



Nutrient Application Management

Technical Review and Appendix

- Sequence of Events and Issues
 - 14 pages of substantive comments – part of this meeting's material.
 - Still a lot of unanswered questions going back to 10/27/14 after 1st draft Tier 2 report.
 - Substantive comments added after each draft report issued.
 - CBPO has been working on draft Technical Appendix for Watershed Technical Workgroup since, but difficult without answers to key questions.
 - Open questions have moved from e-mails to panel (chair) → substantive comments → Technical Appendix
- 25 minute explanation of issues – especially if you haven't read the panel's report and/or substantive comments.
- CBPO SB staff probably have unique perspective on work of expert panels, their reports, approval, BMP protocol as we've been through a lot of these across all sectors over several years.



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Scientific Concerns

- If the basis of the panel's recommended reductions are a switch from N-based NutMan to P-based for crops that have historically seen high application rates of manure P, why are crops that don't see manure nutrients (have never seen or see very little) eligible for Tier 2 credit?, including:
 - Crops on fertilizer-only farms (about 85% of cropland for the CB watershed as a whole, up to 65% of cropland in counties with high animal densities)
 - legumes such as soybeans and alfalfa
 - vegetables and specialty crops
- Recently approved "Continuous High-Residue Minimum Soil-Disturbance" report notes adjustment of literature review nutrient benefits according to the proportion of crops not receiving manure (determined from USDA-NASS census data). Why wasn't this manured/non-manured approach used in Tier 2 recommendations?



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Scientific Concerns

- The Tier 2 report identifies manure incorporation as a component of Tier 2 management. If this is the case, will additional model reductions be given once this particular practice is investigated and approved through the WQGIT?
- Proposed Technical Appendix answer is “no”. The panel clearly identified manure incorporation as a component of Tier 2 so crediting again separately would be double-counting of benefits.
- However, 6/5/14 NutMan panel minutes say the panel thought this practice should be incorporated as a separate BMP.



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Scientific Concerns

- Another component of Tier 2 NutMan is timing of application. The panel minutes note that the model currently assumes ideal nutrient application timing. If true, why is there additional credit beyond Tier 1 for right timing?
- N split application presentation presented at the October meeting indicated one study that showed a benefit of split application (Poplar Research Farm on the Eastern Shore, MD), but another study (Forage Research Farm, Piedmont region, MD) that indicated no significant difference in N application. How was this incorporated with final recommendations?



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Scientific Concerns

- P site indices: Didn't appear to be a sub-panel assigned to evaluate the benefits of P indices. The citation in Appendix H is one study in Iowa, but does not include benefits to phosphorus. The justification on page 10 (paragraph 5) of the report, indicates an 80% or more reduction in P application on manure acres by going to Tier 2, yet there is no citation for this assertion.
- Could not find anything in the report (studies, minutes, etc.) indicating why or to what degree benefits are ascribed to nutrient application setbacks



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Scientific Concerns

- How much did each component of Tier 2 contribute to the final benefit recommendations?
 - Reduction in application rates
 - Manure incorporation
 - Manure application timing
 - N split applications
 - N fertilizer banding
 - P site indices
 - Nutrient application setbacks
- Simply need more detail from well qualified experts that have already dedicated significant time to this effort.
- Documentation of the decision-making that lead to the conclusions of the report isn't clear enough.



Nutrient Application Management

Data and Documentation for Compliance

- Response to substantive comments and panel report explain that compliance wasn't part of the panel's original charge
- Tier 2 definition and report don't provide enough direction for compliance measures
- Watershed Technical Workgroup and the Technical Appendix
 - Accommodating Tier 2 with Scenario Builder + Watershed Model
 - Tracking and reporting of BMPs
 - Quality of BMP data
- Questions:
 - How will a state make determinations to move a Tier 1 acre into Tier 2?
 - What practices would be eligible for full Tier 2 benefits? Are all components relevant to N and P (among the 6) required? A fraction of the components? Which ones and to what degree?
 - What documentation is to be used in the assessment of eligibility for Tier 2 benefits?



Nutrient Application Management

Data and Documentation for Compliance

- The proposed Tier 2 recommendations without verification of compliance could put 2.5 million acres of Tier 1 nutrient management (reported last year) into Tier 2 this year with about twice the nutrient benefits, with no corresponding shift in on-the-ground management at larger scales.
- Puts us in danger of over-reporting on such a heavy-hitter practice
 - Washington Post, 2004 “Bay Pollution Progress Overstated-Government Program's Computer Model Proved Too Optimistic” →
 - Several years with OIG →
 - Quality Assurance Project Plans (QAPP) from each state sector +
 - NSF Independent Evaluator (BMP effectiveness/tracking and accountability →
 - Heightened verification



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USDA CEAP Findings

- Increases in applications of nitrogen and phosphorus above crop need can be substantiated for the period 2003-2006 through 2011
 - “Impacts of Conservation Adoption on Cultivated Acres of Cropland in the Chesapeake Bay Region”, 2003-06 to 2011, USDA Conservation Effects Assessment Project (CEAP), Conservation Progress Report, November, 2013.
 - USDA's comparison of almost a thousand sample points from farmer surveys (NRI-CEAP Cropland Survey) over a 5-8 year period representing the diversity of soils and other conditions for cropped acres in the Chesapeake Bay region.
 - Assessment of what conservation practices were in use and a collection of detailed information on farming practices – including how farmer behavior regarding all elements of Nutrient Application Management has changed.
 - Good news for conservation-tillage, cover crops and structures!



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USDA CEAP Findings

- After CEAP's considerations of crop yield increases over the period 2003-06 to 2011, the report shows the following for the CB watershed:
- After crop yield improvements, there are **net increases** in N and P applications above crop need.
- **Increases** in application rates and, generally, **decreases** in appropriate rate, timing, and method.
 - 11% increase in N use above crop need
 - 4% increase in P use above crop need



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USDA CEAP Findings

- Increase in nitrogen use can be substantiated:
 - Annual nitrogen application:
 - 10 percent **increase**, including a 9 percent **increase** in commercial fertilizer application and a 13 percent **increase** in manure nitrogen application
 - Appropriate nitrogen application rate on all crops in rotation, including manure applications:
 - 9 percentage point **decline**, from 32 to 23 percent of cropped acres;
 - Appropriate nitrogen application timing on all crops in rotation, including manure applications:
 - 14 percentage point **decline**, from 50 to 36 percent of cropped acres; and
 - Appropriate nitrogen application method on all crops in rotation, including manure applications:
 - 7 percentage point **decline**, from 34 to 27 percent of cropped acres



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USDA CEAP Findings

- Increase in phosphorus use can also be substantiated:
 - Annual phosphorus application:
 - 6 percent **increase**, including a 5 percent **increase** in commercial fertilizer application and an 11 percent **increase** in manure application
 - Appropriate phosphorus application rate on all crops in rotation, including manure applications:
 - **Maintained** 2003-06 conservation level, 54 and 57 percent of cropped acres in 2003-06 and 2011, respectively;
 - Appropriate phosphorus application timing on all crops in rotation, including manure applications:
 - 11 percentage point **decline**, from 53 to 42 percent of cropped acres
 - Appropriate phosphorus application method on all crops in rotation, including manure applications:
 - **Maintained** 2003-06 conservation level, 42 and 37 percent of cropped acres in 2003-06 and 2011, respectively



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Data and Documentation for Compliance

- Procedures for Annual Model Progress Assessments
- CBPO questions BMP implementation rates that greatly exceed historic rates during every annual Progress assessment – needing assurances of data quality through the mechanism of a QAPP (Quality Assurance Project Plan).
 - For issues flagged:
 - Is there a data error?
 - Was there an initiative that gained traction or additional funding source of tried-and-true BMPs?
 - Is there a new source of BMP data that's just now simply being reported?



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Data and Documentation for Compliance

- QAPP = Quality Assurance Project Plans for the collection and use of environmental data are required from Bay Program jurisdictions as part of Implementation Grants.
- Beginning in 2006 for point and non-point source BMP data reported annually to CBPO for use in environmental tools, each grantee is required to have a QAPP.
- QAPP needs to be updated to include new BMPs and BMP sources, changes in tracking and reporting procedures, changes in assessing quality of BMP data, etc.
- Another surge in improving QAPP and BMP data with the introduction of NEIEN reporting in 2011.



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Data and Documentation for Compliance

- For each BMP in each QAPP:
 - Detailed description of the data sources and procedures being used to process, compile, and analyze the data prior to submission to the CBP office annually.
 - Define the acceptance criteria for the use of this data in the project and discuss any limitations on the use of the data resulting from uncertainty in its quality.
 - Specifically address the reasonableness of each BMP's implementation level, understanding CBP BMP definitions and how environmental data is applied in CBP watershed models.
 - Does each BMP's implementation level reasonably reflect on-the-ground conditions?



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Data and Documentation for Compliance

- Since the TMDL 2009 baseline, reported acres have changed for individual states as below:
 - Over 600K acre (51.2%) **decrease** in State 1 reported acres in NutMan
 - Over 200K acre (20.6%) **decrease** in State 2 reported acres in NutMan
 - Over 94K acre (72.6%) **decrease** in State 3 reported acres in NutMan
 - Over 44K acre (22.2%) **decrease** in State 4 reported acres in NutMan
 - Difficult for states to substantiate higher levels of NutMan
 - 400K acre movement from traditional NutMan to Decision Agriculture + Enhanced NutMan
 - Over 136K acres (69.2%) **decrease** in reported acres in Cover Crops
 - 25K acre **increase** in reported Forest Buffers acres **re-adjusted** for data error
 - Substantial swings in reported stream restoration from data errors.
 - Volatility in reported EandS as tracking improved and connections made to BMP definition.



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Technical Appendix

- If Tier 1 is N-based manure rates and Tier 2 is P-based manure rates, will Scenario Builder be run under N-based conditions for calculating rates for Tier 1 acres and P-based conditions for calculating rates for Tier 2 acres – and if not, why not?
- What if there's both Tier 1 (N-based) and Tier 2 (P-based) in the same county or Watershed Model segment (Scenario Builder doesn't operate at finer scales since so much of the data isn't sub-county)?
- Answer



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Technical Appendix

- The implementation period for BMP data reported to CBPO (in a week) for 2014 Progress is July 1, 2013 – June 30, 2014. How can Tier 2 be reported now when there was a lack of information about the BMP (no report) when it needed to be tracked?
- Isn't there a WTWG-imposed lock-down period for changes or additions to NEIEN-reported data to avoid this situation?
- Answer



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Technical Appendix

- What specific data and documentation does a jurisdiction need to provide to CBPO to ensure acres reported for the annual model progress assessment under Tier 2 Nutrient Application Management meet the definition of the BMP?
- Specifically, what is the documentation that's supported with records referred to in the following excerpt from the Tier 2 definition? " . . . Implementation of formal NM planning is documented and supported with records demonstrating efficient use of nutrients for both crop production and environmental management . . ."
- There are several questions not addressed by the panel about the need for specific criteria or guidance that would qualify an acre managed under Tier 2 to be reported as Tier2.
- Other data reporting requirements correlated to the Tier 2 may need to be determined by relevant WQGIT workgroups, committees, and EPA (as part of grant and cooperative agreement QAPP).
- Possible Answer = In part, annual TN and TP application rate changes and appropriateness of rates, timing, and methods – for both manure nutrients and commercial fertilizer.



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Technical Appendix

- According to the report, “implementing a nutrient management plan consistent with the approved Tier 2 definition, acres having a very high phosphorus test, which are most often manured acres, are applying only about 10-20% of the P that was previously allowed under Tier 1. This 80% or more reduction in P-application rates from manure, combined with those acres that are not phosphorus limited (receiving a Tier 1 P rate), would yield at least an estimated 10% reduction in P loss.”
- So according to these criteria, acres reported as managed under Tier 2 would need to show at least an 80% TP application reduction to get a 10% TP load reduction in the model?
- **Proposed Answer = It seems, according to the panel's report, yes.**



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Technical Appendix

- According to USDA, soil testing on manured acres prior to applying more manure occurred on only 37 percent of cropped acres in 2011 for the CB watershed as a whole. Are similar types of data needed for determining Nutrient Application Management compliance for CBP reporting?
- Proposed Answer = Yes. Methods and data for calculating compliance rates and the degree of eligibility for tiers of Nutrient Application Management will be part of each state's QAPP.



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Technical Appendix

- Can acres be reported for Tier 1 or Tier 2 model credit that are part of an operation that simply has a written Nutrient Management plan?
- Answer = No. There needs to be demonstrated elevated change in nutrient management action from Tier 1 actions. Those changes don't include solely upgrading written plans.



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Technical Appendix

- According to the panel's response to comments, "Verification programs must be documented in 2015 and fully implemented by 2018." Does this mean documentation and data no longer have to be provided to CBPO regarding the quality of environmental data reported to EPA and, specifically, data on compliance levels and changes in application rates over time?
- Answer = No