Appendix I – Actions and Schedule

To inform the midpoint assessment, the Chesapeake Bay Program Partnership will fully develop and follow a schedule that includes the following actions and approximate timeframes. This schedule may change during the midpoint assessment process.

1. Gather Partnership input on priority needs for the midpoint assessment (July 2012 – March 2013)
2. Develop work plans for high priorities (December 2012) and other priorities (February 2013) for approval by the Water Quality Goal Implementation Team
3. Incorporate BMP expert panel and workgroup recommendations, with a focus on adding BMPs and updating current BMPs to enhance the evaluation of progress (Underway and Ongoing)
4. Evaluate progress through 2017 and attainment of the "60% by 2017" goal (Completion by March 2018)
5. Refine decision-support tools, as appropriate, to enhance the evaluation of progress and crediting of actions on the ground (Underway, completion estimated by September 2016)
6. Calibrate "proposed final" modeling updates (Completion by 3 months after Step 5, estimated December 2016)
7. Test any refinements and, to the extent possible, assess model certainty and scope for using modeling tools within the WIP and milestone process (Completion by 6 months after Step 6, estimated June 2017)
8. Based on input from the Partnership, EPA provides expectations for scope and content of Phase III WIPs (June 2017)
9. Make any final modifications in response to Step 7 testing and setting Phase III WIP planning targets (Continuous, completion by 6 months after Step 7, estimated December 2017)
10. Develop 2018-2019 Milestones (Completion by early 2018)
11. Develop draft and final Phase III WIPs based on criteria for scope and content that may vary across jurisdictions due to implementation progress (Draft WIPs completed by 6 months after Step 9 and Final WIPs completed by 12 months after Step 9, estimated June 2018 and December 2018, respectively)
12. Modify the TMDL, as necessary
13. Continue EPA oversight of WIP implementation (Ongoing).

Refinements to the Phase 6 Prototype PQUAL Model

November 28, 2012

The initial prototype Phase 6 Model version essentially replicated the Phase 5.3.2 results in PQUAL. With acceptance of the initial Phase 6 Model work in March 2013, work will begin to add additional years to the simulation period to extend the simulation period from 1985 to 2011. This will also allow additional flow and water quality stations to be added to the Phase 6 Model. Refinements to the Phase 6 Model prototype will include 'nudging' loading/export sensitivities toward land-segment aggregate values associated with different of physiographic regions.

The work of refining the Phase 6 Prototype can be separated into six tasks.

Task 1 – A precipitation data set for the entire Phase 6 simulation period from 1985 to 2011 will be developed, applied, and calibrated. Land use and atmo. dep. loads will need to be added for the new years.
Start Date:
End Date:
Key Staff: Bhatt, Shenk, Yactayo

Task 2 – New calibration stations allowed by the expansion of the simulation period will be applied and calibrated.

Start Date:
End Date:
Key Staff:

Task 3 – Assessment in the changes that are due only to the change in the hydrology calibration from steps 1-2 will be quantified and documented.

Start Date:
End Date:
Key Staff:

Task 4 – Adjustments to the input load/export sensitivities, changes in regional factors, and other changes will be made to examine the practicality of providing a more rational approach to regional factors. One approach would be input load/export sensitivities aggregates of major physiographic regions, i.e., Coastal Plain, Piedmont, Ridge and Valley, and Appalachian Plateau. Another approach would be to expand to the TMDL basin so that the Coastal plain would be divided into three East Shore subbasins and a West Shore subbasin. Another example of subregions of the physiographic regions is shown in Figure 1. The extent of the aggregation of the land segment load/export sensitivity will be determined by the practicable approaches available. Included in this task would be adjustment of regional factors where practicable.

In addition to developing a more rational approach to regional factors other aspects will be investigated including 1) calibration approached associated with quintiles of flow, 2) new

methods to calibrate PQUAL land loads, particularly groundwater nitrogen loads, to observed riverine concentrations, and 3) examining the trapping of additional reservoirs not currently simulated and perhaps even trapping efficiencies of farm ponds and other small impoundments depending on data availability, and 4) the use of SPARROW and other model system in calibration.

The work will continue on the load-export sensitivities developed in the initial Phase 6 prototype and bring in other modeling groups to the extent practicable. The calibration task is large and complex and includes new land uses and loads from the expert groups. For example the urban groups are interested in expanding urban lands to include commercial, industrial, new urban, old urban, and others.

Start Date:
End Date:
Key Staff:

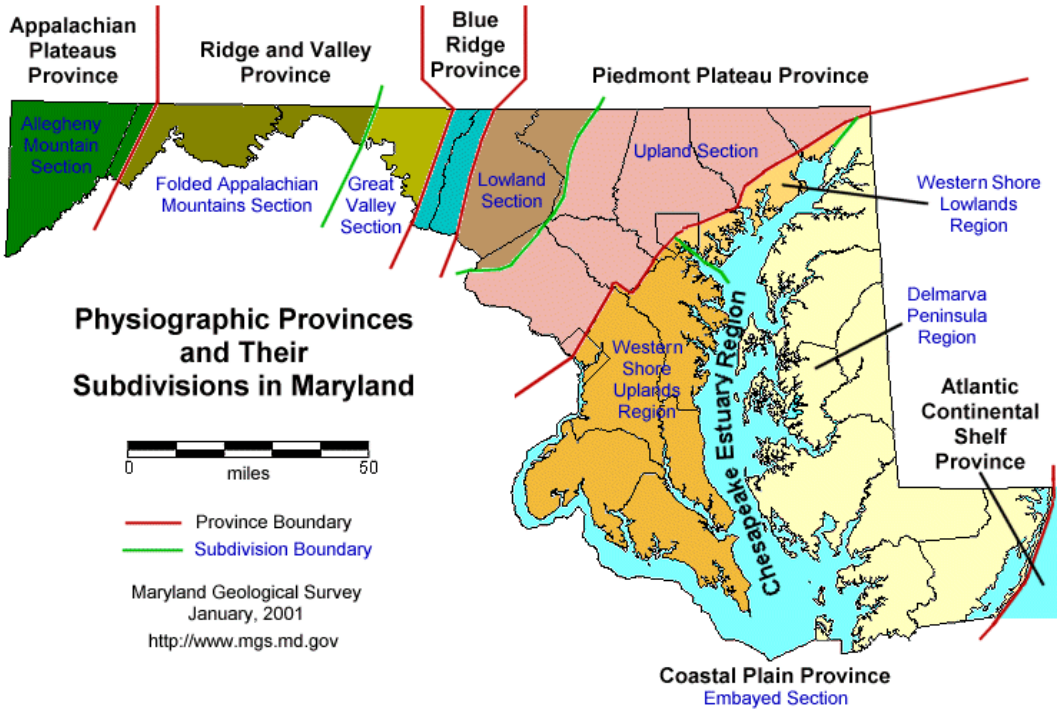


Figure 1. Physiographic regions and subregions.

Task 5 – Documentation of the input load/export sensitivities, changes in regional factors, and other changes will be completed.

Start Date:
End Date:
Key Staff:

Task 6 – Presentation of the refined prototype Phase 6 Model for review and approval by the Modeling Workgroup (technical assessment) and the WQGIT (management assessment and implications).

End Date:

Final Draft Chesapeake Bay Program Partnership's BMP Verification Principles

CBP Principals' Staff Committee Review Version

Recommended by the Management Board: November 14, 2012
Subject to Further Revision

The priority of the Chesapeake Bay Program (CBP) Partnership is the implementation of the Chesapeake Bay TMDL, the jurisdictions' Watershed Implementation Plans, and 2-year milestones. The Partnership has committed to the development of a basinwide best management practice (BMP) verification framework for use by the seven watershed jurisdictions to assure data quality for BMP reporting for annual Model Progress runs. The CBP Partnership will establish a BMP Verification Review Panel which will examine the degree to which a jurisdiction's program meets the parameters established by the Partnership's BMP verification framework. This review will include an examination of existing BMP measurements, accounting, and inspection systems and any proposed improvements to those systems submitted for CBP Partnership review. The Partnership recognizes that some jurisdictional programs may already achieve some of these principles and may not require significant modification or enhancements.

The CBP Partnership has defined verification as the process through which agency partners ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and/or sediment pollutant loads are implemented and operating correctly. The process for verifying tradable nutrient credits or offsets is a separate, distinct process not addressed either by these principles or through the partnership's BMP verification framework.

Working to verify that practices are properly designed, installed, and maintained over time is a critical and integral component of transparent, cost efficient, and pollutant reduction effective program implementation. Verification helps ensure the public of achievement of the expected nitrogen, phosphorus, and sediment pollutant load reductions over time. The CBP Partnership will build from existing practice tracking and reporting systems and work towards achieving or maintaining the following principles.

PRINCIPLE 1: PRACTICE REPORTING
Verification is required for practices, treatments, and technologies reported for nitrogen, phosphorus, and/or sediment pollutant load reduction credit through the Chesapeake Bay Program (CBP) partnership.

Verification protocols may reflect differing tools and timelines for measurement, as appropriate, for a specific BMP. For example:

- A permit (e.g., MS4) may establish periodic inspections for a regulatory BMP;
- A contract may govern examinations of a cost-shared structural (e.g., manure storage structure) or annual (e.g., cover crops) BMPs; or
- A statistical sampling may best define measurement for non-cost shared structural, annual and/or management BMPs.

Verification protocols will ensure that under normal operating conditions:

- Structural practices are properly designed, installed, and functionally maintained to ensure that they are achieving the expected nitrogen, phosphorus, and sediment pollutant load reductions reviewed and approved to by the CBP Partnership;
- Practices, including annual practices, meet the CBP Partnership's implementation and management definitions;
- Practices are consistent with or functionally equivalent to established practice definitions and/or standards;
- Practices are not double counted; and
- Practices are currently functional at the time of seeking credit and not removed from the landscape.

For verified practices not consistent with, nor fully or partially functionally equivalent to, established practice definitions and/or standards, partners and stakeholders can seek CBP Partnership approval for crediting through the established CBP Partnership's BMP review protocol.

Any practice, treatment, and technology (or partial or full equivalency) approved by the CBP Partnership that is properly tracked, verified, and reported will be incorporated into the CBP Partnership's models and credited in the accounting of progress toward the jurisdictions' milestones and in the interpretation of observed trends in monitoring data.

PRINCIPLE 2: SCIENTIFIC RIGOR

Verification of practices assure effective implementation through scientifically rigorous and defensible, professionally established and accepted sampling, inspection, and certification protocols regardless of funding source (cost share versus non-cost share), source sector (agriculture, urban, etc.), and jurisdiction (state, local). A method and schedule for confirmations to account for implementation progress over time will help ensure scientific rigor. Verification shall allow for varying methods of data collection that balance scientific rigor with cost-effectiveness and the significance of or priority placed upon the practice in achieving pollution reduction.

PRINCIPLE 3: PUBLIC CONFIDENCE

Verification protocols incorporate transparency in both the processes of verification and tracking and reporting of the underlying data. Levels of transparency will vary depending upon source sector, acknowledging existing legal limitations and the need to respect individual confidentiality to ensure access to non-cost shared practice data.

PRINCIPLE 4: ADAPTIVE MANAGEMENT

Advancements in Practice Reporting and Scientific Rigor, as described above, are integral to assuring desired long-term outcomes while reducing the uncertainty found in natural systems and human behaviors. Verification protocols will recognize existing funding and allow for reasonable levels of flexibility in the allocation or targeting of those funds. Funding shortfalls and process improvements will be identified and acted upon when feasible.

PRINCIPLE 5: SECTOR EQUITY

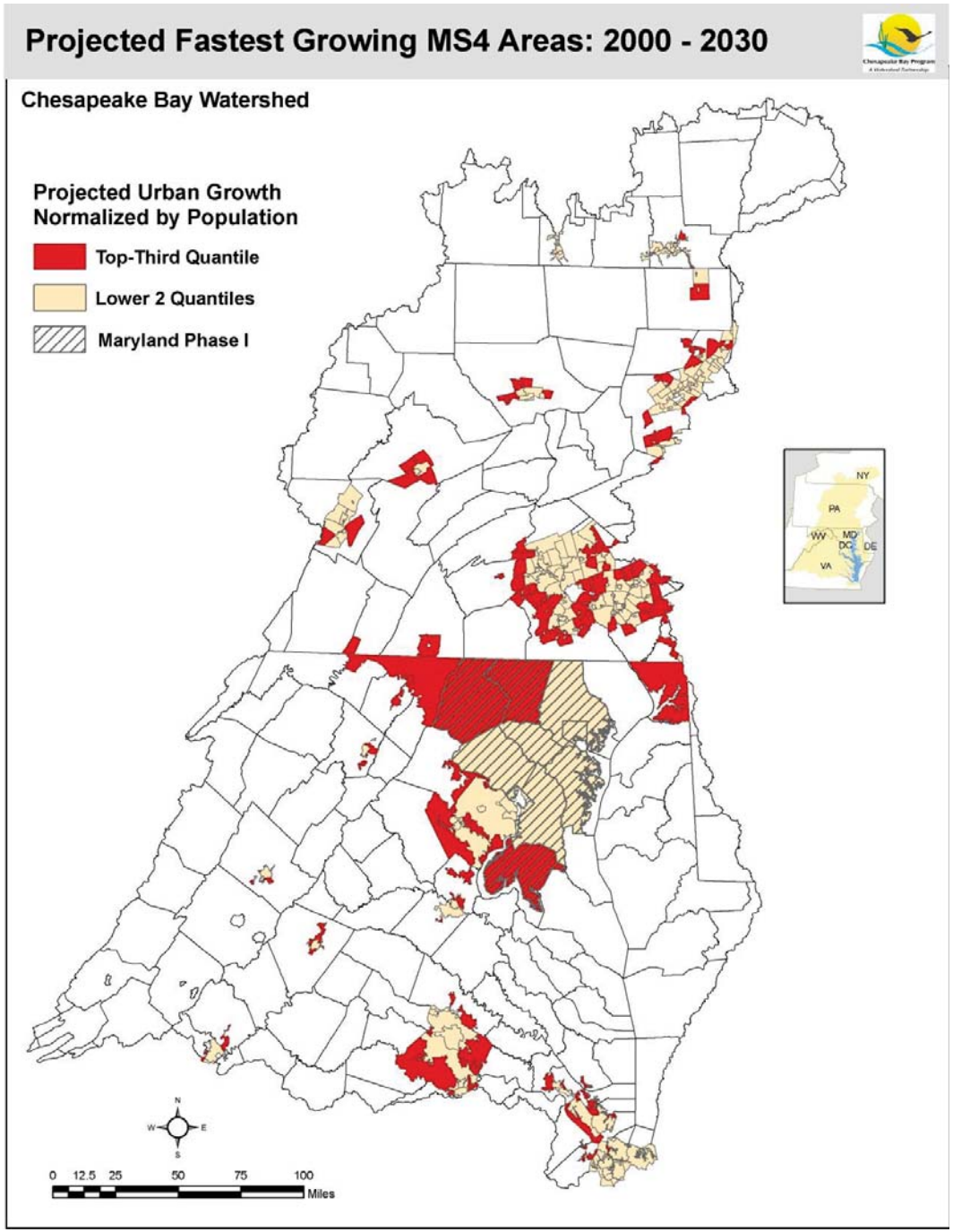
Each jurisdiction's program should strive to achieve equity in the measurement of functionality and effectiveness of the implemented BMPs among and across the source sectors.

Draft Principles and Protocols for Urban Stormwater BMP Verification

Normand Goulet
Urban Stormwater Workgroup
Northern Virginia Regional Commission

FRAMEWORK

- NPDES MS4 Permit Core
- Regular Inspections and Maintenance
- Removal Rate Tied to Visual Inspections
- Process for BMP Downgrades
- Tracking and Reporting
- Recognition that proposed effort will not support Mid-Point Assessment



Stormwater Verification must operate in two worlds:

- Regulated Stormwater
- Unregulated Stormwater

Ability to Verify is Often Linked to Whether a community has a MS4 permit or not.

VERIFICATION FOR URBAN BMPS

The need for verification differs among each type of BMP, but they can be generally classified into four broad categories:

- Traditional engineered stormwater BMPs that were historically installed through a local stormwater plan review process.
- New runoff reduction BMPs that will be implemented to meet new state stormwater performance standards in the future and also go thru the local stormwater review process.
- Stormwater retrofits and restoration practices designed and installed by localities to treat existing impervious cover.
- Non-structural or operational BMPs that are typically applied by a municipal agency or a homeowner.

Role of Maintenance in BMP Performance

Regular inspections and maintenance of BMPs are critical to ensure their pollutant removal performance is maintained and extended over time.

Therefore, the core verification principle is to ensure that BMPs are installed and maintained properly over their design life to qualify for their pollutant removal rates.

Utilize Existing MS4 Framework

The existing MS4 inspection and maintenance framework for hundreds of communities in the Bay watershed should be the foundation of any BMP reporting and verification system for the Bay TMDL.

Ongoing BMP reporting and maintenance inspections requirements in MS4 permits may need to be adjusted slightly to verify BMP performance, but the modifications should be limited to reduce the administrative burden for local and state agencies.

Removal Rate Tied to Visual Inspections

The basic concept is that urban BMPs will have a defined time-frame in which the pollutant removal rate applies.

Credit can be renewed or extended based on a visual inspection that confirms that the BMP still exists, is adequately maintained and is operating as designed.

It is recommended that these rapid investigations be piggy-backed as part of routine stormwater BMP inspections required under their MS4 NPDES permits.

Recommended Cycle for Field Verification of Urban BMPs

Local inspectors should perform field verification at least once every other inspection cycle mandated under their MS4 permit.

The typical inspection cycle in MS4 permits ranges from 3 to 5 years.

Recommended that localities should complete Legacy BMP inventory verification within Two Permit Cycles.

Suggested Process for BMP Downgrades

If the field inspection indicates that a BMP is not performing to its original design, the locality would have up to one year to take corrective maintenance or rehabilitation actions to bring it back into compliance.

If the facility is not fixed within a pre-defined time frame, the pollutant reduction rate for the BMP would be eliminated, and the locality would report this to the state in its annual MS4 report.

If corrective maintenance actions were verified for the BMP at a later date, the locality could take credit for it then.

NON MS4 LOCALITIES

- Option 1: Follow the verification inspection process outlined for MS4 community and gets the same credit.
- Option 2: Locality sub-samples a representative fraction of **their** local BMPs and applying the results to their entire population of BMPs that are credited in the CBWM.
- Option 3: State or Third Party conducts a sub-sample of BMP verification in a representative non-MS4 community, and applies the results to other comparable non-Ms4s.
- Option 4: Locality does not perform verification inspections and accepts gradual downgrades in BMP performance. Full performance credit is given for the first five years, and then is downgraded by 20% each year over the next five years, such that all BMP credits expire in ten years.

Locality reporting systems

- Localities to verify that BMP:
  - Installed properly
  - Meets/exceeds design standards
  - Functions hydrologically as designed
- Initial verification should be provided by the designer or local inspector as condition of project completion.
- Localities provide BMP review and inspection results in annual MS4 Reports.

State Reporting Systems

- States report BMP data using CBP-approved rates/methods, reporting units, geographic location.
- Periodically field verify BMPs as part of delegated NPDES Authority

IMPEDIMENTS

- Urban BMPs are installed in non-regulated areas in the watershed. Many of these localities may not have all of the legally required BMP inspection and maintenance provisions found in MS4 localities. As a consequence, BMP reporting and verification may be challenging in non-MS4 communities, particularly in smaller localities with limited staff resources.
- Most localities do not currently report on voluntary BMPs that are installed by homeowners or watershed groups.
- Some resistance to Urban Verification Principles due to concerns about EPA enforcement actions as a result of inaccurate or incomplete tracking, reporting or inspections.

IMPEDIMENTS

- Some urban BMPs are implemented outside the local development review process, and therefore may not be properly counted or reported.
- Most Bay states are just now developing tracking systems to aggregate the BMPs reported by individual localities, and several have not been able to keep up with BMP information submitted by 70 to 400 MS4s in their jurisdiction.
- Up to now, few states have allocated sufficient staff resources to fully enforce existing MS4 permit maintenance conditions or to verify that local BMP information is accurate.