review and vetting of each draft product, the TOPO will provide written comments to the contractor. The contractor shall incorporate the comments from the TOPO and provide the revised draft to the TOPO within the timeframe specified in the written technical direction.
(4) Provide the TOPO with annual written documentation and compilation of products produced for the seven watershed jurisdictions under this task by January 31 of each year. This documentation shall include all products produced through December 31 of the previous year.

(5) Provide the TOPO with documentation of support provided to the jurisdictions in development of their Phase III WIPs by December 1, 2017.

Task 5: Technical Support for Development and Application of Decision Support Tools

CBPO Technical Leads: Gary Shenk, Jeff Sweeney, Matt Johnston
CBP Partnership Leads: STAR Modeling Workgroup, WQGIT Watershed Technical Workgroup

The Phase 5.3.2 Chesapeake Bay Watershed Model is an application of the Hydrologic Simulation Program-Fortran (HSPF) based on a segmentation scheme which divides the Chesapeake Bay watershed into approximately 1,000 segments/subbasins, with the average size about 64 square miles. The Watershed Model simulates loading and transport of nitrogen, phosphorus, and sediment loads from pollutant sources throughout the Bay watershed and provides estimates of watershed nitrogen, phosphorus, and sediment loads resulting from various management scenarios. The Bay Watershed Model currently simulates the 21-year period of 1984–2005 on a one-hour time step. Nutrient inputs from manure, fertilizers, and atmospheric deposition are based on an annual time series using a mass balance of U.S. Census of Agriculture animal populations and crops, records of fertilizer sales, and other data sources. BMPs are incorporated on an annual time step and nutrient and sediment reduction efficiencies are varied by the size of storms. Municipal and industrial wastewater treatment and discharging facilities and onsite wastewater treatment systems' nitrogen, phosphorus, and sediment contributions are also included in the Bay Watershed Model.

Scenario Builder is a standalone data pre-processor for the Phase 5.3.2 Chesapeake Bay Watershed Model. It is designed to track the land use-related nutrient processes for the multiple land use-related sources in the Bay watershed and to facilitate parameterization of those sources for watershed model scenarios to be run through the Bay Watershed Model. Scenario Builder generates information that is used to simulate loads related to animal production areas, manure storage, application of manure and fertilizers, septic inputs, plant growth/uptake, and BMP implementation.

The Chesapeake Assessment and Scenario Tool (CAST) is a web-based tool used by the CBP jurisdictional, regional, and local partners to rapidly develop scenarios for the CBP's Scenario Builder and Watershed Model. The tools are designed to engage local jurisdictions such as counties, municipalities, Planning District Commissions, Soil and Water Conservation Districts, and watershed groups in the BMP implementation planning process. These tools facilitate transparency, consistency and communication between the state and local governments and the CBP. MAST and VAST are the Maryland and Virginia-specific versions of CAST, respectively.

Information generated using the CAST, MAST, or VAST tools may be input directly into Scenario Builder, saving time and effort for the modeling team. The tools also approximate the output of the Watershed Model in terms of edge-of-stream and delivered loads to land river segments. These data can help users of the tools to target practices to the most effective location and identify the practices that will have the most impact. Enhancement and maintenance of these tools is required to continue to support the seven CBP Partnership

watershed jurisdictions' and the local planners' planning for and implementation of the Chesapeake Bay TMDL.

The contractor shall provide specialized technical support for continued enhancement and evolution of this suite of tools to meet the Partnership's objectives under the Chesapeake Bay TMDL midpoint assessment. The contractor shall support knowledge transfer to the technical staff at the Chesapeake Bay Program Office in Annapolis, Maryland, and the Water Protection Division in Philadelphia, Pennsylvania.

The contractor shall:

- Assist EPA in working with state and other partners to respond to jurisdiction requests for new and interim BMPs.
- Build these requests into the CBP Partnership's modeling tools.
- Analyze and troubleshoot states' concerns about Scenario Builder inputs and outputs.
- Provide input to EPA in responding to state requests to modify Scenario Builder and CAST/MAST/VAST, documenting changes and updates to Scenario Builder and CAST/MAST/VAST.
- Aid in the transfer of the Scenario Builder and CAST/MAST/VAST technology to the partners.
- Travel to CBPO in Annapolis, Md., periodically for in-person meetings when needed. There will likely be three to four in-person meetings in each base and option period.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the scope of the technical support identified above and below. It is anticipated that support on this suite of tools shall be provided simultaneously or iteratively rather than in a stepwise fashion throughout each term of the period of performance. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue technical direction, which will be the sole basis for the contractor to incur billable costs.

The contractor shall carry out the following activities for each model below, recognizing much of this work is interrelated and interconnected between more than one modeling tool, decision support tool, BMP tracking, verification, and reporting system, and accountability tool. This list is not all inclusive.

<u>Watershed Model</u>

- Support ongoing development of and periodic updates to web publication of detailed watershed model documentation.
- Consult with the WQGIT, the Land Use Workgroup, the Watershed Technical Workgroup, and source sector workgroups on priority needs for further review and refinement of existing or development of new loading estimates, model input data, or other watershed modeling needs.
- As described under Task 3, coordinate with the TOPO to convene expert review panels to develop recommendations to address the identified priorities needs. All of the work under this activity is covered by the expert review panels activities under Task 3.

- Support efforts to ensure Bay Watershed Model consistency with the Scenario Builder and CAST/MAST/VAST tools.

Scenario Builder and CAST/MAST/VAST

- Continue making partnership-requested improvements and enhancements to CAST/MAST/VAST based on priorities established by the WQGIT.
- Keep CAST/MAST/VAST consistent with any changes in the Scenario Builder or Watershed Model.
- Continually improve CAST/MAST/VAST to bring it closer to the results produced by Scenario Builder and the Watershed Model through additional testing, validation, and development and implementation of strategies to correct for differences in results.
- Assist EPA in organizing and facilitating meetings of jurisdictional partners focused on requests for review and approval of new and interim BMPs for incorporation into Scenario Builder, CAST/MAST/VAST, and other CBP modeling tools.
- Identify to EPA and assist in working through issues related to incorporation of these BMPs into Scenario Builder, CAST/MAST/VAST, and other CBP modeling tools.
- Provide technical and logistical support to the review and approval of BMPs for incorporation into the CBP modeling tools.
- Incorporate the approved new and interim BMPs in Scenario Builder and CAST/MAST/VAST.
- Assist EPA in responding to jurisdictional and other partners' questions about Scenario Builder and CAST/MAST/VAST and requests to better understand how Scenario Builder and CAST/MAST/VAST processes their data.
- Conduct analyses of Scenario Builder and CAST inputs and outputs to troubleshoot and diagnose concerns raised by the jurisdictions and other partners and make recommendations to EPA for addressing these concerns.
- Assist EPA in responding to jurisdictional requests for modifications of Scenario Builder and CAST/MAST/VAST.
- Develop expanded Scenario Builder and CAST/MAST/VAST documentation and work to continually update the documentation as changes are made.
- Enhance the user interface to facilitate use and understanding of model inputs and outputs.
- Assist EPA in transferring the Scenario Builder and CAST/MAST/VAST technology and the understanding of how it functions to the jurisdictional and other CBP partners, including but not limited to coordinating trainings on Scenario Builder and CAST/MAST/VAST.
- Work with CAST/MAST/VAST users directly to address the following issues on an on-going basis:
    - Analyze scenarios from CAST/MAST/VAST to answer questions and address concerns by jurisdictions.
    - Provide technical support and training on the tools to facilitate WIP and milestone preparation by local government agencies.
    - Update documentation as changes are made to the tools.
- Provide partnership-based prioritization of CAST/MAST/VAST update tasks to developers.
- Modification of CAST/MAST/VAST as agreed upon by member jurisdictions and CBP.

- Provide technical training to Chesapeake Bay Program Office staff on CAST/MAST/VAST and Scenario Builder.
- Organize and deliver trainings in various locations throughout the watershed, as requested by the seven Bay jurisdictions. There will be up to seven jurisdiction-specific training sessions in each base and option period. Whether these sessions will be webinars, in-person meetings or a combination of the two will be determined based on needs expressed by each jurisdiction. The need for training sessions will likely only occur after the release of each new version of the tool. As part of these trainings the contractor shall:
    - Locate the appropriate facilities for each training session with the necessary amenities.
    - Work with the Chesapeake Bay Program Office, Water Protection Division, and relevant jurisdictions to publicize the trainings.
    - Register the participants.
    - Deliver training which includes administering the conference code and webinar; leading the training; and responding to participants questions both during the training and after.
    - Assist EPA with posting all training presentations, supporting materials, and responses to questions received during each training session on www.epa.gov/chesapeakebaytmdl within three business days of training.
- Support ongoing development of, updates to, and web publication of detailed Scenario Builder and CAST/MAST/VAST documentation.

Task 5 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

(1) Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.
(2) Provide immediate written notification to the TOPO of any delays in completing any activities under this task.
(3) Provide annual submissions by January 31 of each year of updated Watershed Model, Scenario Builder, and CAST/MAST/VAST documentation.
(4) Provide draft products (e.g. documents, databases, modifications to the suite of tools in this Task) to the TOPO as delineated in written technical directions furnished by the TOPO. After EPA review and vetting of each draft product, the TOPO will provide written comments to the contractor. The contractor shall incorporate the comments from the TOPO and provide the revised draft to the TOPO within the timeframe specified in the written technical direction.
(5) Provide annual documentation and compilation by December 1 of each year of technology transfer products (e.g., documents, presentations, workshop summaries, webinar summaries, syntheses of feedback from training session participants) prepared and delivered over the prior year.
(6) Create the next annual version of CAST and the jurisdiction specific versions (i.e., MAST, VAST) by incorporating the high priority refinements and modifications requested by the WQGIT and the watershed jurisdictions by December 1 of each year.

(7) Submit to the TOPO an initial version of integrated draft Phase 6 Chesapeake Bay watershed model integrated with supporting versions of Scenario Builder and CAST/MAST/VAST by December 1, 2014. The contractor should anticipate receiving written technical direction from the TOPO regarding this draft.
(8) Provide to the TOPO the next versions of Scenario Builder and CAST/MAST/VAST, supporting calibration of the second draft version of the Phase 6 Chesapeake Bay watershed model, to the TOPO by December 1, 2015. The contractor should anticipate receiving written technical direction from the TOPO regarding this draft.
(9) Provide the TOPO the next versions of Scenario Builder and CAST/MAST/VAST, supporting calibration of the third draft version of the Phase 6 Chesapeake Bay watershed model, to the TOPO by September 1, 2016. The contractor should anticipate receiving written technical direction from the TOPO regarding this draft. The contractor shall revise versions of Scenario Builder and CAST/MAST/VAST supporting calibration of the "proposed final" Bay watershed model, by December 1, 2016.
(10) Document all results from the suite of management scenarios requested by the jurisdictions supporting the jurisdictions' development of their Phase III WIPs by June 1, 2017.

Task 6: Support for Bay TMDL Tracking and Accountability

CBPO Technical Lead: Megan Thynge
CBP Partnership Lead: WQGIT

The contractor shall support EPA in the continued development and enhancement of the Chesapeake Bay Tracking and Accounting System (Bay TAS), initially released on January 31, 2011, through the Chesapeake Bay Program's Chesapeake*Stat* website (see: http://stat.chesapeakebay.net/). Bay TAS will help ensure that the Chesapeake Bay Program partners and the public have a transparent means of tracking, verifying, reporting, and accounting for pollution reductions, nutrient credit trades, and offsets in increased pollutant loads as the Bay TMDL is implemented. Bay TAS contains the 2009 baseline levels of nitrogen, phosphorus, and sediment pollution to the Bay; the allocations of pollutant reductions called for in the final Bay TMDL; 2017 interim targets; and annual loading reduction progress scenario data. This information is displayed geographically by watershed jurisdiction, by water body segment, and by source sector. Jurisdiction-specific data reflecting implementation progress — measured against the 2009 figures — will be added to the system on an ongoing basis.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the specific scope of the technical support identified below. It is anticipated that support on this suite of tools shall be provided simultaneously or iteratively rather than in a stepwise fashion throughout each term of the period of performance. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue technical direction, which will be the sole basis for the contractor to incur billable costs.

The contractor shall:

- Build into Bay TAS the additional data, information, and functionality necessary to help track, account for, verify, and report out on:

    - Tracked, verified, and reported BMPs, treatments or technologies.
    - Estimated pollution reductions from implementation of those BMPs, treatments, and technologies.
    - Actions reported by the jurisdictions to offset documented increases in pollutant loads from population growth and development of the watershed.
    - Pollutant load credit trades reported by the jurisdictions.
    - Other changes in pollutant sources as the jurisdictions work to implement the provision of the Bay TMDL and their supporting Watershed Implementation Plans.
- Build into Bay TAS the complete record of BMPs tracked and reported to the Chesapeake Bay Program Office since 1985.
- Support ongoing Bay TAS operation and maintenance activities.
- Enhance Bay TAS functionality for tracking and reporting on progress towards the jurisdictions and federal agency partners' two year pollutant load reduction and programmatic milestones.
- Provide documentation of all enhancements and additions to Bay TAS.
- Ensure the data and information contained within Bay TAS is fully consistent with the same data and information contained within and produced by the Bay Watershed Model, Scenario Builder, and Chesapeake*Stat* tools.
- Support the knowledge transfer to the technical staff at the Chesapeake Bay Program Office in Annapolis, Maryland, and the Water Protection Division in Philadelphia, Pennsylvania.
- Travel to CBPO in Annapolis, Md., when in-person meetings are required. There likely will be one formal in-person meeting each base and option period.

Task 6 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

(1) Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.
(2) Provide immediate written notification to the TOPO of any delays in completing any activities under this task.
(3) Provide for the operations and maintenance associated with the ongoing management applications of Bay TAS and document actions taken in the quarterly technical progress reports.
(4) Develop web services for each new dataset added into Bay TAS to facilitate the dissemination of the authoritative data to other key CBP partnership decision support systems (e.g., Chesapeake*Stat*) by January 31 of each year.
(5) Build in automation of data import and reporting features for each new dataset added into Bay TAS by December 31 of each year.
(6) Upload permit tracking information for full array of existing non-significant wastewater treatment facilities, Concentrated Animal Feeding Operations (CAFOs), Municipal Separate Storm Sewer Systems (MS4s), and other National Pollutant Discharge Elimination System- (NPDES) permitted sources into Bay TAS by December 31, 2013.
(7) Incorporate additional BMP tracking, reporting, and display functions in Bay TAS for the display of BMP implementation data from NEIEN at the county level by

December 1, 2013.

(8) Develop requirements for tracking and reporting on two-year pollution reduction and programmatic milestones for Bay TAS.
    a. Provide a draft of these requirements by November 1, 2013.
    b. After EPA review and vetting of the draft, the TOPO will provide written comments to the contractor. The contractor shall incorporate the comments from the TOPO and provide a final version to the TOPO by January 31, 2013.
(9) Develop offsets and trading tracking requirements for Bay TAS.
    a. Provide a draft of these requirements by December 1, 2013.
    b. After EPA review and vetting of the draft, the TOPO will provide written comments to the contractor. The contractor shall incorporate the comments from the TOPO and provide a final version to the TOPO by February 28, 2014.
(10) Incorporate enhanced wastewater database functionality into Bay TAS.
    a. Provide a proposal for how to go about incorporating this enhanced functionality into Bay TAS by October 1, 2013.
    b. Incorporate agreed-upon enhancements into Bay TAS by December 1, 2013.
(11) Compile and upload annual progress data, facility changes, and regulated source updates into Bay TAS by February 28 of each year (February 29 in 2016).
(12) Create the next version of Bay TAS, which shall include offsets and trading tracking and reporting and two-year pollution reduction and programmatic milestones tracking and reporting functionality by December 1, 2014.
(13) Update Bay TAS to include draft Phase III WIP data and information by February 28, 2018.

Task 7: Support for Exchange Network-Based BMP Tracking, Verification, and Reporting

CBPO Technical Leads: Jeff Sweeney, Matt Johnston
CBP Partnership Leads: WQGIT Watershed Technical Workgroup

The contractor shall assist EPA with continued development and enhancement of the Chesapeake Bay Node on the National Environmental Information Exchange Network (NEIEN). NEIEN is a national network facilitating data sharing among partners. The Chesapeake Bay Program's implementation of NEIEN facilitates transfer of BMP implementation numbers from state and federal partners to CBP for use in modeling, accounting for, and evaluation progress under the jurisdictions' two year milestones. The contractor shall also provide specialized technical support for continued enhancement and evolution of the CBP Partnership's tools and larger accountability framework for tracking, verification, and reporting of BMP and other nutrient and sediment load reduction treatments and technologies to meet the Partnership's objectives under the Chesapeake Bay TMDL midpoint assessment. The CBP Partnership has publically committed to the development, adoption, and long term implementation and adaptation of a basinwide framework for verification of implemented practices, treatments, and technologies being credited for nutrient and sediment pollutant load reductions.

The contractor shall provide documentation of all enhancements and additions to the Chesapeake Bay NEIEN node and the CBP Partnership's BMP tracking, verification, and reporting system. The contractor shall actively support knowledge transfer to the technical

staff at the Chesapeake Bay Program Office in Annapolis, Maryland, and the Water Protection Division in Philadelphia, Pennsylvania.

The TOPO will furnish the contractor with written technical direction on a case-by-case basis as to the specific jurisdiction, and the scope of the technical support identified below. The contractor shall anticipate working with the TOPO and staff leads in CBPO and jurisdictions to furnish the requested technical assistance. However only the TOPO may issue technical direction, which will be the sole basis for the contractor to incur billable costs.

It is anticipated that support shall be provided to states simultaneously or iteratively rather than in a stepwise fashion throughout each term of the period of performance. The contractor shall provide the following support to the seven watershed jurisdictions, but not limited to:

- Organize and facilitate meetings between providers of data and CBP users of the information to ensure accurate and timely submission of data and appropriate interpretation of the data.
- Provide support to the seven watershed jurisdictions as requested to support work on their state NEIEN nodes, development and implementation of jurisdiction-specific databases and mechanisms for enhancing tracking, verification and reporting of BMP data, and clean-up of their historical BMP databases.
- Build in mechanisms for certifying verification of the inbound BMP data following the protocols and procedures agreed to by the CBP Partnership.
- Link EPA's Integrated Compliance Information System (ICIS) and/or Permit Compliance System (PCS) with the Chesapeake Bay NEIEN node to ensure full network-based exchange of data.
- Work with NEIEN participants directly to address issues on an ongoing basis.
- Work to provide for full provision of NEIEN data for each annual progress scenario run.
- Summarize lessons learned from the prior year of NEIEN implementation and recommend further enhancements.
- Develop custom plug-ins for documenting receipt and validating format of inbound BMP flow data.
- Develop custom plug-ins or outbound services to serve as inputs to Bay TAS, Scenario Builder, and CAST/MAST/VAST.
- Manage the BMP schema, including necessary changes to broaden the applicability required to satisfy other programmatic needs.
- Implement BMP processing rules and requirements to be included within Scenario Builder infrastructure.
- Provide technical training to Chesapeake Bay Program Office and Water Protection Division staff on the NEIEN.
- Support knowledge transfer to the technical staff at the Chesapeake Bay Program Office and Water Protection Division.
- Document all enhancements and additions to Chesapeake Bay Node on the NEIN.
- Develop updates to and web publication of detailed NEIEN documentation.
- Travel to CBPO in Annapolis, Md., when in-person meetings are required. There likely will be one formal in-person meeting each base and option period.

Task 7 Deliverables:

All written documentation and files produced by the contractor and provided to the TOPO shall be in an electronic format that EPA can support. The contractor shall:

(1) Furnish written monthly progress updates of each activity under this task requested by the TOPO through technical direction in their quarterly technical progress reports described under Task 1.

(2) Provide immediate written notification to the TOPO of any delays in completing any activities under this task.

(6) Provide draft products (e.g. documents, databases, computer code changes) to the TOPO as delineated in written technical directions furnished by the TOPO. After EPA review and vetting of each draft product, the TOPO will provide written comments to the contractor. The contractor shall incorporate the comments from the TOPO and provide the revised draft to the TOPO within the timeframe specified in the written technical direction.

(3) Provide the TOPO with annual documentation and compilation of products produced for the seven watershed jurisdictions and for EPA under this task by March 31 of each year. This documentation shall include all products produced through December 31 of the previous year.