Chesapeake Bay Foundation – November 19

Current recommendations for Tier 2 would result in a 6.5% increase in nitrogen removal efficiency and a 10% increase in phosphorus removal efficiency for HWM, LWM, HOM, PAS, HYM, ALF, and URS land uses over Tier 1. We appreciate the work of the NM Panel to work expeditiously to address questions raised on the earlier draft. Unfortunately, for reasons highlighted below, the Chesapeake Bay Foundation still does not believe there is sufficient justification for these efficiencies to be adopted at the present time.

According to the revised report, Tier 2 NM consists of 6 planning components: manure incorporation, manure application timing, N split application, N fertilizer banding, P site indices and nutrient application setbacks. The NM Panel broke into subpanels to consider some of these various components. These groups met during the summer and in October. Our comments are derived from reviewing the minutes from these meetings, the draft report, and associated appendices.

1. *Manure incorporation*: According to NM Panel meeting minutes (June 5, 2104), the panel thought this practice should be incorporated as a separate BMP. If so, then attributing any credit to this practice is not appropriate given it will be considered as stand- alone BMP.
2. *Manure application timing*: According to the meeting minutes (July 18, 2014), Chris Brosch indicated that the model currently assumes the ideal nutrient application timing. If true, then additional credit beyond Tier 1 is not justified. In addition, note this component seems to apply only to manure application, yet additional benefits for Tier 2 are also given to land uses that use commercial fertilizer. In addition, the technical references used to support this practice (page H-3) are very limited. One appears to be based on experiments in soil boxes with no crops growing, the others are based on studies in Quebec and compare fall and spring applications.
3. *N split application*: According to the meeting minutes (July 14, 2014), there was a need for more data/information. In addition, Ken Staver noted that most of the existing studies did not measure leaching – obviously a major pathway for nitrogen loading to the Bay. Appendix H lists the available studies that include a study in Florida and Minnesota. It is not clear if these studies included surface and subsurface flows. In addition, the studies did not present information on total nitrogen, just nitrates. The presentation on split application presented at the October meeting indicated one study that showed a benefit of split application (in terms of N applied) for one study (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.
4. *N fertilizer banding*: According to the meeting minutes (July 18, 2014) Doug Beegle indicates there may not be current research on fertilizer banding – other subpanelists agreed with this statement. The meeting ended with the decision to have a second call to discuss when more data was available. There is no documentation of this second call. The information presented in Appendix H included two studies – one in WV and one in PA. The WV study included only an assessment of concentrations in the first runoff event. It is unclear if this study looked at subsurface leaching. The PA study did indicate decreased N and P loadings under some conditions, but it also noted an increase in N subsurface leaching in one of the treatments.
5. *P site indices:* There apparently was no subpanel 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 something about an 80% or more reduction in P application on manure acres by going to Tier 2, yet there is no citation for

this assertion. It will only be soils with high soil phosphorus, not all fields, where manure application will be constrained. Presumably the increase in phosphorus pollution removal efficiency is driven by the use of P indices. We do not believe that applying this efficiency to land uses that do not receive manure is technically sound. In addition, we note there is variation among states in the P indices and their use e.g., some consider subsurface transport and some do not and this would also influence the pollution removal efficiency.

6. *Nutrient Application Setback:* According to the subpanel meeting minutes, several members of the panel (Chris Brosch, Doug Goodlander) indicate that based on the available studies, no reduction should be ascribed to this practice. The one study referenced in Appendix H indicated no difference in phosphorus and that nitrogen was not reported.

Lastly, we note pages 11-16 of the draft report summarizes the challenges and limitations of the available data, highlighting the uncertainty associated with making decisions based on the available information.

Taken in the aggregate, as presented, we do not see sufficient justification for the Tier 2 efficiencies chosen. This is not meant to question the scientific credibility of the expert panel who clearly are well qualified and have dedicated significant effort to this effort. As noted earlier, CBF is grateful for their contribution and willingness to volunteer their time and expertise. The problem is that the documentation for decision-making does not provide the needed support and transparency to lead to the conclusions of the report or, in our opinion, meet the level of justification seen in other similar panel reports. As a result, we believe moving forward at this juncture would lead to compromising the integrity of this process of assigning BMP efficiencies.

As a side note, in the Appendix I, response to comments, we noted that our reference to the CEAP report was not focused on the modeled loads, but rather the information gained from farmer surveys about the level of nutrient management being implemented in the Chesapeake Bay Watershed. As a result, the response does not address the question we intended to raise. From our perspective, this information will be important to consider, in the future, when the jurisdictions will determine the level of implementation to report to the Chesapeake Bay Program.

Chesapeake Bay Foundation - November 3

First of all, please pass along our sincere thanks to members of all the expert panels. We recognize these folks volunteer their time and expertise and we very much appreciate their willingness to do so. Their participation is critical to maintaining the scientific integrity associated with the Chesapeake Bay Watershed Model.

Our comments are offered in the spirit of maintaining this level of integrity as well as ensuring the process of revising BMP efficiencies is transparent. Specifically, the Panel proposed the existing NM approach be replaced by three tiers of management: (1) Crop Group Nutrient Application Management (CGNAM), (2) Field Level Nutrient Application Management (FLNAM), and (3) Adaptive Nutrient Management (ANM). And ultimately they made recommendations for efficiencies for both Tier 1 and 2 levels of management.

We have concerns about the adoption, at this time, of an efficiency for Tier 2. For one, documentation and support for this decision by the Panel is lacking from the public record. Since we have not been tracking the revisions to the nutrient management efficiencies closely, we reviewed the meeting notes of the Panel to get a sense of the discussions and scientific documentation. We note that there were a series of meetings of relevant subgroups in July 2014 that discussed various components that could be included in Tier 2 NM. From the reading of the meeting notes of most of these subgroups, however, there were no clear decisions or recommendations. Then, at the next publically documented meeting in October 2014, efficiencies for Tier 2 were adopted. We also note that in the summary of the current working draft of the Panel recommendations (p.4) that "The Panel did not estimate FLNAM and ANM effectiveness because of time constraints." From someone on the "outside" of this process, the recommendations for efficiencies for Tier 2 do not appear to be well supported, nor the decision-making, transparent.

It is our understanding that many states believe their current programs would justify claiming large amounts of cropland under Tier 2 NM. Once this occurs, nutrient reductions associated with nutrient management will increase dramatically – due to a change in accounting, not a true change in management. From the "public" perspective, this is problematic for several reasons. For one, this benefit does not jive with recent observations about the effectiveness of nutrient management in the Bay region. For example, the USDA CEAP report found that only 5% of cropland in the Bay watershed meets USDA's own criteria for appropriation N and P management. Application rates of commercial fertilizer and manure increased between 2006 and 2011 (the two CEAP time periods) and there was a decrease, between 2006 and 2011, in the amount of cropped acres that have appropriate nitrogen management, from 13 to 7%. Phosphorus management generally either improved or stayed the same between the two CEAP study time periods when looking at commercial and manure, combined. But when manure is looked at separately, appropriate application rates for all crops in rotation dropped by 8 percentage points, from 17 to 9 percent of manured cropped acres. Given these observations, estimating a large reduction from NM at this time, presents a distinct difference between

documented behavior and modeled benefits. Communicating this disconnect to the "public" will be challenging.

We are also concerned about such a dramatic change in BMP efficiencies before the states have adopted verification protocols. In the future, unless states adopt acceptable verification approaches for a particular BMP, they will not be given credit for implementation. NM is probably one of, if not the, most difficult BMPs to verify. Giving credit to Tier 2 NM now and then possibly having to remove some or all of the credit in the future will only add to confusion and suspicion about the validity of the model. Ideally, we were hoping that the adoption of the verification protocols would occur before the midpoint evaluation – because of the potential implications for verification for all BMPs and nutrient crediting. Unfortunately, the schedule for final adoption is not until 2018. **Consequently, we recommend that this change to the model not be included until the states adopt and finalize their verification protocols.** If states want to get credit for Tier 2 before 2018 (when the verification protocols are to be finalized and approved), we recommend they also have to provide robust verification of the implementation of this level of NM. Per the verification process, their verification plan should be reviewed by the Verification Expert Panel. As noted above, the CEAP report seems to demonstrate there is much room for NM improvement, so verification for claiming additional benefits at this time seems warranted.

CBPO Modeling Team Comments and Email Exchanges – November 6 (Text from report or responses from panel in blue)

Summary of Concerns:

- Proposed Tier 2 Nutrient Management benefits 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.
- There's the potential for full credit of the recommended benefits even though there was no corresponding shift in on-the-ground management.
- According to USDA (CEAP), application rates of N and P on crops have increased over a recent 7-year period for the CB watershed as a whole – for both manure and fertilizer nutrients.
- We also recently obtained data showing significant increases in N fertilizer sales from 2007-2012 in all states but WV – and increases in P fertilizer in MD and PA. The increasing use of fertilizer tracks big jumps in corn production and it is to a degree beyond what improved yields could achieve.
- Both of these lines of evidence are strong and are contrary to the effect of jumping 2.5 million acres of crop to Tier 2 with twice the nutrient benefits of Tier 1.
- The Nutrient Management Expert Panel seems reluctant to address this issue in their report – implying it's solely a verification problem. However, their premise is that Tier 2 is different than Tier 1 because of heightened oversight by the state, conservation districts, etc. and more required reporting by farmers.
- We've asked for more clarity in the report about what data and information needs to be provided (possibly to CBPO) to verify being at Tier 2 levels. Clarity is essential to address the yearly debate with states about compliance of their reported 2.5 million acres in Nutrient Management.
- We would like the issue to be thoroughly reviewed according to the BMP Protocol (including adequate time for comments and responses to substantive comments in the public record) rather than rush it through to get it into 2014 Progress.
- If this is more about verification, then the CBP Verification Committee should have time to thoroughly vet.
- Of all BMPs that have been through panels, this one needs more scrutiny because of the extent and potential benefits of the practice and its high visibility among stakeholders.
- On the Tier 2 Nutrient Management: What should states be submitting this year? Last year we assumed that states were at the more traditional level of Tier 1 Nutrient Management, and their reductions (except for in DE) mirrored fairly well their reductions they would have received with the land use change BMP. I'm concerned that states may claim to be at Tier 2 Nutrient Management for this progress year even though they weren't submitting any

enhanced nutrient management last year. That would double the reductions of P for every acre of nutrient management without there really being a change in management actions on the ground. Do you think most states are at Tier 2, or are they still at Tier 1?

- Response: All the states have Tier 2 plans. Every state with the exception of perhaps PA and WV will have a majority Tier 2 plans. All of VAs plans are tier 2. Enhanced NM is completely different, so it doesn't surprise me that few states submitted a handful of acres.
- It would be best to have a table in the report listing each state, the year Tier 2 began, and the basis for beginning Tier 2 that particular year. As you know, if Tier 2 is introduced in 2014 Progress, it will appear as if there's been a major increase in implementation when, in fact, there's been little change in management on the ground from last year for this particular BMP. There will likely be stakeholders who publically question the abrupt "paper" shift so we need to be prepared – and have clear, specific documentation from the experts on this panel that can be cited – and, if that doesn't meet the needs, be available for questions that come to the office about the recommended benefits.
- So does the use of Tier 2 Nutrient Management result in a reduction in application rates or changes to the other 3Rs on the ground? How long has every state been at Tier 2? Does it go all the way back to the calibration?
- Response: Tier 2 came on the scene around 2005 depending on the land grant university, state agency and the regs, so as far as acres in calibration, I would estimate very few. Tier 2 is a change in rates, especially an increase in acres getting no rate. Several components in tier 2 are based on the other 3 Rs.
- Is there any chance some of those details could be included in the report? I think including descriptions as you just did in the main text would answer a lot of questions from partners at the WTWG level and beyond.
- If Tier 2 Nutrient Application Management is introduced for 2014 Progress to the levels you're predicting, there will be significant model load reductions attributed to the BMP that will contradict measured trends in loads. According to an in-depth analysis of 25-30 years of monitoring data by USGS, 6 of 9 major tributaries are showing degrading conditions in TOTP loads over a recent 10-year period – where long-term trends were not as dire. Degrading conditions for TOTP are measured for Susquehanna, Choptank, Rappahannock, Pumunkey, James and Appomattox – many of which are predominantly agriculture above the fall line.
- For nitrogen, only 1 of the 9 major tributaries is showing improving conditions in TOTN loads over a recent 10-year period (wastewater-dominated Patuxent). The other 8 have flat-lined, i.e., no improvement in TOTN loads. There were decreasing TOTN loads in the Susquehanna and Potomac over the long term – that have recently leveled out. This implies it's not lag times.
- The point is that the effect of the panel's recommendations, for (apparently) one of the most extensive BMPs in the watershed, yield results in the model that directly contradict observations – when we know monitored wastewater discharges and atmospheric

deposition are, in fact, decreasing. Please comment how the initiation of Tier 2 Nutrient Application Management across extensive regions of the CB watershed (which would greatly affect surface runoff and groundwater discharge) could occur when water quality conditions stopped improving or began to degrade in these same regions –and where conditions continue to degrade many years later.

- The Nutrient Management Expert Panel seems reluctant to address this issue in their report – implying it's solely a verification problem. However, their premise is that Tier 2 is different than Tier 1 because of heightened oversight by the state, conservation districts, etc. and more required reporting by farmers. Please address.
- I believe your panel didn't want to address verification, but it's right there in the definitions. It's great that this is part of the definition, but we need more clarity on "Implementation of formal NM planning is documented and supported with records demonstrating efficient use of nutrients for both crop production and environmental management." There should be specifics in the Technical Appendix and the report about what kind of documentation or what kind of records/data are needed from state/federal/districts to substantiate the reported implementation follows the definitions of Tier 2. Knowing the history of reporting this BMP for model purposes, the documented specificity is imperative.
- If this is more about verification, then the CBP Verification Committee should have time to thoroughly vet. Does the panel agree?
- Of all BMPs that have been through panels, this one needs more scrutiny because of the extent and potential benefits of the practice and its high visibility among stakeholders. Does the panel agree?
- What are the minimum reductions in N and P application rates – and changes in timing, method and form – that correspond to the recommended loading reductions in the report.
- The reader of this report determined that the Expert Panel's definition of nutrient management (NM) is vague and inadequate. Furthermore, the recommended credit for NM is inconsistent and does not reflect comprehensive data and information from USDA specific to the Chesapeake Bay watershed over many years as well as quality data over a similar time period from the Association of American Plant Food Control Officials (AAPFCO) regarding fertilizer nutrient use, also specific to the Chesapeake Bay watershed.
- Although better than definitions for Decision Agriculture and Enhanced Nutrient Management, the recommended definitions are still vague to the point of not being able to establish whether an acre reported under Tier 2 clearly follows the definition and, therefore, is eligible to receive the recommended nutrient reductions for model purposes. Clear definitions were one of the primary reasons the panel was established – to end yearly lengthy debates about the eligibility of acres reported under Nutrient Application Management. This issue remains unless the definitions are clearer. What data and information are needed (and needed to be reported to CBPO) to establish and verify an acre in Tier2 opposed to Tier 1 and opposed to no Nutrient Application Management?

- According to the report, “Verification considerations were discussed and the discussion has been deferred to its own Expert Panel established by AgWG on September 29, 2013. The Expert Panel intends to yield to the newly created Agricultural Management Plan Expert Panel for developing guidance on how to verify nutrient application management BMPs. The panel notes that verifying active plans in compliance with the approved definitions presents unique challenges compared to BMPs that are visibly implemented.” Would the panel confirm that there is, in fact, a newly created Agricultural Management Plan Expert Panel? Knowing how approval of the panel’s recommendations are being “expedited”, when will a verification group develop guidance on how to verify nutrient application management BMPs – as recommended by the panel? When does this occur in the BMP Protocol process?
- A considerable amount of the Tier 2 report seems to be a review of a literature review conducted by the panel’s contractor – and written by the contractor. Why did the panel choose not to explain how and which information from the literature review – was used in their judgment of Tier 2 benefits? Please explain this disconnect between the search findings (written in great detail) and the panel’s recommendations. How, specifically, was information from the search assessed according to Protocol guidelines and used.
- According to the report, “The Panel indicated that all three NM tiers likely have acres available for credit in every state.” What’s the basis of this statement for Tier 2 when the panel has not clearly defined what meets and doesn’t meet the definition – a vital charge given to the group?
- According to panel recommendations, “acres that could not be verified should not be credited.” Since the panel is made up of 28 experts in Nutrient Application Management, it would be helpful/essential to have documented discussion of this statement.
- How (and to what degree) were results of studies included in Appendix A used in the panel’s recommendations?
- The BMP protocol “Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model”, July 2014 states that it’s critical for BMP definitions and effectiveness estimates be developed in a process that is consistent, transparent, and scientifically defensible. For transparency and consistency with other panels, did the Nutrient Application Management panel adhere to the following?
- The report state that all panel members agree to all recommendations and, if there are any dissenting opinions or caveats to agreement, they need to be a part of the report.
- That the panel members receive all substantive comments about the report, write responses to these comments in the report, and have these substantive questions/responses addressed prior to voting for approval by the Agriculture Workgroup, Watershed Technical Workgroup and Water Quality Goal Implementation Team. According to the BMP Protocol, “although the Panel Chair and Coordinator are responsible for managing the comment process, Panel members may be expected to address and respond to comments received during the comment period for the relevant draft of the

Panel's recommendations." How many of the 28 members of the panel wrote responses to comments?

- According to the BMP Protocol, "the Scientific and Technical Advisory Committee (STAC) will also be afforded the opportunity to comment before final approval." Has this report been provided to STAC for comment or just to members of the Agriculture Workgroup, Watershed Technical Workgroup and Water Quality Goal Implementation Team?
- According to the BMP Protocol, "the Expert Panel will develop definitions and loading or effectiveness estimates for nutrient- and sediment-reducing technologies and practices. The Panel will work with the source Workgroup and WTWG to develop a report that includes the following:" Please identify where in the report these requirements are addressed, or if they are not addressed, include the element in the report – to follow protocol.

    - Justification for the selected effectiveness estimates, including
    - Detailed discussion of how each reference was considered, or if another source was investigated, but not considered.
    - Description of how best professional judgment was used, if applicable
    - Conditions under which the BMP works:
    - Should include conditions where the BMP will not work, or will be less effective. An example is large storms that overwhelm the design.
    - Useful life; effectiveness of practice over time
    - Cumulative or annual practice
    - Description of how the BMP will be tracked, reported, and verified:
    - Documentation of any dissenting opinion(s) if consensus cannot be reached
    - Operation and Maintenance requirements and how neglect alters performance

- According to guidelines in the BMP Protocol, negative results need to be considered. Specifically, "where studies with negative pollution reduction data are found, they should be considered the same as all other data." During the time since cropland became eligible for the panel's criteria of Tier 2 Nutrient Application Management, there are several lines of evidence (through quality data covering the entire Chesapeake Bay watershed) showing that application rates to cropland for nutrients INCREASED for both manure and fertilizer – beyond what can be substantiated through improved yields. Why didn't the panel consider this information – if eligibility for Tier 2, according to the (vague) definition, seems to essentially be changes in plan recommendations and record keeping?
- Please explain how the period for review, comments, and approval for these recommendations DOES NOT violate the BMP Protocol, specifically, "The Panel

Coordinator and/or sector Workgroup Chair will be responsible for distributing the draft Expert Panel report at least ten business days in advance of each kick-off meeting, and at least ten business days in advance of the approval meeting of the (1) source sector Workgroup and WTWG; and (2) the WQGIT. The review and comment period for each stage shall be twenty business days in duration beginning the business day after each kick-off meeting and ten business days prior to the approval meeting.

- As we're still in the comment period for this report, how will the following element in the BMP Protocol be adhered to? [The Panel Chair and Coordinator will be responsible for developing a "response to comments" document that provides a response to comments received. This document will be posted as an appendix to the final Panel's report.] How can a vote on approval of the panel's recommendations be taken prior to workgroup members seeing any response to comments from the panel?
- How and when will the panel adhere to the following in the BMP protocol? "In the event that a comment does not result in a change to the review Panel's report, the Panel Chair and Panel Coordinator shall work with the specific commenter(s) to resolve the issue." As with all other panels, this needs to happen prior to a request for approval of recommendations.
- How and when will the panel adhere to the following in the BMP protocol? "In the interim between the two approval meetings, the objecting member(s) shall work with the respective Panel Coordinator, Panel Chair, Workgroup/GIT Chair and Coordinator to resolve the objection, including drafting clarifying text or proposing an alternative option."
- Will the following from the BMP protocol be adhered to? "In the event that the Expert Panel recommendation(s) are modified during the review and comment period, a separate section will be added to the Expert Panel final report explicitly detailing the original Expert Panel recommendations and how those recommendations were modified as reflected in the final report. In addition, any unresolved issue(s) or dissenting opinions should also be included.
- Please respond with respect to the line in the report, "The Panel based the effectiveness solely on LGU recommendation changes over time because of a lack of scientific literature documenting efficiencies of the proposed practice." Is the panel saying there's a lack of scientific literature about a BMP that has the potential of affecting 2.5 million acres in the Chesapeake Bay watershed that, according to the report itself, "is one of the oldest best management practices (BMPs) in agriculture and is the cornerstone of stewardship efforts by conservation groups, producers and jurisdictions.
- As with all panels, draft reports go out at the various stages of approval (providing enough time to review) so that comments can be compiled, addressed by the panel, and documented in the report – all before approval is requested. I can't think of any BMP to-date where this is more important than Tier 2 Nutrient Application Management. CBP is doing this for relatively minor (in implementation) urban practices and there have been several roadblocks along the way to approval that were eventually addressed by the panel, chair, or coordinator to satisfaction. There needs to be the same thorough review and

comments from stakeholders – and a response to the comments as part of the public record which is the report. Does the panel understand why this is important and agree that there shouldn't be a different set of WQGIT rules for this panel?

- It's imperative the answers to member comments and questions be part of the record, which is the report. Once a report is approved, we have nothing from the panel in the record to cite or to go to for guidance in answering questions. I anticipate there will be many questions regarding Tier 2 during the 2014 Progress run. In the past, results from progress model runs have been delayed for months as the definition of Decision Agriculture and Enhanced Nutrient Management were debated. As the panel report notes, there was nothing to go to for clarity on these practices – so the debate came about because of different "interpretations" of the definition. I see the same thing happening for, at least, the part of the Tier 2 definition "supported with records demonstrating efficient use of nutrients for both crop production and environmental management." Where in the report are listings of types of records that would suffice – according to the panel?
- If "FLNAM is a new practice that reflects the substantive change in NM that addresses P applications and methods by the LGUs and jurisdictional policies circa 1995," why is the panel saying implementation of Tier 2 begins 10 years afterwards?
- Why does the report state, "In the absence of historic surveys on nutrient applications to crops" when, a year ago, the panel was provided with a USDA report based on high-quality data – describing, in detail, changes in fertilizer and manure nitrogen and phosphorus application rates to crops, changes in timing, form, and method over a ~ 7 year period of Tier 2 Nutrient Application Management that's specific to the Chesapeake Bay watershed? The report states that there have been increases in both N and P application rates over this period and specifically notes "Crop use efficiency remained relatively constant." Please reconcile.
- Report: Benchmark efficiency was defined as the additional efficiency reduction (beyond Tier 1) that would be achieved when a Tier 2 plan was followed on a field. To determine the total efficiency for a Tier 2 acre for a landuse the benchmark efficiency described below for Tier 2 is added to the Tier 1 efficiencies (an approach commonly termed as "stackable"). [This isn't quite what "stackable" is. It's different BMPs treating the same acre; more like a treatment train effect with the multiplicative benefits. Stackable Tier 1 and Tier 2 would be multiplying the benefits of the tiers which is not what's being recommended.]
- Report: The phosphorus benchmark efficiency of 10% TP for implementing a Tier 2 plan on Tier 1 acres was selected and approved by the Panels for all agricultural landuses. This was based on the estimated amount of phosphorus not applied as a result of using environmental P-risk assessment tools like the P-site index across all agricultural lands, but most importantly on lands receiving manure. To expand, 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. [Now I really don't understand so please address the following comments in response to the report's description of how the panel went from a literature review to efficiency recommendations. The estimated 10% reduction in P loss recommended by the panel considers or takes into account acres that are receiving a Tier 1 P rate – while the same report and panel members say that compliance is not part of the panel's charge and was not considered by the group. Additionally, what does one do in a state like VA that intends to report all acres in Nutrient Application Management as Tier 2 – while the recommendation is based, in part, on considerable amount of acres in Tier 1? Does the recommendation imply an 80% or more reduction in P-application rates from manure on all corn, soybeans, wheat, etc. and how do the recommendations account for crops that don't get manure, e.g., soybeans, and the vast majority of crops that see only chemical fertilizer?]

- According to USDA, soil testing on manured acres prior to applying more manure increased from 15 percent to 37 percent of cropped acres – from the end of the WSM calibration through 2011. So just over a third of the cropland has enhanced management. How do the efficiency recommendations account for the nearly 2/3 of cropland that doesn't have soil testing?
- Report: 10% P efficiency is directly linked to using P-based manure rates rather than N-based manure rates. [For the technical appendix, SB applications would be under P-based Nutrient Management rather than N-based, but don't know what to do if there's both Tier 1 (N-based) and Tier 2 (P-based) in the same county.]
- Report: A summary of these benchmark values is given in Table 1, which lists the separate reduction effectiveness values for Tier 1 and Tier 2, and the combined reduction effectiveness values for Tier 2 that results from the stacking Tier 2 onto Tier 1 (see last 2 columns in Table 2). Table 2 also lists the application of the Tier 1 and Tier 2 estimates, and the combined stackable Tier 2 reduction efficiencies for the current Land Uses in Phase 5.3.2. Table 2 also shows that manured lands receive a higher reduction effectiveness than other Land Uses [There are a lot of crops in the hwm + lwm, etc. categories that don't get the degree of manure because there's no substantial benefit and because operators never use manure to fertilize, just chemical fertilizers. How does this fit into the recommended reduction efficiencies in the Table?] and that effectiveness values have also been included for Tier 2 where no NM credits previously existed (nursery).

Official Panel Responses and Follow-up Questions/Comments from CBPO Modeling Team – November (Blue text indicates follow-up questions/comments)

Response to substantive comment: **How does this recommendation account for the CEAP report?** Additionally, the Panel did not attempt to link our estimates to other models (i.e. CEAP or Sparrow) because of the uncertainties in how these other models were calibrated and validated to the field-level Chesapeake Bay conditions.

There are many comments about the panel's draft report that focus on CEAP are NOT related to loads estimated by models. Please read the comments carefully. All CEAP references address statistical results of USDA's comparison of almost a thousand sample points from farmer surveys (the NRI-CEAP Cropland Survey) over a 5-8 year period (that's largely post-WSM calibration) – representing the diversity of soils and other conditions for cropped acres in the Chesapeake Bay region – to determine what conservation practices were in use and to collect detailed information on farming practices – including how farmer behavior regarding all elements of Nutrient Application Management has changed.

Response to substantive comment: Instead, the experts focused on using reasonable effectiveness estimates for on-the-ground practices established in the Bay States in 2006 that went beyond an older era (circa 1985-1995) of NM plans summarized by Tier 1. Before BPJ based efficiencies were chosen the panel had exhaustively discussed over 75 peer-reviewed articles and considered LGU recommendation changes from the era 1995-2005. In addition, these benchmarks were checked against unpublished data from inside the watershed, which were considered to be of unique value because these local (within the Watershed) data require no outside-inside transfer adjustments. The benchmarks were approved and the resulting efficiencies for Tier 2 were calculated and confirmed as described above.

Regarding "on-the-ground practices established in the Bay States in 2006 that went beyond an older era (circa 1985-1995) of NM plans summarized by Tier 1", the CEAP report counters what this statement contends. The following are directly from "*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.

"Nutrient management changes are best characterized as largely being maintained at 2003-06 conservation levels, with progress in some aspects countered by declines in others."

"Annual **nitrogen** application: 10 percent increase, from 95.0 to 104.5 pounds per acre per year, including a 9 percent increase in commercial fertilizer application (6.7 pound per acre and a 13 percent increase in manure nitrogen application (2.8 pound per acre per year increase)."

"On cropped acres receiving commercial **nitrogen** and/or manure based nitrogen in 2003-06 and 2011: 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."

"Annual **phosphorus** application: 6 percent increase, from 23.8 to 25.2 pounds per acre per year, including a 5 percent increase in commercial fertilizer application (1.0 pound per acre per year increase) and an 11 percent increase in manure application (0.4 pound per acre per year increase)."

"On cropped acres receiving commercial **phosphorus** and or manure based phosphorus between 2003-06 and 2011: 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; and 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."

Response to substantive comment: This concept will not violate the calibration, because the BMP was never adopted by a state until 2006 and the definition, as approved, was never utilized completely in a non-cost-shared system. Furthermore it is impossible to estimate the extent of some components on the landscape during or before the calibration and this is one of the reasons the protocol insists conservativeness be added. The panel is confident an appropriate amount of conservativeness was added to these efficiencies. The model as it exists today has flaws.

It appears from major findings of CEAP's comparison of almost a thousand sample points from farmer surveys (the NRI-CEAP Cropland Survey) over a 5-8 year period (that's largely post-WSM calibration) – representing the diversity of soils and other conditions for cropped acres in the Chesapeake Bay region – to determine what conservation practices were in use and to collect detailed information on farming practices – including how farmer behavior regarding all elements of Nutrient Application Management has changed – that the post-calibration period has over-credited these practices since many of the most important elements of the BMP suite are degrading, not improving.

Response to substantive comment: **Where's the verification?** The Panel, being established and charged in 2011 prior to the Program's interest in verification, was never given the charge to address verification issues within the Panel's report.

But verification or compliance was incorporated by the panel itself in its recommended reduction efficiencies in that they have taken into account acres that are receiving a Tier 1 rate. Please explain.

Chesapeake Bay Commission – November 6

The staff has significant concerns about the implications of the Nutrient Management Expert Panel Report and contends that the report recommendations are not ready for approval at the November 6 Ag Workgroup Meeting. Furthermore, the meeting scheduled is in direct conflict with our quarterly Commission meeting precluding our participation.

Specifically, we are concerned about the lack of clarity of practice definitions and the lack of justification of the efficiencies derived. There is a critical need to address not only practice definition and efficiencies but verification as well. How can the value of a NMP double in credit if no additional action is taken or further verified?

We recommend that the Ag Workgroup adhere to the Chesapeake Bay Program Partnership's BMP protocol (July 14, 2014) and involve the verification advisors as it moves forward in building consensus.

Thank you for your attention to this request

EPA – November 6

I'd like to extend my appreciation to all the Nutrient Management Expert Panel members in volunteering their time and expertise to engage in this important work. This is likely one of the most complicated practices, covering the most acreage, and a big player in achieving nutrient and sediment reductions from agricultural land. Therefore, ensuring that we build consensus on the panel's recommendation is critical for moving forward.

In the event that this week's Agriculture Workgroup meeting is viewed as an approval meeting, I want to convey the three main comments I have on the panel's report: (1) practice definitions need more clarity, (2) justification for efficiencies for Tier 2 should be documented, and (3) significant concerns expressed by partners should be addressed before these recommendations move forward, in compliance with the BMP protocol.

Definitions. A main reason for refining the nutrient management practice was to remedy the vagueness of the current practice definition. It is still unclear to me how a state will make the determination of whether an acre is under Tier 1 versus Tier 2 management. Although the panel was not charged specifically to deal with how states will verify nutrient management practices, the definitions should be clear enough to move the states down that path to have a strong defense for why they are counting some acres as Tier 2 versus Tier 1.

Efficiencies. The report outlines many caveats regarding the data evaluated in developing Tier 2 efficiencies. Some of the shortcomings of data used for Tier 2 articulated in the report were: majority of the data are not published; majority of the data are from plot studies and extrapolation to field and watershed scales is uncertain; and many of the studies only address surface runoff and do not address other key nutrient transport pathways like leaching and subsurface flow. Although I'm certain the panel had many discussions about efficiencies, there is no discussion in the main body of the report regarding how the panel used the data to arrive at an efficiency recommendation and why the panel believes the efficiencies chosen are defensible even given the data deficiencies articulated in the report.

Partner Concerns: I understand that other members of the Agriculture Workgroup have significant concerns about the panel's report. Given the concerns being raised by multiple partners, I am expecting that the Agriculture Workgroup will invoke and follow the procedures outlined in the latest version of the Partnership's BMP protocol (July 14, 2014) approved by the WQGIT. These procedures outline a clear process and timing for reviewing, raising comments, seeking specific responses from the Panel, working through the workgroup to resolve those concerns, working towards consensus decisions, and, as a last resort, asking for a super majority vote for a decision. I expect that we, as a partnership, will take the time to hear partner concerns and questions, work through these issues, and come up with a strong, defensible approach for moving forward in how to best credit nutrient management in our decision support tools.