Independent study evaluates why progress in achieving Bay water quality goals is lagging

The report by the Chesapeake Bay Program’s Scientific and Technical Advisory Committee offers options on how restoration can be accelerated

Annapolis, MD— Reducing the amount of pollution entering the Chesapeake Bay and improving its water quality is proving to be more challenging than anticipated, according to a new report released by the Scientific and Technical Advisory Committee (STAC) for the Chesapeake Bay Program. The STAC, an independent entity that provides scientific and technical advice to the Chesapeake Bay Program, has spent the past four years evaluating reasons as to why progress in meeting the goals of the Chesapeake Bay Total Maximum Daily Load (Bay TMDL) and achieving water quality standards in the Chesapeake Bay has been slower than anticipated. The report also offers suggestions on how progress can be accelerated moving forward.

While significant progress has been made in addressing nutrient and sediment pollution since the signing of the first Chesapeake Bay Agreement in 1983, modeling and monitoring indicate that current efforts to reduce nutrient pollution entering the Chesapeake will not meet Bay TMDL goals, and water quality conditions in many regions of the estuary have been slow to respond to restoration efforts.

The report examines how effective our current actions have been in helping to reduce nutrient pollution from wastewater treatment plants (point sources), as well as farms and developed lands (non-point sources). It then looks at how the Bay’s water quality is responding to these actions. Finally, it considers how the Bay’s living resources (e.g., blue crabs, oysters, fish) are impacted by these changes in water quality.

While there has been great success in reducing pollution from point sources, findings indicate that actions taken to reduce pollution from non-point sources, such as farms or developed lands, are insufficient to achieve pollutant reduction goals. Runoff from urban stormwater and agriculture are the largest sources of nutrient pollution entering the Bay. The implementation of best management practices (BMPs) on agricultural lands have prevented a significant increase in pollution, but data indicates that these efforts are not as effective as expected. These challenges are not unique to the Chesapeake Bay watershed, as other large-scale restoration efforts taking place in areas around the world (e.g., Great Lakes, Gulf of Mexico, Baltic Sea) are experiencing similar outcomes.

The implementation of BMPs have helped to lower the level of nutrient pollution throughout the Chesapeake Bay, leading to water quality improvements in some regions. However, attaining water quality standards remains a challenge across a large portion of the Bay’s waters. Water quality standards are measured by chlorophyll a (an indicator of algae growth), underwater grass abundance (an indication of water clarity) and dissolved oxygen levels, representing the conditions necessary to support the living resources (e.g., oysters, fish) of the Bay. These parameters vary throughout the different habitats of the Bay, but no significant improvement has been measured in the majority of them, most notably in the deep waters of the Bay, suggesting that the anticipated water quality response appears to be lagging. The report suggests that the response of living resources (e.g., blue crabs, underwater grasses) can be boosted with efforts already in place to improve water quality by placing additional focus on the Chesapeake’s shallow and open water habitats.
"This report set out to focus a tremendous amount of scientific expertise to synthesize what the science is telling us about how people, pollutant processes and the estuary is responding to water quality improvement efforts," said Dr. Kurt Stephenson, professor, Department of Agricultural and Applied Economics, Virginia Tech. “Moving the needle on improving Bay water quality will require more than just money and effort—it will require new approaches to implementation. We hope this report provides the Chesapeake Bay Program with ideas on how to improve nonpoint source programs and increase the potential of water quality management to improve living resources.”

Findings also indicate that the abundance and diversity of the Bay’s plant and animal species are not solely dependent on water quality standards, but rather will be impacted by a variety of future conditions, including but not limited to, disease, water temperature and salinity levels, commercial and recreational harvests, and nearshore habitat (e.g., wetlands, shorelines). These factors make it difficult to ascertain the impact of water quality changes on the Bay’s living resources.

Ongoing changes to the Bay’s ecosystem—including land use changes, population growth, climate change and economic development—will require us to think differently about what constitutes a “restored” Bay.

“The Chesapeake Bay and its surrounding watershed are critical to the livelihood of all its 18 million residents, and changes in land use, population growth, economic development and climate change mean that its past conditions cannot be recreated; the Bay of the future will not be the same as the Bay of the past’, said Denice Wardrop, research professor of geography at Penn State and executive secretary of STAC. “However, significant opportunities exist to improve the effectiveness of our actions, achieving a Bay of equal vitality by building on the significant learnings of the past.”

Opportunities exist for Chesapeake Bay Program partners to meet the challenges laid out within the report, but it will require changes in how we all currently operate, allowing for new beginnings and approaches in how implementation, planning and decision-making occurs. A complete set of opportunities for advancement can be found in the full report—Achieving Water Quality Goals in the Chesapeake Bay: A Comprehensive Evaluation of System Response.

The STAC provides independent scientific and technical advice to the Chesapeake Bay Program through a variety of ways, including workshops, reports, discussion groups and position papers, to name a few. Members represent universities, federal and state government agencies, research institutions and private industry, providing a diverse range of scientific and technical backgrounds and expertise. The governors of each watershed state (Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia) and the mayor of the District of Columbia name representatives for the committee, while others are appointed by the director of the Chesapeake Bay Program and the STAC Executive Committee.

The Chesapeake Bay Program is a regional partnership working to meet the goals and outcomes of the Chesapeake Bay Watershed Agreement. Partners include the states of Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia, the District of Columbia, academic institutions, non-profits and the federal government agencies of the Environmental Protection Agency, National Park Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Oceanic and Atmospheric Administration and U.S. Department of Agriculture.