Key Challenges Identified by the Chesapeake Bay Program Partners from the NAS/NRC Report Entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation*

DRAFT as of November 1, 2011

INTRODUCTION

On May 4, 2011, the National Research Council (NRC) of the National Academy of Sciences (NAS) made available the report entitled *Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation.* This work was conducted under the direction of the Chesapeake Executive Council (EC).

At the November 2008 EC meeting, the Governors, the Mayor, the Administrator and the Chesapeake Bay Commission Chair requested to increase accountability, "that the Chesapeake Bay Partnership be evaluated by a nationally recognized independent science organization." The Partnership, under the leadership of the Principal's Staff Committee (PSC), convened an Independent Evaluator Action Team whom constructed study questions and the Environmental Protection Agency (EPA) managed a contract with the NAS.

In 2009, EPA requested that the NRC of the National Academies evaluate and provide advice on the Chesapeake Bay Program (CBP) partnership's nutrient and sediment reduction programs and strategies. The NRC study panel was made of individuals (Attachment 1) chosen for their wide range of perspectives and technical expertise as prescribed by the NAS procedures and standards. The NRC was convened for two years until May 2011, when they issued the prepublication copy of their report. Over the two years the study panel met with a wide range of Chesapeake Bay experts, reviewed the CBP Partners' work products related to the source sectors, nutrient tracking, sediment control practices, the two year milestones, and methods by which program business is conducted to establish, manage, and account for progress toward meeting goals.

The PSC, on May 3, 2011, directed the CBP Partnership to provide a written response to all 25 of the NRC panel's science based conclusions within 90 days (by August 4, 2011); the deadline was later extended to 180 days (November 4, 2011) by the CBP's Management Board. The PSC reconvened the Independent Evaluator Action Team to produce this written response. In addition, on May 10, 2011, the PSC asked the Independent Evaluator Action Team to recommend the next steps to the PSC on the ongoing function of the Independent Evaluator and do so in the context of their written and formal response to the NAS report.

To this end the Independent Evaluator Action Team expanded its membership to address the expanded charge to include representatives from Enhancing Partnering, Leadership, and Management Goal Implementation Team (GIT 6), the Science and Technical Analysis and Reporting (STAR) Team, and the Water Quality Goal Implementation Team (WQ GIT). The expanded Action Team membership (Attachment 2) afforded broad participation and input from the Partnership into the formal response.

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 Partnership 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.

The Chesapeake Bay Partnership's formal response is comprised of two documents. One is this *Key Challenges* document, and the other is the companion reference tool document entitled *CBP Partnership Suggested Responses to May 2011 NRC Report*.

This *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 (MB) and PSC. 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 and Partnership.
- Chesapeake Bay Modeling Laboratory.
- Ongoing Function of the Independent Evaluator in the Chesapeake Bay Program Partnership.

Each section offers some background discussion followed by specific recommendations to the MB and PSC. A complete list of the 25 science based conclusions offered in the NRC report is contained in Attachment 3.

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

- 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 Action Team recommends that with the delivery of the *Key Challenges* and *CBP Partnership Suggested Responses to May 2011 NRC Report* documents to the PSC that the Action Team formally disband. Further work on the four key challenges and other work suggested in the Suggested Responses to May 2011 NRC Report is as follows.

- BMP Effectiveness/Monitoring – STAR.
- BMP Effectiveness/Tracking and Accountability – WQ GIT and its source sector workgroups as appropriate.

- Adaptive Management – GIT 6 lead in coordination with WQ GIT, the states where appropriate
- Modeling Laboratory – new Modeling Laboratory Action Team (described under the Modeling Laboratory section.
- Ongoing Function of the Independent Evaluator – GIT 6 lead in coordination with Citizens Advisory Committee (CAC), Science and Technical Advisory Committee (STAC), and Local Government Advisory Committee (LGAC), based on level of interest.

BMP EFFECTIVENESS MONITORING/TRACKING and ACCOUNTABILITY IN THE CHESAPEAKE BAY WATERSHED

Background and Rationale

The NRC's review science based conclusions (SBC) expressed many concerns with obtaining a better understanding of BMP effectiveness in the Chesapeake Bay watershed and the challenges associated with BMP tracking and accountability. The CBP Partnership is actively addressing these concerns while acknowledging limitations and uncertainties in dealing with this issue (see *CBP Partnership Suggested Responses to May 2011 NRC Report*).

Monitoring

BMPs are expected to reduce nutrient loadings due to air deposition as well as nutrient and sediment delivery to streams, rivers and the Bay from land-based activities and pollutant discharges. Monitoring programs are expected to be targeted to provide better BMP efficiency estimates (SBC6) and support adaptive management (SBC14). Monitoring in the form of reliable documentation of implementation (SBC3) with consistency across the partnership (SBC2) is critical to an accurate accounting of progress (SBC4). Insuring the data are meaningful to evaluate effectiveness of implementation actions (SBC10), quantifying uncertainties in the monitoring process (SBC18) when there are ecosystem response lag times, thresholds and variability with implementation (SBC13, SBC18) were all recognized as important to the credibility of the restoration effort. The CBP Partnership reflected upon these concerns and challenges and provides the following discussion and recommendations. Specific SBC are found in attachment 3.

In November 2009, the Partnership's Management Board adopted the findings and recommendations coming out of the STAC led re-evaluation of the partnership's water quality-focused monitoring networks Monitoring Needs and Partnership Opportunities Assessment: A Report to the Chesapeake Bay Program Monitoring Re-Alignment Action Team (http://archive.chesapeakebay.net/calendar.cfm?EventDetails=10479&DefaultView=all&RequestDate=10/24/2009). The work of the Monitoring Realignment Action Team built upon a series of STAC sponsored monitoring and analysis workshops and reviews. These workshops and reviews provided the Partnership with a solid, scientific basis for targeting monitoring efforts to better address management needs. With leadership by the U.S. Geological Survey (USGS), the Natural Resources Conservation Service (NRCS) and the EPA, the CBP Partnership has already invested shared monitoring resources towards targeting intensive conservation practice implementation within small watersheds.

Key Findings from the Monitoring Re-Evaluation

- Even with targeted monitoring on small watersheds that is part of ongoing expansion of the CBP's watershed monitoring network, the scale associated with the watershed water quality monitoring network can only assess effectiveness of suites of BMPs and not individual BMPs.

- Water quality monitoring data analyses techniques have advanced the Partnership's uncertainties association with loads (http://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2010.00482.x/full). Through the new load-trend estimation techniques, river input water quality monitoring data-based load estimates are now deemed comparable to model-based load allocations.
- To interpret the effects of conservation practices on nutrient discharges, watershed monitoring alone is not sufficient. It will be necessary to collect, maintain, share, analyze, and interpret detailed data on the practices and activities that effect nutrient and sediment runoff.
    - 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.
    - Improving consistency in tracking and reporting practice data across the Partnership and reducing uncertainties in the monitoring process are activities which must be pursued in parallel.
    - A series of parallel activities will converge together over the coming year to form a more comprehensive BMP tracking, verification, and reporting system and which must be pursued in parallel to insure that meaningful data are collected and reported.

Monitoring Recommendations

- As funding continues to become available, the CBP partners have a prioritized list of the next set of targeted small watersheds for monitoring and assessment to complete the long-term watershed monitoring network. These include additional monitoring in agriculturally and urban dominated watersheds as well as the coastal plain filling existing gaps in the network. The jurisdictions will have the ability to prioritize which watersheds are selected for monitoring in their areas.
- To quantify effects on nutrient and sediment runoff, supplement the existing monitoring strategy in small watersheds (http://www.chesapeake.org/stac/Pubs/swmreport.pdf and http://www.dnr.state.md.us/ccp/funding/pdfs/Monitoring_Strategy.pdf) by making a long term commitment (5-10 yr+) to four essential tasks in all studies of targeted small watersheds: 1) maintain conservation practices; 2) assemble and share spatially explicit data on conservation practices and other activities; 3) conduct watershed monitoring following the procedures and protocols recommended in the STAC workshops and reviews; and 4) conduct follow up data analyses.
- Continue to seek innovative multi-agency strategies (e.g., USGS, USDA, NRCS, and FSA MOUs 2010) to overcome institutional and legal barriers to assembling and sharing data on conservation practices and agricultural activities (http://www.chesapeake.org/stac/Pubs/swmreport.pdf).
    - Build partnerships to coordinate among study watershed efforts and to analyze and interpret resulting data.
    - Build partnerships within study watersheds to implement and maintain the conservation practices, collect data on conservation practices and activities, and to conduct watershed monitoring.
    - Document BMP efficiency case studies and results and synthesize lessons learned to be used in adaptive management.

- For example, Wye River, Upper Pocomoke, German Branch, and the Corsica River studies have been detailed in the 2010 Trust Fund Water Quality Monitoring Strategy (http://www.dnr.state.md.us/ccp/funding/pdfs/Monitoring_Strategy.pdf).

- Continue to compile evidence of lag times and threshold responses in the Bay and watershed apply new findings and insights into the ongoing data analysis, progress interpretation, and the adaptive management cycle.
  - The age of waters being delivered to a stream will be influenced by the relative contribution of surface runoff, soil water, and ground water. Runoff and soil water both have very young ages (hours to months, respectively) and supply, on average, about half of the water to a stream. The remainder of the water supplied to a stream moves through the ground-water system and has a range of modern to over 50 years, with a median age of 10 years (http://pa.water.usgs.gov/reports/wrir03-4035.pdf).
  - Variable responses in Bay subestuaries illustrate a variety of lag and thresholds which can be extracted from monitoring analyses (http://www.mdsg.umd.edu/members/sandy/images/Thresholds_Report_web.pdf).
- Incorporate the use of inexpensive, low frequency (e.g., quarterly) sampling of baseflow nitrate from many study watersheds selected to represent a wide range of levels of conservation practices; compare neighboring watersheds within each physiographic province of the Chesapeake Bay Watershed.
- To quantify the effects on phosphorus and sediment discharge, use continuous automated water quality monitoring to capture the important effects of episodic high flows (http://pubs.usgs.gov/sir/2009/5165/, and http://www.chesapeake.org/stac/Pubs/swmreport.pdf).
  - Sample a limited number of well studied watersheds with before and after implementation to reduce costs with this technology.
- Actively create and carry out innovative funding models which seek to integrate non-traditional monitoring partners (e.g., watershed organizations, permitted dischargers, river keepers) into the Partnership's existing fixed station monitoring networks. A solid example is Virginia Volunteer Monitoring Program which contributes data to the Chesapeake Bay 303d listing assessments datasets. This approach provides a means for expanding the existing largely EPA and state funded monitoring networks filling in monitoring gaps in the watershed and across the tidal waters which would otherwise go unaddressed due to state and federal funding limitations.
- Address detailed questions about specific conservation practices or specific mixes of conservation practices through specific rigorously defined research efforts at the sites of practice implementation, not through watershed monitoring (http://www.chesapeake.org/stac/Pubs/swmreport.pdf).
- Use monitoring data to assess progress in load reductions in tandem with improving model simulation efforts.

Tracking and Accountability

Accurate tracking and accounting of BMPs to quantify non-cost shared practices and increased geo-referencing of practices is of paramount importance because the CBP Partnership relies upon resulting data to estimate current and future nutrient and sediment loads to the Bay (SBC1, SBC3, SBC5). Challenges to date have included inconsistent accounting across the jurisdictions, inconsistent tracking and reporting across source sectors, and limited to no tracking of reporting of non-cost shared BMPs (SBC2). Guidance is needed on levels of field verification (SBC7). Electronic tracking and data transfer systems are likely to improve reporting and reduce accounting burden (SBC8).

There are significant logistical, institutional, and legal barriers to assembling and sharing these data (e.g., agricultural data privacy constraints). However, the CBP Partnership is near the end of a six year effort to develop and adopt the National Environmental Information Exchange Network (NEIEN) approach to exchange reported BMP data seamlessly across the seven watershed jurisdictions. There are existing commitments within the Partnership to actively confront and resolve these long standing barriers to the exchange of practice data. Two prime examples are the USGS MOUs with NRCS and the Farm Services Agency (FSA) to make geospatial practice data available to the Partnership; and the Executive Order 13508 commitment by USDA and EPA to, by July 2012, develop and implement mechanisms for tracking and reporting of non-cost shared conservation practices installed on agricultural lands.

Tracking and Accountability Recommendations

- Commit to sustained implementation of the NEIEN approach to the open exchange of BMP data across the partnership, collectively working to resolve reporting and tracking issues as they arise and bringing more and more partners and stakeholders who fund and conduct on the ground implementation into the network exchange.
- Building on the strong foundation already established, bring forward through the Partnership a set of integrated recommendations for a comprehensive BMP tracking, verification and reporting system. While the implementation of this recommendation is directed toward verification of all BMPs (i.e., urban, ag and other), this work should be built on that done to date by the National Association of Conservation Districts, which is 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 and by the USGS's work with USDA and the states to propose guidance on improving cost-shared conservation practice data.
    - Work the recommendations 'up' through the CBP Partnership, starting with the source workgroups under the direction of the WQ GIT, then through the WQ GIT onto the Management Board, and finally to the Principals' Staff Committee for final deliberations and adoption for basin wide application.
    - Address the full array of practices covering all land-based nutrient and sediment sources—agricultural lands and production areas, developed lands stormwater runoff, on-site treatment systems, and stream corridors.
    - Actively factor in innovative approaches being taken by the jurisdictions, municipalities, and conservation districts and recognize unique circumstances within the Partnership.
- Actively expand the application of ChesapeakeStat as an analysis and decision making tool within the Partnership.

ADAPTIVE MANAGEMENT OF THE CHESAPEAKE BAY PROGRAM

Background and Rationale

The CBP Partnership has and continues to practice many elements of adaptive management as described in the NRC panel review. The CBP agrees that there are opportunities to improve specific elements such as more formal identification of uncertainty and ensuring that management activities, modeling tools, and monitoring are designed to reduce uncertainty and continually improve efforts directed towards achievement of CBP Partnership's goals. The recently adopted decision framework is helping the Partnership to systematically assess how Goal Implementation Teams' (GIT) goals and strategies are informed by monitoring so that, over time, key uncertainties are addressed. The

continued implementation of the decision framework and the ability of the Partnership to practice adaptive management, in the context of the regulation-driven effort to restore clean water, will face a number of challenges.

Challenges to Adaptation Facing the Partnership

- Building awareness among partners on why more formal identification of uncertainties and opportunities to learn from management successes and failures will be constructive and worthy of the attention of staff and leadership of the program and on how it will improve goal achievement.
- Implementing the Bay TMDL accountability system while allowing jurisdictions to experiment through management actions without fear that federal consequences will be applied because resulting pollutant reductions were less than expected.
- Fully utilizing the two-year milestone cycles to drive adaptive management and capture new information to help all jurisdictions and partners be more effective in subsequent planning and implementation cycles.
- The availability of resources to monitor outcomes at a scale that will effectively provide data to use in adjusting future strategies.
- Communicating restoration progress to program stakeholders in a manner that creates acceptance of the time needed to implement, learn, adjust, and allow management actions to create the expected improvements in water quality.
- Finding efficient ways to use the decision framework without creating burdensome, low-value work that involves tracking too-great a level of detail.
- Avoiding the creation of new data collection activities for information that is already collected elsewhere and managing the reporting burden conveyed to program partners.
- Adopting a flexible approach to implementing the decision framework to allow the GITs to develop effective goals and action plans and the Chesapeake Bay partnership to better align the outcomes of the Executive Order Strategy with current or future partnership agreements. Other reports completed by the National Research Council at NAS, in addition to the report that is the subject of this response, helped inform the Partnership's understanding of how other programs are using adaptive management (http://www.nap.edu/catalog.php?record_id=10972, http://www.nap.edu/catalog.php?record_id=11754, and http://www.nap.edu/catalog.php?record_id=10146).

Adaptive Management Recommendations

- Reaffirm that the implementation of the Decision Framework under GIT 6 will include the adaptive management principles described in the NAS report and those contained in other studies published by the National Research Council of NAS.
- Use the decision framework and an annual planning process to identify specific areas of uncertainty and prioritize the need for reducing high priority uncertainties largely by learning from instances where goals are and are not met.
- Encourage the GITs, with oversight provided by the Management Board, to systematically identify uncertainties and design activities to reduce those uncertainties that have the highest potential to improve the program's abilities to reach established goals.
- Encourage continued implementation of the decision framework, which will prompt regular review of whether valid monitoring data is answering the critical questions that will create greater certainty that future actions will be successful.

- Encourage the partnership to conduct analyses, supported by monitoring and the use of current modeling tools, to explain why management actions are or are not having intended results and to document how the results are used to adjust strategies for reducing nutrients and sediment. EPA should consider evidence of such analyses in deciding on applying federal actions as a consequence of not meeting milestone targets.
- Request a joint assessment from the WQGIT and GIT 6 on barriers to adaptive management in the TMDL/Watershed Implementation Plan process. For identified barriers, CBP will consult with other watershed restoration programs, adaptive management experts and regulatory experts and propose regulatory and governance changes to reduce barriers. Recommend that GIT 6 be responsible for coordinating and tracking changes.

CHESAPEAKE BAY MODELING LABORATORY

Background and Rationale

The NRC panel recommended establishing a Chesapeake Bay Modeling Laboratory charged with evaluating monitoring data and uncertainty in model simulations, improving the predictive skill of the models, and continuously seeking model improvements to accommodate new scientific understanding of the system. Multiple modeling approaches in which open-source models are exercised cooperatively with the scientific community are key features of the approach recommended by the NRC panel and by the Chesapeake Bay Program's STAC. While the NRC panel identified many critical improvements in the development and use of models, the CBP could evaluate whether these can best be addressed through a centralized physical modeling laboratory, like the National Center for Atmospheric Research or the Geophysical Fluid Dynamics Laboratory, or through a less centralized, "virtual laboratory" approach recommended by the STAC.

Particularly important at this stage of the CBP Partnership is taking on a more adaptive management approach through which uncertainty can appropriately recognized and dealt with and efficiency and accountability are emphasized. The NRC panel stressed the importance of integrating modeling in the ongoing adaptive management of the Bay and indicated an important component of a modeling laboratory (Chapter 5) would be the integration of monitoring with modeling efforts within an adaptive management program (Chapter 4). Therefore, it will be essential in any redesign of the Partnership's modeling activities to reduce organizational stovepipes and/or barriers to systematically connecting monitoring and modeling activities, and continually improving how these are used in management decision making. Organizational models that accomplish this result should be evaluated that include, but are not limited to, a physically consolidated "modeling" laboratory.

Feedback from Partnership and Additional Considerations

- The WQGIT, the STAC, and the STAR were generally in favor of a modeling laboratory in a functional sense, although not necessarily as a separate 'bricks and mortar' entity. The groups all recognize the extent that implementation was limited by resource constraints.
- The positive response has been indicative of the central role modeling plays in Partnership decision making and concerns about the need to increase credibility of ongoing Bay modeling efforts.
- Such a laboratory would help to counter the perception of excessive EPA control over the models and help facilitate work on further addressing model uncertainty, two specific needs expressed by a number of WQGIT members.

- Currently, academic input is achieved through formal STAC reviews, committee, goal team, and workgroup participation. A modeling laboratory would serve to increase and institutionalize this valuable input from academic partners.
- Care would have to be taken that the modeling laboratory would be responsive to management needs and include an operational focus. The NRC committee recognized this when they recommended that the center be staffed primarily by academics, but led by federal staff.
- Part of the motivation for the modeling laboratory is that too much knowledge is invested in too few people. There has been concerted effort to get more partners directly applying the various Partnership models and tools themselves, but the circle of model applicators is still too limited.
- The NRC committee was clear that a modeling laboratory should have a physical location to facilitate constant communication between modelers working on separate, but related, parts of the overall project and to ensure a cohesive strategy to respond to management needs. Some in the Partnership have suggested that a virtual modeling laboratory could achieve the same goals.
- An effort such as this could not reasonably be funded from current Chesapeake Bay Program funding levels, without cuts to some program areas.

<u>Modeling Laboratory Recommendations</u>

- Commit to proceeding forward with more in-depth evaluation of the recommendation for establishing a Chesapeake Bay Modeling Laboratory and other alternatives to achieve the recommendations of the NRC committee.
- Establish an action team charged with responsibility for developing a more definitive set of implementation options.
- Appoint action team members with well recognized expertise in modeling, monitoring data and management decision making in order to represent multiple perspectives.
- The action team's charge would include:
    - Evaluation of other existing modeling laboratories, including those cited by the NRC committee, and adaptive management programs that encompass modeling, addressing how they function and how applicable their structure and mandate is to the Chesapeake Bay Program Partnership.
    - Consideration of the range of options for what would constitute a Chesapeake Bay modeling laboratory, a virtual laboratory, or responsive program reorganization that is capable of carrying out the functions outlined by the NRC committee and addressing the series existing STAC and the jurisdictions' recommendations on modeling and integration with monitoring to support adaptive management.
    - Development of options and recommendations for actual institutional sponsorship and how the laboratory would function for carrying out mandates.
    - Assessment of the possible range of financial investments and funding mechanisms required for the establishment and long-term operation of a Chesapeake Bay modeling laboratory and its alternatives.
- Request the action team to report back to the Management Board on its findings, options, and recommendations within nine months. In turn, the Management Board would then decide on what specific recommendations to put forward for deliberation and final decisions by the Principals' Staff Committee.

ONGOING FUNCTION OF THE INDEPENDENT EVALUATOR IN THE CHESAPEAKE BAY PROGRAM PARTNERSHIP

Background and Rationale

On May 10, 2011, the PSC asked the Independent Evaluator Action Team "to recommend the next steps to the PSC on the ongoing function of the Independent Evaluator and do so in the context of their written and formal response to the NAS report."

The Action Team consulted the following references in their analysis of the PSC's question to recommend the next steps on the ongoing function of the independent evaluator.

- Citizens Advisory Committee (CAC) Recommendations on Enhanced Bay Program Accountability and Accelerating Implementation to PSC (June 19, 2008).
  - "CAC encourages the Chesapeake Bay Program to utilize an independent review of program implementation as a way to increase accountability and reassure ongoing confidence in the Program. CAC is not advocating this review be congressional oversight or mandated. The evaluation group should be composed of professionals that are outside of the state and federal agencies directly involved in the restoration effort."
- CAC Accountability Meeting with CBPO/CPR/CAC/ACB/MD DNR (July 31, 2008).
  - "The group discussed the authority of the coalition and raised the question of whether the Chesapeake Bay Program Congressional Reauthorization should be amended to include the creation of the coalition on accountability."
- The Center for Progressive Reform (CPR) Memo to PSC on Independent Evaluator for the Bay Program – Initial Draft (August 18, 2008).
  - The CPR focused on defining a "diagnostic role that assesses the specific problems that prevent the Bay Program from achieving its mission, an accountability role that allocates responsibility, and an enforcement role that ensures indentified problems are addressed, adjustments are made, and consequences are imposed". Further, the CPR recommended that "an independent entity …. can accomplish the following:
    - Foster a culture of accountability in the Program and with partners;
    - Play the crucial role of giving high-level decision-makers the information necessary to make smart decisions about the direction of the Program and state and federal-directed Bay protection and restoration efforts;
    - Explain to Congress, the media, and the public what is being done and what needs to be done to clean up the Bay and why any gap between the two exists; [and]
    - Impose enforcement measures at the direction of the Executive Council."
- MD DNR, Frank Dawson, presentation to the PSC on Accountability in the CBP (September 22, 2008).
  - The MD DNR presentation focused on transparency; fairness and objectivity; avoiding duplication; quality controls; defining a crucial focus; and determining the ultimate goal. MD DNR recommended that the Chesapeake "Executive Council [EC] create an independent evaluator within the program" whose function could be:
    - "Implemented by an independent Accountability Officer, the National Academy of Sciences, or through a RFP from EPA or GAO."
    - To "gather and audit data needed to evaluate the Partner's progress under the final accountability metrics and identify corrective actions."
    - "Funded by public funds, hired/fired with the EC's approval and supervised by the PSC."

- To "submit, for review and comment, a report to the CAC, LGAC, STAC, and the PSC that includes the status of partners' performance under the metrics and recommended policy solutions."
- To submit a final report "to the PSC and EC to adopt corrective actions. Corrective actions could include recommendations for legislative changes, or commitments to seek additional funding for program activities."

- 2008 Executive Council decision on the Independent Evaluator (December 18, 2008).
  - At the November 2008, Executive Council meeting they requested to increase accountability, "that the Chesapeake Bay Partnership be evaluated by a nationally recognized independent science organization."
  - The Partnership, under the leadership of the Principal's Staff Committee (PSC) convened an Independent Evaluator Action Team whom constructed study questions and EPA managed a contract with the National Academy of Sciences' (NAS) National Research Council (NRC) to conduct the third party independent science review.
- White paper from Nikki Tinsley entitled *Creating an Independent Evaluator for the Chesapeake Bay Program* (April 12, 2009).
  - Audit committees are used by publicly trade organizations "to oversee financial reporting and accounting; regulatory compliance; and to monitor internal controls and risk management." The paper suggests that, like an audit committee, "a CBP evaluation committee (PEC) could be established to increase the credibility of the independent evaluation process. The PEC would report to the EC and could provide a valuable contribution to CBP management. The PEC would assist the EC and CBP managers in carrying out their oversight activities as they relate to the efficiency and effectiveness of program operations and reporting processes. …. PEC duties would include developing evaluation questions, selecting the evaluator (based on the evaluator's experience and ability to apply an evaluation methodology that would result in reliable findings), and overseeing the evaluation."
- May 12, 2009, Executive Order 13508 indentified the need for ongoing independent reporting and evaluation
  - "Sec. 206. Strengthen Accountability. The Committee [Federal Leadership Committee], in collaboration with State agencies, shall ensure that an independent evaluator periodically reports to the Committee on progress toward meeting the goals of this order. The committee shall ensure that all program evaluation reports, including data on practice of system implementation and maintenance funded through agency programs, as appropriate, is made available to the public by posting on a website maintained by the Chair of the Committee."
- May 10, 2011 request of the PSC to the Action Team to make recommendations on the ongoing function of the Independent Evaluator.
  - on May 10, 2011, the PSC asked the Independent Evaluator Action Team to recommend the next steps to the PSC on the ongoing function of the Independent Evaluator; the Team should consider that there is a place on the program's organizational chart and whether a more broad scope is needed and the Action Team is to do this in the context of their written response to the NAS report.
- GIT 6 proposal (~August 11, 2011).
  - Goal Implementation Team (GIT) 6 (officially titled Enhancing Partnering, Leadership, and Management) offered a potential ongoing function as a quality management function to provide an objective source of independent advice to the EC on:
    - Recommendations for improving program effectiveness and governance.

- Extent to which CBP has developed a unified strategy and action plan.
- CBP's performance in completing planned activities and the program's transparency in reporting performance.
- Determining the appropriateness of corrective actions for all program evaluations (internal and external).
- The effectiveness of adaptive management as it is applied in the program and CBP's ability to reduce uncertainty in management strategies.

Possible Functions of an Independent Evaluator

The Action Team discussed the types of business functions that an Independent Evaluator, whether it is internal or external, could address.

- Manage an evaluation process by coordinating and responding to requests for information made of the evaluator.
- Consider all evaluations happening (or that have happened) on the Partnership, take into account gaps and what evaluations are needed, and whether this is best addressed by an internal or external evaluation.
- Commission studies, and manage contracts, to be completed by third or external parties.
- Conduct internal evaluations.
- Insure the intent of the 2008 Executive Council decision and 2009 Presidential Executive Order 13508 are carried forth.

Ongoing Function of the Independent Evaluator Recommendation

- The Independent Evaluator Action Team recommends that GIT 6 establish a process for independent evaluation with input from CAC, STAC and LGAC. The Independent Evaluator Action Team discussed two distinctly different options to address the Chesapeake Bay Program need for an internal evaluation component: an independent program evaluator and internal program evaluator. The two options are discussed below; these may be considered as two single options (either or) or taken together (option 1 and option 2) to carry out the evaluation needs of the Partnership. There are two minority opinions.

Option 1: Independent Evaluation

An Office of the Independent Evaluator would be established within the Chesapeake Bay Program. The Evaluator would conduct or contract for evaluations that contribute to program efficiency and effectiveness. Each year, the Office would:

- Develop a work plan based on, but not limited to 1) a review of external evaluations conducted by government (Government Accountability Office (GAO); Offices of Inspector General, State and Legislative Auditors), university, non-profit and other organizations; 2) information developed from GIT assessments through the Decision Framework; and 3) consultation with CBP stakeholders, including the advisory committees, interested non-profits, watershed organizations, and regulated entities. Interaction and consultation with interested organizations will be a part of the Evaluator's performance agreement. While the work plan would be informed by the input from the aforementioned entities; the priorities and focus of the work plan would be developed at the discretion of the Office of the Independent Evaluator – thus ensuring the necessary independence to fairly and accurately evaluate the efficiency and effectiveness of the Bay Partnership's programs and efforts.

- Have a mission statement and an annual budget, and be staffed by full-time government employees, but will not be political appointments. The Office would report to a high level EPA official, but is in service to the Chesapeake Bay Program Partnership.
- Interact with stakeholders including other evaluation organizations, interested organizations, program managers, advisory committees, the Management Board, the Principals' Staff Committee, and the Executive Council when determining what evaluations to perform.
- Prepare and share with Partners, for comment, a draft of the work plan, and publish the final work plan.
- Have purview over all CBP Partnership evaluation studies.
- Conduct or contract for evaluation studies to be performed by other evaluation organizations
- Publish evaluation reports.
- Insure that the 2008 Executive Council decision and the 2009 Presidential Executive Order (13508) intent regarding the independent evaluation or the Chesapeake Bay Program will be carried forth.

Some issues with regard to this recommendation that would need to be resolved include: funding and budgets, and authority to review partner activities (partner buy-in.)

Option 2: Non-Independent Internal Program Evaluation

The Management Board would establish a distinct entity either within GIT6 or separate but equal to GIT6 as a permanent staff (team) that would design and implement internal program evaluations. The Team would report to the Management Board. The evaluations would be carried out in support of Decision Framework implementation and as a part of the Partnership's adaptive management efforts.

- The Team would be composed of selected members of GIT6, EPA staff, and experts in program evaluation methods. The Team Leader would be selected by the Management Board and would serve on a 2 year rotating basis.
- The Team would have the authority to recommend and receive direction from the Management Board on the selection, design, and implementation of internal evaluations and make recommendations on external evaluations topics.
- The Team will focus primarily on evaluations to improve the quality and efficiency of CBP Partnership processes, operations, management, and overall governance.
- The Team's work planning would be integrated into the Decision Framework process in order to ensure that - uncertainties and risks identified during the adaptive management process are adequately considered during the selection of evaluation topics.
- The Team would draft evaluation objectives and questions and develop evaluation methodologies and would have the authority to manage contractors to carry out evaluations.
- Evaluations conducted or overseen by the Team may include recommendations to Management Board.
- Funds to support the Team and any internal evaluations would be provided by EPA.
- GIT6 would be accountable for coordinating the development and implementation of corrective actions to address all evaluation recommendations.
- GIT6 would be required every two years to report to the Management Board on the status of implementation of all evaluation recommendations.

There are similar issues with regard to this recommendation that would need to be resolved including: funding and budgets, authority to review partner activities (partner buy-in). Also, there would be some question as to whether this option meets the executive order intent.

Citizen Advisory Committee (CAC) offered a minority opinion, as follows:
CAC believes that it will be very important to have some type of entity that can add credibility to the States' reporting of BMP implementation. Currently EPA accepts BMP implementation data without verification. An independent evaluator may be the one way to add accuracy and transparency to the process.

The most important factor to CAC is to understand why the Bay's water quality is not improving with the speed expected. CAC wants an independent evaluator to help the members of the Partnership understand the following. CAC members suspect some of each to be true.

- We are doing the wrong things?
- We are not doing enough of the right things?
- We are not doing what we report?

The NRC report made several points about the problems with verification of BMPs. The PSC now has an opportunity to "adaptively manage" to address these comments. CAC wants GIT6 to play a leadership role in ensuring that an independent function is added to the Partnership that can at least immediately take of the issue of "We are not doing what we report", and eventually the other two listed just above.

Pennsylvania and Virginia offered a minority opinion, as follows:
"The decision of the PSC to charge the Chesapeake Bay Program Partnership to evaluate whether an Independent Evaluator function would enhance program performance was made prior to the development of an adaptive management process for Bay Program management. With the PSC endorsement of the document," Enabling Effective Adaptive Management in the Chesapeake Bay Program," and the Decision Framework, the Program now has an adaptive management decision framework which will allow the Program to accomplish internal program evaluations. PA and VA support using this approach over the establishment of an Independent Evaluator function. With reductions in federal and state funds, it is imperative that federal funds be directed to assisting the jurisdictions in meeting the required TMDL reductions and not be diverted to programs which do not have a direct effect on the ground water quality improvement."

ATTACHMENT 1

NRC STUDY COMMITTEE ON THE EVALUATION OF CHESAPEAKE BAY PROGRAM IMPLEMENTATION FOR NUTRIENT REDUCTION TO IMPROVE WATER QUALITY

Kenneth H. Rechhow, Chair, RTI International, Research Triangle Park, North Carolina
Patricia E. Norris, Vice Chair, Michigan State University, East Lansing
Richard J. Budell, Florida Department of Agriculture and Consumer Services, Tallahassee
Dominic M. Di Toro, University of Delaware, Newark
James Galloway, University of Virginia, Charlottesville
Holly Greening, Tampa Bay Estuary Program, St. Petersburg, Florida
Andrew N. Sharpley, University of Arkansas, Fayetteville
Adel Shirmohammiadi, University of Maryland, College Park
Paul E. Stacey, Great Bay National Estuarine Research Reserve, Durham, New Hampshire

NRC Staff
Stephanie E. Johnson, Study Director, Water Science and Technology Board
Michael J. Stover, Research Associate, Water Science and Technology Board

ATTACHMENT 2

ACTION TEAM MEMBERS

Jeff Horan, Maryland of Natural Resources/Independent Evaluator Action Team Chair
Julie Winters, U.S.EPA Chesapeake Bay Program Office/Independent Evaluator Action Team Coordinator
Victoria Kilbert, Chesapeake Research Consortium Chesapeake Bay Program Office/Independent Evaluator Action Team Staff

Anne Swanson, Chesapeake Bay Commission
Anthony Moore, Virginia Natural Resources Secretariat
Don Boesch, University of Maryland Center for Environmental Science
Carl Hershner, Virginia Institute of Marine Science
Carin Bisland, U.S.EPA Chesapeake Bay Program Office/Enhancing Partnering, Leadership, and Management GIT
Diane Davis, District of Columbia Department of the Environment
Doug Lipton, University of Maryland Sea Grant Program
Greg Allen, U.S.EPA Chesapeake Bay Program Office/Enhancing Partnering, Leadership, and Management GIT
John Schneider, Delaware Department of Natural Resources and Environmental Control
Jennifer Pauer, West Virginia Department of Environmental Protection
Jennifer Volk, Delaware Department of Natural Resources and Environmental Control
Katherine Antos, U.S.EPA Chesapeake Bay Program Office/Water Quality GIT
Larry Merrill, U.S.EPA Region 3 Water Protection Division/Water Quality GIT Chair
Mike Foreman, Virginia Department of Conservation and Recreation/ Enhancing Partnering, Leadership, and Management GIT (GIT 6) Vice Chair
Mark Bennett, U.S. Geological Survey-Virginia/STAR Vice-Chair
Michael Mason, U.S.EPA Chesapeake Bay Program Office/Enhancing Partnering, Leadership, and Management GIT
Nikki Tinsley, Chesapeake Bay Program Citizens Advisory Committee
Pat Buckley, Pennsylvania Department of Environmental Protection
Peter Tango, U.S. Geological Survey/Chesapeake Bay Program Office/STAR
Richard Batiuk, U.S.EPA Chesapeake Bay Program Office
Russ Perkinson, Virginia Department of Conservation and Recreation/Water Quality GIT Vice Chair

ATTACHMENT 3

25 SCIENCE BASED CONCLUSIONS (SBC) FROM NAS/NRC REPORT

Tracking and Accounting (Chapter 2)

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.
2. The current accounting of BMPs is not consistent across the Bay jurisdictions. Additionally, given that some source-sector BMPs are not tracked in all jurisdictions, the current accounting cannot on the whole be viewed as accurate.
3. The committee was unable to determine the reliability and accuracy of the BMP data reported by the Bay jurisdictions.
4. The committee was unable to quantify the magnitude or the likely direction of the error introduced by BMP reporting issues.
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.
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.
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.
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.

Assessment Of The Two Year Milestones (Chapter 3)

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.
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.
11. The first two-year milestone goals will likely be the easiest to achieve.

Adaptive Management (Chapter 4)

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.
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.
14. Targeted monitoring efforts by the states and the CBP will be required to support adaptive management.
15. Additional federal actions are needed to fully support adaptive management in the CBP.

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.

Strategies For Meeting The Goals (Chapter 5)

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.
18. Helping the public understand lag times and uncertainties 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.

Agricultural Strategies

19. Ag: Improved and innovative manure management.
20. Ag: Incentive-based approaches and alternative regulatory models.

Urban Strategies

21. Urban: Regulatory models that address stormwater, growth and development, and residential fertilizer use
22. Urban: Enhanced individual responsibilities.

Cross-Cutting Strategies

23. Additional air pollution controls.
24. Innovative funding models will be needed to address the expected costs of meeting Bay water quality goals.
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.