CBP Partnership Suggested Responses to May 2011 NRC Report

DRAFT – November 1, 2011

This document is a supporting companion piece to the *Key Challenges* identified by the Chesapeake Bay Program Partners in the National Academy of Sciences(NAS)/National Research Council (NRC) Report Entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*. Together these two documents are the Chesapeake Bay Program Partnership's formal response to the National Research Council's report.

The Key Challenges document focuses on four areas that were identified by the Independent Evaluator Action Team for special focus, discussion by, and recommendations to the Management Board and Principals' Staff Committee. These four areas addressed 13 of the 25 science based conclusions offered in the NRC report. Of four key challenges areas, three come directly from the NRC report and one at the request of the PSC in May 2011. The four areas are:

- Best Management Practice (BMP) Effectiveness (Monitoring/Tracking and Accountability) in the Chesapeake Bay Watershed.
- Adaptive Management of the Chesapeake Bay Program.
- Chesapeake Bay Modeling Laboratory.
- Ongoing Function of the Independent Evaluator in the Chesapeake Bay Program Partnership.

The *CBP Partnership Suggested Responses to May 2011 NRC Report* is a supporting document (to the *Key Challenges*), which addresses three objectives:

- Documents the actions already being taken by the CBP Partnership to address each of the 25 science based conclusions.
- Documents specific suggestions for addressing individual science based conclusions not address within the *Key Challenges* document.
- Provides detailed documentation for the record that the Partnership actively considered each of the 25 science based conclusions.

To the extent it is possible within this document, supporting information and reference citations are provided.

The intent of the Partnership's formal response is to: close the loop on this independent evaluation with ourselves as we manage the program; be transparent about how the program implemented the NRC panel's science based conclusions; clearly reflect the implementation action steps; and address the recommendations for the ongoing function of the independent evaluator. The NRC panel that produced the report has completed their effort and has officially disbanded, so the response will not be directed to them, however, it will become part of the public record, just as is their report.

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1	Accurate tracking of BMPs is of paramount importance because the CBP relies upon the resulting data to estimate current and future nutrient and sediment loads to the Bay.	Water Quality Goal Implementation Team with its Watershed Technical Workgroup and source sector workgroups	• The Chesapeake Bay Program (CBP) Partnership is near the end of a six year effort to develop and adopt the National Environmental Information Exchange Network or NEIEN approach to exchange reported Best Management Practice (BMP) data seamlessly across the seven watershed jurisdictions, an unprecedented accomplishment unmatched across the country. • The CBP Partnership adopted a protocol for the review and approval of new practices, definitions, efficiencies, means for tracking and reporting and simulation within the respective Bay model (http://archive.chesapeakebay.net/pubs/Nutrient-Sediment_Control_Review_Protocol.pdf) and an amendment to the original protocol (http://archive.chesapeakebay.net/pubs/Addendum-Outside%20BMP%20Requests_6%2013.pdf). The protocol also addresses review of existing Partnership approved practices where new scientific findings support reconsideration of the practice's efficiencies. **Suggestion for the Management Board (MB)/Principals' Staff Committee (PSC):** • Charge the Water Quality Goal Implementation Team to revisit privacy issue with U.S. Department of Agriculture (USDA), to the extent those barriers are not addressed through the U.S. Geological Survey (USGS) memoranda of understanding (MOU) with the National Resources Conservation Service (NRCS) and the Farm Services Agency (FSA), in order to achieve the goals of more complete tracking and report without getting into duplicative state, federal and/or non-governmental organization reporting.
2	The current accounting of BMPs is not consistent across the Bay jurisdictions. Additionally, given	Water Quality Goal Implementation Team with	• Through a series of parallel activities, which will converge together over the coming year to form a more comprehensive BMP tracking, verification, and reporting system, the CBP partners are tackling the following issues through a variety of approaches:

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	that some source-sector BMPs are not tracked in all jurisdictions, the current accounting cannot on the whole be viewed as accurate.	Watershed Technical Workgroup and source workgroups	**Agricultural data privacy constraints:** USGS has signed MOU with the USDA NRCS and the FSA to help CBP partners improve reporting of agricultural practices. The USGS is working with USDA and the six watershed states to establish procedures for improving the tracking and reporting of all USDA cost-shared conservation practice data which respects producer privacy and still ensures partner access to geographic-based reporting of BMP at the scales appropriate to a variety of management and assessment objectives. **Verification and Non-Cost Shared Practices:** The National Association of Conservation Districts (NACD) has been funded by USDA NRCS to coordinate development of data collection and verification protocols for non-cost shared agricultural conservation practices implemented in the Chesapeake Bay watershed. EPA and USDA are working directly with NACD, the state agricultural agencies, conservation districts, and the agricultural and agribusiness communities to develop and implement mechanisms for tracking and reporting verified non-cost share practices by July 2012, as committed to in the Executive Order 13508 Strategy. Lessons learned from this effort will be useful in improving tracking, verification, and reporting of both cost shared and non-cost shared practices in other pollutant source sectors. **Double counting:** The USGS agricultural data reporting system described above is being structured to significantly reduce double counting of jointly federal/state cost shared conservation practices. As states begin to track non-cost shared agricultural practices, it will be essential for the CBP partners to develop mechanisms for identifying and removing any double counted data before data are transmitted for use in the Bay TMDL accountability system. [Pennsylvania notes that states have a limited window, until 2015 to collect non-cost share BMPs. These practices will not duplicate existing BMP data. Pennsylvania notes that since these practices will not be duplicated, it is necessary to fix all double counted data before it is allowed to submit non-cost shared BMPs.] **Practice lifespan:** The CBP Partnership has developed some initial practice-specific life spans for use in the model; that work needs to be expanded to cover the full suite of CBP

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			approved practices used in the model. All seven watershed jurisdictions need to put in place protocols for removing practices from the shared accounting systems after the end of the agreed to lifespan. [Before being able to fully comment, Pennsylvania would need a better understanding of how calibrations are performed and what evidence is available to support a need to discount BMPs. Pennsylvania submits that a decision to discount BMPs would increase the time spent by staff on BMP reporting and counting, which takes away from staff time to help support programs that result in additional BMPs on the ground. Finally, Pennsylvania notes that addressing historical BMPs would be a challenge and that they do not have the staff resources available to verify all historical BMPs; especially those that are not geo-referenced, so it would not be feasible to re-visit all of them.]
3	The committee was unable to determine the reliability and accuracy of the BMP data reported by the Bay jurisdictions.	Water Quality Goal Implementation Team with Watershed Technical Workgroup and source workgroups	• As described above and below, the CBP Partnership is focused on addressing several areas for continual refinement and vetting by the Water Quality Goal Implementation Team to existing BMP tracking and reporting procedures to improve the shared confidence in the BMP data: o more fully accounting for non-cost shared BMPs. o more comprehensive verification of cost shared and non-cost shared practices. o ensuring that historic data reported for use in the suite of CBP Partnership's model do not include duplicate records, expired practices, and/or practices on land that has since been converted to another use. o accounting for practice lifespan in simulating pollutant reductions. o accounting for site-level variability in BMP efficiencies. o increasing access to BMP location information. o even more consistency in BMP definitions across the state and federal partners. • While the input data for the CBP Partnership's Watershed Model allows for a reasonable estimate of agricultural loadings to the Chesapeake Bay and the effect of conservation practices, the CBP Partnership will continue to refine the model with the latest available verified data.
4	The committee was not able to quantify the magnitude or the likely direction of the error introduced by BMP reporting issues.	Water Quality Goal Implementation Team with Watershed Technical Workgroup and source workgroups	

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5	A consolidated regional BMP program to account for voluntary practices and increase geo-referencing of BMPs present opportunities to improve the tracking and accounting process.	Water Quality Goal Implementation Team with source workgroups	• See actions described above in responses to science based conclusions 1 through 4 as those responses also apply here in reply to 5. **Suggestion for the MB/PSC:** • Charge the Water Quality Goal Implementation Team to further evaluate Florida's approach as referenced and described within the NRC Panel Report.
6	Targeted monitoring programs in representative urban and agricultural watersheds and subwatersheds would provide valuable data to refine BMP efficiency estimates particularly at the watershed scale, and thereby improve Watershed Model predictions.	Science, Technical Analysis and Reporting Team with Nontidal Water Quality Monitoring Workgroup	• With leadership by USGS and NRCS, the CBP Partnership has already invested shared monitoring resources in establishing monitoring sites within small watersheds targeted for intensive conservation practice implementation (http://archive.chesapeakebay.net/calendar.cfm?EventDetails=11267&DefaultView=all&RequestDate=06/11/2011). • These small watershed monitoring programs are being designed and implemented following guidelines developed through workshops sponsored by the CBP Partnership's Scientific and Technical Advisory Committee (STAC). o Beyond USGS and NRCS, the CBP Partnership has invested in monitoring implementation in high priority watersheds and summarizing existing BMP studies in their jurisdictions. Maryland Department of Natural Resources (DNR), in cooperation Maryland Department of the Environment (DOE), University of Maryland Center for Environmental Science (UMCES), and University of Maryland Wye Research and Education Center, has developed a water quality monitoring strategy to identify nutrient reduction efficiencies of best management practices. BMP efficiency case studies are described and results and lessons learned summarized for Wye River, Upper Pocomoke, German Branch, and the Corsica River (2010 Trust Fund Water Quality Monitoring Strategy http://www.dnr.state.md.us/ccp/funding/pdfs/Monitoring_Strategy.pdf).

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			o County level efforts are also being conducted across the Partnership to understand the efficiency of BMPs in developing and developed landscapes (e.g. the Fairfax County, VA Monitoring Network http://va.water.usgs.gov/projects/ffx_co_monitoring.htm, Montgomery County, MD with Dr. J.V. Loperfido collaborating with USGS scientist, Dr. Dianna Hogan, to investigate the effects of stormwater management strategy on the export of nutrients and sediments from urban watersheds). o The CBP's Science, Technical Analysis and Reporting (STAR) Team's Tidal Monitoring Workgroup and Nontidal Monitoring Workgroup are working together to develop broader lessons learned documentation on BMP effectiveness and ecosystem response from the Chesapeake Bay watershed. A focus meeting is being held October 12th, 2011 (http://archive.chesapeakebay.net/calendar.cfm?eventdetails=11515), agricultural and urban case histories are being presented. Case histories and lessons learned will be summarized. Communication product development from the summary will be developed in 2012 to support adaptive management.
7	Additional guidance from the EPA on the optimal extent of field verification of practices in relation to expected benefits would improve tracking and accounting of both cost-shared and non-cost shared practices.	Water Quality Goal Implementation Team with Watershed Technical Workgroup and source workgroups	• The NACD has been funded by USDA NRCS to coordinate development of data collection and verification protocols for non-cost shared agricultural conservation practices implemented in the Chesapeake Bay watershed. EPA and USDA are working directly with NACD, the state agricultural agencies, conservation districts, and the agricultural and agribusiness communities to develop and implement mechanisms for tracking and reporting verified non-cost share practices by July 2012, as committed to in the Executive Order 13508 Strategy. Lessons learned from this effort may be useful in improving tracking, verification, and reporting of both cost shared and non-cost shared practices in other source sectors.

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8	Electronic tracking and data transfer systems are likely to improve the quality of reporting and reduce the jurisdictions' tracking and accounting burden but may currently be contributing to delayed assessment of implementation progress.	Water Quality Goal Implementation Team with Watershed Technical Workgroup and source workgroups	• The CBP Partnership is near the end of a six year effort to develop and adopt the National Environmental Information Exchange Network or NEIEN approach to exchange reported BMP data seamlessly across the seven watershed jurisdictions, an unprecedented accomplishment unmatched across the country. The Partnership will complete the transition NEIEN-based BMP network exchange and work to ensure the exchange network results in more rapid access and, therefore, more timely assessment of tracked, verified and reported BMPs.
9	The two-year milestone strategy commits the states to tangible, near-term implementation goals and improves accountability and, therefore, represents an improvement upon past CBP long-term strategies. However, the strategy, in and of itself, does not guarantee that implementation goals will be met, and consequences for nonattainment remain unclear.	Water Quality Goal Implementation Team's Milestones Workgroup	• Chesapeake Bay accountability framework, officially put in place with publication of the Chesapeake Bay TMDL on December 29, 2010, is composed of Watershed Implementation Plans (WIPs), two-year milestones, tracking and assessment of progress meeting Bay TMDL allocations, and federal actions, all of which provide greater assurance for achievement and maintenance of the Bay TMDL allocations. EPA has shared the *Evaluation of Bay Jurisdictions' 2009-2011 Milestones* memorandum and the *Guide for Chesapeake Bay Water Quality Two-year Milestones* (www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html?tab2=3) with the jurisdictional partners. • All of these efforts resulted in the CBP Partnership adopting a decision framework (http://stat.chesapeakebay.net/?q=node/127) in May 2011, which provides and adaptive management process. The new decision framework emphasizes goal setting, monitoring, and assessing performance to manage adaptively. The monitoring improvement and small watershed studies listed in SBC 6 provide an important component for applying adaptive management. • The Bay TMDL/Watershed Implementation Plan cost analysis committed to at the June 2011 Chesapeake Executive Council meeting, is now being conducted. The analysis is

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			expected to be available in mid-2012. Results of the analysis will assist in setting strategies.
10	CBP jurisdictions reported mixed progress toward their first two-year milestone goals. However, data were insufficient to meaningfully evaluate implementation or anticipated load reduction progress relative to the goals.	Water Quality Goal Implementation Team's Milestones Workgroup	• The CBP Partnership is near the end of a six year effort to develop and adopt the National Environmental Information Exchange Network or NEIEN approach to exchange reported BMP data seamlessly across the seven watershed jurisdictions. EPA has shared the *Evaluation of Bay Jurisdictions' 2009-2011 Milestones* (www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html?tab2=3) memorandum with the jurisdictional partners so that everyone is clear on the planned evaluation. • The seven Bay watershed jurisdictions will report to the public on final progress under their 2009-2011 milestones at the upcoming 2012 Chesapeake Executive Council meeting. The Partnership will complete the transition NEIEN-based BMP network exchange and work to ensure the exchange network results in more rapid access and, therefore, more timely assessment of tracked, verified and reported BMPs. The Partnership will continue forward with the two-year milestone process as described within the *Evaluation of Bay Jurisdictions' 2009-2011 Milestones* memorandum and the *Guide for Chesapeake Bay Water Quality Two-year Milestones* (www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html?tab2=3). • The new CBP decision framework (http://stat.chesapeakebay.net/?q=node/127) will allow the partners to better identify uncertainty associated with water-quality decision making. Some specific examples to address uncertainty are improved techniques developed by USGS to show the uncertainty associated with trends analysis of nutrients and sediment monitoring data in the watershed.

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11	The first two-year milestone goals will likely be the easiest to achieve.	Water Quality Goal Implementation Team's Milestones Workgroup	• The CBP Partnership has taken note the NRC panel's observation.
12	Neither the EPA nor the Bay jurisdictions exhibit a clear understanding of adaptive management and how it might be applied in pursuit of water quality goals.	Enhance Partnership, Leadership Goal Implementation Team	• The CBP has undertaken some activities related to improving knowledge and reducing uncertainties such as: o model refinements based on improved understanding of the ecological system and model calibrations; and o more accurate estimates of the efficiencies of best management practices based on the results of monitoring and in-field simulations. • The newly-adopted decision framework, designed and implemented after the NRC panel review, is allowing the CBP Goal Implementation Teams (GITs) to use a more explicit process that includes steps for developing and documenting the key elements of adaptive management that are listed in the NRC report (see Adaptive Management Chapter http://www.nap.edu/catalog.php?record_id=13131). The decision framework was largely based on findings and recommendations from earlier NRC reports that reviewed adaptive management in ecological restoration and conservation contexts (Adaptive Management for Water Resources Management, NRC 2004 http://www.nap.edu/catalog.php?record_id=10972). • An example of the application of the framework for agriculture and water quality is available at (http://stat.chesapeakebay.net/?q=node/130). The ChesapeakeStat website is the public presentation of the strategic application of the decision framework and includes monitoring and other data that is used to continually improve the targeting and overall effectiveness of Bay restoration actions. • The Partnering, Leadership and Management GIT (GIT 6) will conduct a review of the elements of the CBP decision framework and determine what areas could be strengthened based on the findings in the NAS report.

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13	Successful application of adaptive management in the CBP requires careful assessment of uncertainties relevant to decision making, but the EPA and Bay jurisdictions have not fully analyzed uncertainties inherent in nutrient and sediment reduction efforts and water quality outcomes.	Enhance Partnership, Leadership Goal Implementation Team	• In addition to ongoing activities that reduce uncertainties, such as model refinements and model calibrations, the CBP has the organizational components in place (WQGIT, GIT 6, STAR, and STAC) to more formally analyze and identify existing and future uncertainties. • An example of how the decision framework provides for identification of uncertainties under the submerged aquatic vegetation goal area is available through ChesapeakeStat. • CBP agrees that careful consideration of what uncertainties can be most effectively and usefully addressed through adaptive management is a key next step. • The establishment of a modeling laboratory would enhance the transparency of the CBP's ongoing efforts to improve the accuracy of the portfolio of modeling and scenario assessment tools used in the Bay TMDL.
14	Targeted monitoring efforts by the states and the CBP will be required to support adaptive management.	Enhance Partnership, Leadership Goal Implementation Team	• In 2009, CBP shifted monitoring resources to improve the coverage of data in areas of the Bay watershed to provide new information on the effectiveness of management practices (e.g., within small watersheds targeted for intensive conservation practice implementation, see SBC 6 above). • Other planned monitoring activities will generate information that will inform CBP's understanding of the effectiveness of management actions such as USDA's monitoring of showcase projects. • The newly adopted decision framework includes an explicit step for designing monitoring activities that provide information on the reasons for success/failure of management efforts so that future adjustments to strategies benefit from learning.
15	Additional federal actions are needed to fully support adaptive management in the CBP.	Enhance Partnership, Leadership Goal Implementation Team	• EPA has communicated the Agency's expectations to the jurisdictions on the progress evaluation process for the Bay TMDL and Watershed Implementation Plans. EPA has indicated that a variety of information will be used in deciding on federal actions, which allows for acceptance of activities that do not result in anticipated reductions, particularly

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			when analysis of the reasons for the shortfall in performance are investigated and avoided in future BMP scenarios. • The CBP Partnership agrees that it is appropriate to provide assurance to the jurisdictions that carefully designed management experiments at an appropriate scale with adequate monitoring, evaluation, and adaptive actions are acceptable, and that failures resulting from genuine adaptive management efforts will not be penalized within the accountability framework.
16	Without sufficient flexibility of the regulatory and organizational structure within which CBP nutrient and sediment reduction efforts are undertaken, adaptive management may be problematic.	Enhance Partnership, Leadership Goal Implementation Team	• The Chesapeake Bay TMDL and the adopted accountability framework, published on December 29, 2010, built in the following adaptability: o Three separate opportunities to develop and refine the Bay TMDL allocations and the jurisdictions' watershed implementation plans—2010, 2012, and 2017—through a phased process on the way to 2025; o Two-year milestones providing multiple opportunities for adaptation over the coming 14 years; and o Jurisdictions and local partners' develop targets at the appropriate scales within each jurisdiction as part of the Phase II Watershed Implementation Plans.
17	Success in meeting CBP goals will require careful attention to the consequences of future population levels, development patterns, agricultural production systems, and changing climate dynamics in the Bay Watershed.	Water Quality Goal Implementation Team	**Consequences of changes in population, development patterns, agricultural production**: The Chesapeake Bay TMDL was established using a 2010 land use, and the seven watershed jurisdictions are expected to offset any new or increased discharges for which an allocation was not established in the Bay TMDL. EPA is in the process of auditing jurisdictions' trading and offset programs in 2011 to ensure they meet EPA's expectations as set forth in Appendix S of the 2010 Chesapeake Bay TMDL (http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html). EPA CBPO is working with USGS and USDA to develop projections of future conditions out to 2025.

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			• USGS made projections of future population and septic systems available to jurisdictions in February 2011 for consideration in their Phase II WIPs. • USGS hosted an Alternative Futures Workshop in September 2011 (workshop proceedings are expected to be available by November 2011). • CBPO staffs are working with USDA to develop projections for the future number and location of animals in the Chesapeake Bay watershed. This will affect land uses, nutrient imbalances, and nutrient and sediment loads delivered to the Bay. **Climate change**: • The Strategy to Protect and Restore the Chesapeake Bay Watershed (http://executiveorder.chesapeakebay.net/file.axd?file=2010%2f5%2fChesapeake+EO+Strategy%20.pdf) , developed in response to Executive Order 13508 (http://executiveorder.chesapeakebay.net/EO/file.axd?file=2009%2f8%2FChesapeake+Executive+Order.pdf), directs for EPA to incorporate the effects of climate change into the Chesapeake Bay TMDL by 2017. • As stated in Section 5.11 of the Bay TMDL (http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html), the potential effects of future climate change were accounted for in the Bay TMDL allocations that EPA established in December 2010 based on a preliminary assessment of climate change impacts in the Chesapeake Bay. • Also as stated in Section 5.11 (http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html) of the Bay TMDL, CBPO is assessing the effects of climate change on nutrient and sediment loads delivered to the Bay, as well as attainment of water quality standards in the Bay, as part of its analysis of the full suite of models in advance of the Phase III WIPs in 2017.
18	Helping the public understand lag times and uncertainties	Water Quality Goal Implementation	• STAR's Tidal Monitoring and Assessment Workgroup has teamed up with the Nontidal Workgroup in 2011 to summarize case studies and elucidate lessons learned from BMP

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	associated with water quality improvements and developing program strategies to account for them are vital to sustaining public support for the program, especially if near-term Bay response does not meet expectations.	Team/Communications Workgroup	effectiveness assessments. This effort also supports an earlier the request made by the Management Board during the Monitoring Realignment work of the Partnership in 2009 for better analysis and synthesis of available information developed into communication products for managers and decision makers. (The meeting information can be found at: http://archive.chesapeakebay.net/calendar.cfm?eventdetails=11515.) • A case study summary report is expected by December 31, 2011. Further communication product development is expected to be part of the STAR work plan for 2012.
19	Ag: Improved and innovative manure management.	Water Quality Goal Implementation Team's Agricultural Workgroup	• In Phase I WIPs, the six states identified many strategies to improve manure management, including application, transport, alternative uses and feed management. o Notably, Pennsylvania committed to innovation in the field of advanced manure to energy technologies. PA committed state funds for this effort and called for USDA and other state agencies to do the same. o As part of the Phase II process, EPA committed to work with Pennsylvania to agree upon credit that State should receive for these technologies. • In its Phase I WIP, Virginia placed all animal feeding operations (AFO) loads in their waste load allocation (WLA) under the 2010 Bay TMDL to signal that more agricultural animal production facilities could be subject to NPDES permits. Virginia also included a plan for addressing water quality concerns associated with unpermitted AFOs (specifically dairies). • In its December 29, 2009 letter to the PSC (http://www.epa.gov/region03/chesapeake/bay_letter_1209.pdf), EPA outlined 8 federal actions that it would take to ensure that nutrient and sediment reduction efforts continue on schedule to meet the Partnership's goal of all practices in place by 2025. One such action is expanding the universe of sources, including animal feeding operations, subject to NPDES permits. • When establishing the Bay TMDL, EPA applied a "backstop allocation adjustment" to CAFO WLAs in West Virginia

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			(http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/FinalBayTMDL/CBayFinalTMDLSection8_final.pdf). EPA shifted 75% of the AFOs not currently identified as being subject to CAFO permits from the LA to the WLA to indicate that EPA is prepared to designate additional AFOs as CAFOs if WV falls behind implementing its agricultural commitments. The backstop adjustment in the TMDL does not designate these operations as being subject to CAFO permits; a formal designation action by the state or EPA would be necessary. • In 2011, EPA is reviewing the six watershed states' state technical standards for nutrient management. Review will include timing and rate of application, as well as assessment of whether technical standards will adequately reduce nutrient transport off of concentrated animal feeding operations (CAFOs) so as to be protective of water quality.
20	Ag: Incentive-based approaches and alternative regulatory models.	Water Quality Goal Implementation Team's Agricultural Workgroup	• In their Phase I WIPs, several states proposed strategies to increase agricultural BMPs without command-and-control regulations, e.g., Virginia's Resource Management Plans. • Many Phase I WIPs (Virginia, Delaware, and Maryland) identified contingencies including mandatory requirements if sufficient increases in voluntary BMPs were not achieved by 2013. • EPA will be analyzing the costs and benefits associated with meeting water quality standards in the Chesapeake Bay in 2011 and 2012.
21	Urban: Regulatory models that address stormwater, growth and development, and residential fertilizer use.	Water Quality Goal Implementation Team's Stormwater Workgroup	• EPA agrees that restrictions on residential fertilizer application are a cost-effective mechanism to reduce nutrient loads. EPA encourages these restrictions, and is pleased that multiple states included them in their Phase I WIPs, e.g., New York's passage of fertilizer legislation in July 2010 and Virginia's passage of fertilizer legislation in 2011. • EPA credited nutrient reductions to states that included fertilizer restrictions in their Phase I WIPs. • Through the Phase II WIPs (http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/PhaseIIWIPS/GuideforthePhaseIIWIPs_330final.pdf), EPA expects that communities will work with states to develop and

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			implement strategies to reduce nitrogen, phosphorus and sediment reductions to the Bay. Such strategies could include land-use regulations or ordinances that limit new or increased loads delivered to the Bay. • The Bay TMDL was established using a 2010 land use, and jurisdictions are expected to offset any new or increased discharges for which an allocation was not established. • EPA will be auditing jurisdictions' trading and offset programs in 2011 to ensure they meet EPA's expectations as set forth in Appendix S (http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html) of the TMDL.
22	Urban: Enhanced individual responsibilities.	Water Quality Goal Implementation Team's Stormwater Workgroup	• Many states assumed that individual actions would be one way to reduce loads from urban runoff and onsite septic systems, and identified education and outreach as an important mechanism to facilitate such voluntary actions. • EPA will give jurisdictions credit for voluntary/non-cost shared practices if the jurisdiction can appropriately report and verify these practices.
23	Additional air pollution controls.	Water Quality Goal Implementation Team	• EPA has committed to a series of national air clean regulations within its 2012-2013 milestones, all of which will provide nitrogen atmospheric deposition load reduction benefits to all seven watershed jurisdictions within the coming years and decades.
24	Innovative funding models will be needed to address the expected costs of meeting Bay water quality goals.	Science, Technical Analysis and Reporting Team's Modeling Workgroup; Water Quality Goal Implementation Team	• The CBP has been increasingly integrating data collection efforts by nontraditional partners and stakeholders (e.g., watershed organizations, permitted dischargers, river keepers) into the existing tidal and watershed monitoring network with plans to further expand both networks with such partners. Key examples include: o Virginia Department of Environmental Quality (DEQ) has a 3-tiered system for volunteer monitors contributing data to their state database. The top tier is data that can be used in regulatory assessments. Volunteer monitoring data has been included in the last two 303d list assessment for dissolved oxygen in the tidal waters of VA. Maryland DNR is piloting such a relationship with South River Federation in MD tidal

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			waters. o VA DEQ includes vertical profiler results from water quality assessments by academic partners. These vertical profiler data have been essential to developing and testing new short term (e.g. 7-day, 1-day, instantaneous) water quality criteria assessment techniques for evaluating dissolved oxygen impairments in Chesapeake Bay from 2008-2011. o Maryland and Virginia has for years coordinated with National Estuarine Research Reserve System for continuous water quality monitoring data assessments in tidal waters.
25	Establishing a Chesapeake Bay modeling laboratory would ensure that the CBP would have access to a suite of models that are state-of-the-art and could be used to build credibility with the scientific, engineering and management communities.	Science, Technical Analysis and Reporting Team's Modeling Workgroup	• This science based conclusion is addressed within the Key Challenges Report.