# Webinar Q&A

Note: Minor edits were made to the original questions posed by listeners to enhance readability.

**Q1. What size did he say the Chesapeake Bay is in sq. mi?**

Answer: The Chesapeake Bay watershed is approximately 64,000 square miles (http://www.chesapeakebay.net/discover/baywatershed). The Bay itself (water body) is 4,500 square miles

**Q2. Are stream segments identified within the watershed on a 303-D List? Or, is the Bay itself on a 303-D List by the regulatory state agency or EPA?**

Answer: It is our understanding that both the bay itself and many of its streams are listed on 303d lists for various constituents, with respect to their states. The Chesapeake Bay Program (CBP) provides information here (http://www.chesapeakebay.net/documents/5372/tmdl_2008.pdf) regarding the Bay 303d listing. Each state will list their own impaired waters. Maryland's list can be found here (http://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Pages/2014IR.aspx) as well as via the (EPA website https://iaspub.epa.gov/waters10/attains_state.control?p_state=MD).

**Q3. What is photovoice?**

Answer: It is an approach used to obtain feedback from watershed residents in which they record, visually and in audio, their perspectives about issues which they feel are important to their local community and its environmental health.

**Q4. Were there any pollutant hotspots that were a surprise? (i.e. communities or large farms that were adding more pollutants than allowed that were previously unseen before)**

Answer: For liability concerns we did not examine the hotspots as correlated to various communities or specific farms.

**Q5. Are hydrologic soil groups based on Lincoln lab data and a destructive soil sampling method?**

Answer: The Hydrologic Soil Groups (HSGs) were provided with the data. Soil data comes from the USDA NRCS SSURGO database. A description of the database and methods for taxonomic classification can be found here (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053627).

**Q6. CSA Area - Did you assume same TN and TP addition by Agriculture?**

Answer: Critical Source Area (CSA) calculations for TN and TP were done independently by constituent as well as by land use. CSA mass export is also calculated independently by each Hydrologic Response Unit (HRU). TN and TP additions were crop-dependent and added on a crop-need basis as determined by the model.

**Q7. How did you get 30% increase in precipitation with climate change? Is this a best guess?**

Answer: The 30% increase is a calculated average for the worst case (SRES A2) scenario at the end of the century as predicted by Global Climate Model (GCM) GFDL CM2.1 climate model inputs. The increase was calculated relative to the 1994-2004 period over which the model was calibrated and which served as a baseline for identifying current-

day critical source areas. It should be noted that there are several other GCMs and that a "best guess" for the end of the century is difficult to define and characterize due, in part, to model uncertainty.

**Q8. Is yield or production built into the model?**

Answer: Agricultural yield is built into the model. However, based on sensitivity analysis, we found that this factor only contributes to our results in very minor ways.

**Q9. What values are used for the effectiveness values for the BMPs? Does your model use values set by the Chesapeake Bay Program, or another source? Was unclear on how the reductions/effectiveness associated with BMPs is determined or defined. Thanks!**

Answer: No values for BMP removal efficiency were set and no specific BMPs were implemented (i.e. Filter strips, strip cropping, grassed waterways and etc.…). BMP efficiency was calculated based on what would be needed to meet TMDL targets using the presented targeting scheme.

**Q10. From models it may look like BMPs will not work in the future?**

Answer: What we try to emphasize in the presented work is that the benefits gained from BMP design using current design standards (and current climate) have the potential of being undone by climate change. Designing BMPs that will account for changes in climate is expected to be more successful at meeting TMDL targets in the future.

**Q11. Do you have any suggestions on how to adapt BMPs to future climate change? Is it a matter of implementing more BMP's or designing the BMP's with climate in mind?**

Answer: While we haven't researched this explicitly it is likely that a combination of BMPs as well as more BMPs will be needed to maintain water quality if the worst case scenario (SRES A2) is realized.

**Q12. What recommendation do you have to replicate this BMP process for forestry operations? Can your model be adapted for that change in focus?**

Answer: The short answer is, yes. The process used in our study is flexible enough to be used in any watershed. However, some process modifications might be necessary if a model other than SWAT will be used. There might also be limitations in the data available depending on where the study area is located.

**Q13. Do you feel you have effectively integrated social dimensions into your model and strategy? I don't see anything about lifestyle and economic benefits.**

Answer: We are reaching this stage of the study and will present related results at a conference this summer.

**Q14. We are doing fine now but when you use the model to jack up rainfall, then we need to do more BMP's to meet the goals? Did I understand it correctly?**

Answer: Yes and no. Unfortunately, we are not currently meeting water quality standards. This is the reason for the implementation of the Chesapeake Bay TMDL. While each state is making progress toward improving water quality they are often not considering climate change. This will end up making current efforts and infrastructure change obsolete and require redesign in the future.

**Q15. Are there any current examples of BMPs that don't include climate considerations that might fail w/ climate models?**

Answer: Climate models or climate change. With climate change, yes. It should be noted that there is a subtle difference, however, between a BMP that will have reduced effectiveness under a future climate and one that will fail completely. BMPs that store water, such as rain barrels or detention ponds, may simply overflow back to the stream or other intended path without failing. Other BMPs, however, are sensitive to the velocity and momentum of flowing water and may erode. These BMPs will be at risk of complete failure. Some examples of this might be filter strips, stream buffers and etc.… Within models BMPs are not very sophisticated and usually assume that they will not fail (this should be improved in future model revisions).

**Q16. What was the perception of 'BMPs" among farmers in the survey?**

Answer: Our survey results suggested that most farmers may be more receptive to BMPs if they are introduced to them by members of the local community, including extension agents, than if the mandate to implement them comes from more remote entities like government agents and researchers.