Army Corps, partners, release new report that analyzes sediment and pollution flow impacts to Chesapeake Bay

New report released for public comment analyzes sediment and nutrient flow impacts to Chesapeake Bay from Lower Susquehanna River Watershed and a series of hydroelectric dams – names watershed-wide nutrient reduction strategies as key.

With startling imagery of sediment plumes making their way to the Chesapeake Bay from upstream sources after major storms, great focus has centered around where this pollution comes from and what steps can be taken to manage it.

Shortly after Tropical Storm Lee hit the East Coast in 2011, the groundwork was laid to begin analyzing the movement of sediment, and associated nutrient loads, and impacts within the 26,000-square-mile Lower Susquehanna River Watershed to the upper Chesapeake Bay.

“We worked with a team of inter-agency experts, using current scientific information and the best modeling tools available in order to understand the complex relationship between river flow and sediment, and ecological resources,” said Col. Trey Jordan, U.S. Army Corps of Engineers (USACE), Baltimore District commander. “Our partners undertaking ongoing efforts to restore the Chesapeake Bay and its surrounding watershed are now armed with better science to make decisions to protect water quality, habitat and aquatic life.”

A draft report was released Nov. 13, 2014, by USACE and non-federal sponsor the Maryland Department of the Environment (MDE).

The team looked at impacts from the lower Susquehanna watershed from Sunbury, Pennsylvania, to the confluence with the Chesapeake Bay, including three hydroelectric dams located on the lower Susquehanna River - Holtwood, Safe Harbor, and Conowingo.

Since their construction, the reservoirs behind these dams have been capturing sediment flowing down the Susquehanna River, reducing sediment and associated nutrients from entering the Chesapeake Bay. Recent studies, however, have questioned the capacity left for these reservoirs to continue to act as “pollution gates.”

The new report confirmed that during periods of low-water flow, or non-storm events, the three reservoirs actually act as sediment traps and aid in the health of the Bay until the next high-flow or storm event occurs.

This report also indicates that although these reservoirs are trapping smaller amounts of sediment and have essentially reached their limit to capture these associated nutrients in the long term, the large majority of the pollution to the Chesapeake Bay during large storm events comes from runoff from pollution sources from the upstream drainage area, as opposed to from behind the dams.

For example, between 2008 and 2011, this study estimated that 13 percent of the Susquehanna River’s sediment load came from the reservoir behind the Conowingo Dam – the largest dam and reservoir closest to the Chesapeake Bay. The remaining 87 percent originated from the

broader watershed – runoff from land, floodplain, and streams. These estimates include sediment loads from Tropical Storm Lee.

"Addressing the sediment behind the dams is part of the complete solution needed to restore the Bay and its tributaries, as is the work that upstream states are doing to reduce pollution in the first place," said Robert M. Summers, MDE secretary. "But, we will not meet our Bay restoration goals without following through on our efforts to control pollution from Maryland and the rest of the watershed as well."

The team identified and evaluated 38 different sediment management strategies as part of the assessment, beyond pre-existing watershed implementation plans that Bay jurisdictional partners are executing. Strategies evaluated include large-scale dredging efforts to remove sediment from the reservoirs, and routing sediment around or through the reservoirs by making modifications to the operation of the dams.

"Our modeling indicates that dredging the sediment yields minimal, short-lived water quality improvements due to the constant deposition of sediment and associated nutrients that come from the watershed," said Anna Compton, USACE biologist and study manager. "Dredging would entail simply keeping up with this deposition."

The report also indicates that while these sediment plumes are alarming, it is actually the nutrients that attach to the sediments that lead to algae blooms and dead zones, which may suffocate marine life. Therefore, it is recommended that management opportunities in the watershed that reduce nutrient delivery to the Bay as opposed to sediment only are likely more effective at reducing impacts to water quality, low dissolved oxygen, and aquatic life from high-flow events.

"The assessment produced numerous products that are available now to assist in future watershed planning and management efforts," said Compton.

Major recommendations include quantifying the full impact on Chesapeake Bay water quality and living resources based on new understandings in the report; integrating findings from the report into ongoing analyses and development of watershed implementation plans as part of the Chesapeake Bay Total Maximum Daily Loads assessments; developing and implementing management options that offset impacts to the upper Chesapeake Bay ecosystem from increased sediment-associated nutrient loads; and committing to enhanced long-term monitoring and analysis of sediment and nutrient processes in the watersheds to promote adaptive management into the future.

The draft peer-reviewed report is open to public comment until Jan. 9, 2015. A public meeting was held Dec. 9 in Maryland. Once comments are incorporated, the final report is anticipated for release in summer 2015.

The Lower Susquehanna River Watershed Assessment team is also comprised of the USACE Engineering Research and Development Center, U.S. Geological Survey, Susquehanna River Basin Commission, Nature Conservancy, Chesapeake Bay Program, Maryland Department of Natural Resources, and Maryland Geological Survey.