

**Testimony of Rick Roush, Dean, Penn State College of Agricultural Sciences  
for the  
Senate Agriculture and Rural Affairs Committee and Senate Environmental Resources and Energy  
Committee  
Regarding the  
Environmental Protection Agency's Chesapeake Bay Mandates  
October 18, 2016  
Hearing Room 1, North Office Building  
State Capitol Complex  
Harrisburg, PA**

Chairpersons Yaw and Vogel, Secretary Redding, Acting Secretary McDonnell, and distinguished members of committees, on behalf of College of Agricultural Sciences at Penn State University, it is a pleasure to discuss with you today strategies to efficiently and effectively address the Environmental Protection Agency's (EPA) Chesapeake Bay Mandates for improved water quality in the streams and rivers of Pennsylvania.

The college has been involved in the Chesapeake Bay Program and agricultural nutrient management since the early 1980s, before regulation, and participated in discussions when the idea of regulations came up in the early 90s. Our faculty and educators worked with legislators and state and federal agency staff as nutrient management legislation was being considered to answer questions and provide science-based information for their deliberations.

When the Pennsylvania nutrient management law was passed, Penn State was identified in the law as part of the education and certification program to support the law. Dr. Doug Beegle was appointed as an advisor to the state Nutrient Management Advisory Board that developed the regulations, and I believe he is the only original person still active with that board. Since then other college faculty (Ken Kephart, Bob Mikesell, Ann Swinker) have served on the board.

When the Nutrient Management Act was revised in 2005, phosphorus was identified as a major issue. The state asked our college to conduct research on the impacts of proposed Phosphorus regulations. We were heavily involved with the overall revision of the regulations to implement the Pennsylvania Phosphorus Index, which was developed by our college and USDA Agricultural Research Service Pasture Systems and Watershed Management Research Unit. We have also worked closely with the Natural Resources Conservation Service in developing national and state standards for nutrient management.

EPA eventually required each state under the jurisdiction of the Total Maximum Daily Loads allocations to develop a Chesapeake Watershed Implementation Plan (WIP) to guide how they would meet the TMDL. Estimated costs for full implementation of the WIPs for agricultural load reductions are about \$900 million **annually** across the watershed. Pennsylvania's portion is more than a third of this. Jurisdiction-specific annual WIP cost estimates are about \$19 million in Delaware, \$83 million in Maryland, \$71 million in New York, \$378 million in Pennsylvania, \$307 million in Virginia, and \$44 million in West Virginia.

For perspective on the \$378 million for Pennsylvania, the National Agriculture Statistics Service's 2015 PA summary reports PA 2012 net cash income from farms at \$1.755 billion,  
[https://www.nass.usda.gov/Quick\\_Stats/Ag\\_Overview/stateOverview.php?state=pennsylvania](https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=pennsylvania).

Our faculty's research indicates significant cost-savings could be achieved by prioritizing BMP implementation to watersheds, and locations within watersheds and prioritizing practices according to cost-effectiveness. Table 3 in the attached Kaufman article estimates a potential cost saving of 73% compared to the Phase 1 WIP. Dr. James Shortle - Distinguished Professor of Agricultural and Environmental Economics and Director of our college's Environment and Natural Resources Institute - believes that may actually underestimate the potential cost savings because the results were developed using the spatially coarse Chesapeake Bay model and that finer scale models could do better. I also believe that substantial cost savings can be obtained by building a stronger culture of voluntary action, including farmers mentoring their peers and cooperative engagement of non-governmental organizations.

The problem is more than a technology problem. New policy is essential to make headway given scarce resources. BMP research is important, but for management practices to be effectively implemented we need policies that enable broad implementation.

The college's ability to serve as an impartial facilitator; provide multi-disciplinary capabilities and expertise in soil science, crop science, animal science, hydrology, economics, engineering, law and policy; our internationally recognized research capabilities; and our continuing education mission carried out by Penn State Extension - with offices in all 67 counties - uniquely positions us to contribute in the search for balanced, cost-effective solutions.

### **Collaboration and Partnerships**

The college serves as a trusted, impartial facilitator among the agriculture industry, government agencies and NGOs and is able to bring diverse stakeholders to the table to work towards economically viable, science-based solutions. We are uniquely positioned to do this as there is no other entity that is seen as being impartial and without an agenda.

An excellent example of this is both the Ag in the Balance Conference that was held eight years ago, and the follow up conference -Pennsylvania in the Balance – that was held in March. The College played a leadership role in facilitating and convening more than 120 stakeholders in Hershey at the *Pennsylvania in the Balance* Conference. This event provided a collaborative forum where motivated leaders in agriculture and the environment identified new, innovative solutions that can help ensure vibrant, productive agriculture while meeting water quality goals for Pennsylvania's rivers and streams and the Chesapeake Bay.

At the end of three days, clear themes and initial recommendations emerged which, if seized upon, can form the basis of a new consensus based, collaborative strategy to ensure profitable and productive agriculture while achieving water quality goals. This strategy embraces agriculture and its ingrained *culture of stewardship*, and looks for leadership from agriculture to *be a solution* to clean water. The Pennsylvania in the Balance draft conference report is attached.

Just last week, on Wednesday, October 12, we reconvened conference attendees and others interested in continuing this dialogue, to develop important priority initiatives to advance this strategy. They are:

1. Education and outreach: developing and disseminating a narrative around a culture of stewardship through soil and stream health;
2. Technical assistance: increasing technical capacity through enhancements in conservation training;
3. Smart implementation: developing and deploying delivery mechanisms for accelerating conservation in priority watersheds; and

4. Raising the bar through voluntary incentive structures: Developing new and creative incentives (such as market based incentives) to encourage a high bar of conservation beyond compliance.

This coalition is strong and has momentum. It includes representation from farmers, agribusiness and industry, PDA, DEP, EPA, USDA, the Chesapeake Bay Commission, and key nongovernmental organizations like the Chesapeake Bay Foundation. We will be taking the leadership role in the coming weeks and months to pursue the ideas coming out of the conference and make them part of our Commonwealth's strategic and cost effective approach to addressing Chesapeake Bay problems. Our staff would be happy to provide members of the Committee with further updates on these efforts as they continue to proceed.

Also, through our Agriculture and Environment Center, we are active in local watershed communities, providing partnership facilitation and leadership in increasing education and outreach to facilitate adoption of agricultural and stormwater best management practices, and helping communities develop cost effective solutions to improve water quality. Our community based watershed engagement model, where we work to facilitate local watershed partnerships involving local agricultural leaders, watershed groups, municipalities, county conservation districts, conservation organizations, and state and federal agencies, has increased awareness and adoption of best management practices in priority watersheds in the Lower Susquehanna such as Conewago, Little Conestoga and Chiques Creek. Our current partnership efforts in Chiques Creek, Lancaster County includes working with the municipalities in the watershed to consider the cost effectiveness of a watershed wide approach to achieving new stormwater requirements under the Chesapeake Bay TMDL.

We have been actively involved in addressing the issue of getting farmers credit for the conservation practices they have already installed. While the Commonwealth has done a good job at reporting to the Chesapeake Bay Program practices installed with government funding, it has lacked mechanisms to capture and report all of the conservation practices that farmers are installing on their own farms with their own dollars. We have partnered with Pennsylvania Farm Bureau, DEP, PDA, and many other agricultural and conservation partners to conduct a massive survey of Chesapeake Bay watershed farmers in Pennsylvania and give them the opportunity to voluntarily report these practices.

In January 2016, this survey was mailed to approximately 20,000 farmers across Pennsylvania's portion of the Bay watershed. Approximately 6,800 farmers returned the survey, an astounding 35% response rate. This shows that many farmers are doing good work to protect and improve water quality, and they want to receive the credit for it.

We are taking all appropriate steps to ensure all data provided by the farmers is and will remain confidential (we are exempt from FOIA requests), and that the data is statistically accurate and fully represents the story of farm conservation in the Chesapeake watershed, and therefore can be accepted into the Chesapeake Bay model to show Pennsylvania's progress. In August and September, approximately 40 trained Extension staff visited ten percent of the farms who returned the survey to assess the accuracy of the data. Our data analysis of all survey and farm visit results is continuing; the research team is completing this analysis even as I speak. We are preparing to share preliminary results later this week at a Chesapeake Bay Program Ag Workgroup meeting. Once statistical analysis review of our data is completed by an outside consulting firm, we will release this data to the public in a report, likely the end of this month.

Even with the inclusion of the data gathered from the farm survey, we know that more work needs to be done, and more conservation practices have to go into the ground. Doing this will take creative solutions and new ways of thinking and action.

## **Research**

Our research and education has historically been a foundation for science-based policy and practices in Pennsylvania and beyond, including areas such as nutrient management practices, innovative farming systems, watershed planning, and innovative policies for incentivizing BMP adoption,.

Research to support cost-effective solutions including tools for prioritization of watersheds, places within watersheds, and practices to be implemented are a critical part of the solution. The attached abstract – “The Costs to Agriculture of the Chesapeake Bay TMDL” - estimates costs to agricultural producers of the Watershed Implementation Plans (WIPs) developed by states in the Chesapeake Bay Watershed to comply with the Chesapeake Bay total maximum daily load (TMDL) and potential cost savings that could be realized by a more efficient selection of agricultural Best Management Practices (BMPs) and spatial targeting of BMP implementation.

The cost of implementing the WIPs between 2011 and 2025 is estimated to be about \$3.6 billion (in 2010 dollars). The annual cost associated with full implementation of all WIP BMPs from 2025 onward is about \$900 million. Significant cost savings can be realized through careful and efficient BMP selection and spatial targeting. Research holds the key to developing efficient prioritization methods.

## **Education and Implementation**

Penn State Extension – part of the national Cooperative Extension Service housed in Universities across the US – provides an incredibly unique state-wide education and distribution network with offices and educators in all 67 counties. Our statewide Program Teams tackle complex problems that require diverse expertise. Our current Extension Water Program Team has expertise in water, dairy and livestock, field and forage crops, economics, soils, horticulture, and engineering. Extension offers education and training in [soil health, soil fertility, soil conservation, cover crops, nutrient management, manure management, and many other topics.

We assist farmers with information, technical training and implementation through both face-to-face workshops and field days as well as online educational training.

Penn State Extension is charged in Pennsylvania Nutrient Management legislation with leading the educational efforts to improve water quality in the Bay. This includes educating policy makers, government officials, farmers, and farm advisors. One key role of extension is providing the necessary extension educational programs for nutrient management planners to successfully complete the requirements for certification in PA. To date more than 2000 nutrient management plans have been developed and approved by the 291 currently certified nutrient management specialists trained by this extension program.

As a result the latest Chesapeake Bay report card again gave the upper Chesapeake Bay, which is dominated by the Susquehanna River flowing out of PA, the highest score indicating that our efforts in nutrient management are having a significant positive impact. This program continued to provide educational and technical support to government agencies and NGOs for the development of nutrient management programs to maximize economic benefit from nutrients while minimizing the environmental impact.

A critical activity has been educational support for the implementation of the Chesapeake Bay TMDL by USEPA and technical support to government agencies and NGOs for this effort. We have developed a user friendly but accountable tool for assisting farmers with development of a manure management plans. This Manure Management Manual (MMM) has been the focus of extensive extension education programming. We have continued to conduct train-the-trainer programs for extension educators, conservation districts, and DEP personnel. They in turn have conducted workshops for farmers across the state to write manure management plans for their farms.

This program is now providing educational support to farmers for implementation of these plans on an estimated 40,000 farms in PA over the next several years. Team members worked with the Chesapeake Bay program to help better account for management practices implemented by PA farmers to protect water quality in PA and the Chesapeake Bay. New software to facilitate improved nutrient management planning was developed by extension staff and is in extensive use.

Penn State Extension also has many other volunteer train-the-trainer programs that create and leverage networks of volunteers across Pennsylvania assisting numerous issues. They include:

***Greening the Lower Susquehanna*** - Our Agriculture and Environment Center has developed a conservation corps of several hundred active “Greening the Lower Susquehanna” volunteers who work with partner communities, organizations and landowners to help plant and maintain riparian buffers, rain gardens and other green infrastructure water quality improvements throughout the Lower Susquehanna region. Our “Greening the Lower Susquehanna” volunteers have helped with projects in Lancaster, Dauphin, Lebanon, Cumberland, and York Counties.

***Master Watershed Stewards*** – This program provides extensive training in watershed management to volunteers who, in return, educate the community about watershed stewardship based on university research and recommendations.

***Master Well Owner Network*** – A network of trained volunteers dedicated to promoting the proper construction and maintenance of private water systems in Pennsylvania and throughout the Mid-Atlantic Region.

To date, more than 400 residents in 61 counties throughout Pennsylvania have been trained as Master Well Owner Volunteers. These volunteers have provided assistance to more than 25,000 homeowners with private water systems.

***Master Gardener Program***- These trained volunteers provide community education and assistance around horticulture, green infrastructure, rain gardens, and other landscape-based water quality strategies.

In conclusion, we believe that all of these elements—research, science based training and program development, education and outreach, community engagement, and partnership facilitation—must be critical aspects of Pennsylvania’s strategy to meet Chesapeake Bay goals and mandates. We are interested in continuing to play a leadership role in our Commonwealth’s water quality improvement efforts.