

## PRESIDENT'S MESSAGE

By Al Tucker

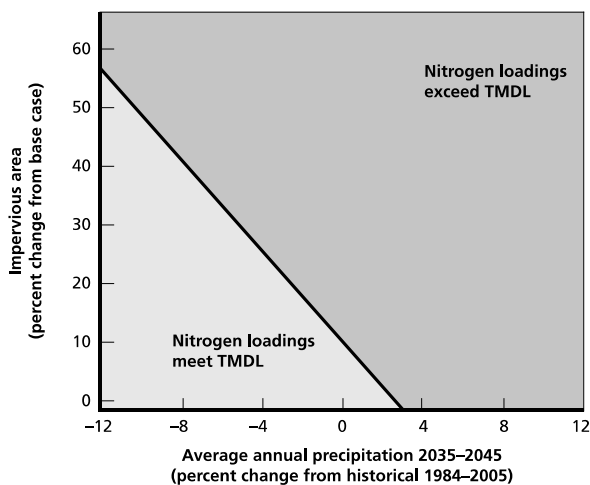


Recently, I attended a conference on the impact of climate change on the Patuxent River watershed. A paper<sup>1</sup> caught my eye. It was quite technical and was presented from the viewpoint of an analyst talking to other scientists and analysts. Its focus was more about explaining the analytical process rather than the results. But one of its pilot studies was an analysis of the Patuxent watershed. From my perspective, the talk would have been better titled, "Growth in the Patuxent Watershed in the Face of Increased Precipitation Will Make the Goals of the Watershed Implementation Plans Impossible." Or even better "We Can't Get There from Here." That would have been a showstopper. Anticipated climate change coupled with projected population growth makes achieving the 2035 TMDL goals and beyond for the watershed highly unlikely.

The paper's analytical process differs from the current modeling approaches in that it uses a "backward" analysis of watershed implementation plans. "Rather than beginning with a set of assumptions about the future, [the process] begins with a proposed plan or plans, uses analytics to stress-test them over many futures, and concisely summarizes the conditions in which each plan will work." The results capture the uncertainty of the assumptions of stormwater Best Management Practices (BMP), their cost-effectiveness, as well as the impact of future land-use patterns on these practices under conditions of precipitation change.

The results of the pilot study of the Patuxent watershed are unequivocal. Under current assumptions of historical hydrology, current land-use, and assumed population change, the Phase II WIP will meet the TMDL target. But when climate change is factored in with increased precipitation deviating from historical trends, these targets cannot be met. The surprise is how small a deviation of land-use or an increase in precipitation causes a failure to reach the goals. A figure from the report illustrates one of the primary conclusions for the Nitrogen TMDL goal.

Futures in Which Phase II WIP Meets and Misses Nitrogen TMDL



RAND RR720-5.2

This result shows that precipitation would have to decline in the future to accommodate future growth (note: impervious surface is a surrogate for growth). A small change in precipitation from the norm (+3.5%) with no increase in impervious surface causes

failure of the TMDL goals. The Maryland Climate Commission predicts our state will have wetter futures. If perchance the futures are drier, even smaller increases of growth will cause failure with smaller increases in precipitation. When the cost-effectiveness of BMPs is factored in, the results indicate that the most effective ones are cost-prohibitive or not enough land exists to implement lower cost alternatives.

The Patuxent watershed is considered to be an urban watershed and can represent a proxy for other watersheds dominated by impervious surface. Since sprawl creates more impervious surface than urban development, the dominant land-use options in the watershed need to shift to even more urban compactness. But as the analysis illustrates there is little room or time left in the face of climate change to implement any of the improved strategies.

Given the uncertainty and variability of the future, why should we give weight to this analysis? The technical approach addresses this "deep uncertainty" by computing hundreds of future climate and growth scenarios. From these the main parameters that affect the TMDLs emerge. It is not a surprise that impervious surface would be a dominant factor, but the ability to compare land use patterns and the impact and cost-effectiveness of BMPs within a local watershed reveals that our choices to mitigate the effects of climate change are shrinking rapidly with time.

These results are disheartening. First, not enough land in the watershed is available to implement most of the BMPs and second, the cost of implementation is beyond the reach of the watershed's jurisdictions and third, getting political consensus among the river's seven counties with different economic development goals is nigh to impossible.

The public needs to have specific information for their watersheds, especially regional ones like the Patuxent. When the idea of "cleaning up the Bay" started, climate change was not a large factor, however, population growth was. The uncertainty surrounding the reality of climate change has decreased over the last decade with noticeable effects for everyone to see.

Hence, decision makers will be faced with the dilemma of either restricting growth or spending more money on stormwater mitigation. Or even worse, continuing on the present course to failure. It will be a shame if the latter outcome occurs without knowledge of the consequence of climate change.

<sup>1</sup>Fischbach, Jordan R., et.al, Managing Water Quality in the Face of Uncertainty: A Robust Decision-Making Demonstration for EPA's National Water Program. Santa Monica, CA: RAND Corporation, 2015.  
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