PhD Dissertation Defense

Candidate: Richard K. Friesner

Defense Date: Nov. 20, 2015

Title: Adaptive Management in the Chesapeake Bay Total Maximum Daily Load (Tmdl): How Do Local Watershed Managers Address Uncertainty and Use Adaptive Management?

Dissertation Director: Dr. R. Christian Jones
Committee: Dr. Walter R. Boynton (UMD), Dr. E. Franklin Dukes, Dr. Pricilla M. Regan, Dr. Daniel M. Sklarew

ABSTRACT

The Chesapeake Bay Total Maximum Daily Load (TMDL) is a federal action the Environmental Protection Agency (EPA) established to create a nutrient and sediment reduction strategy for the Chesapeake Bay based on contributions by the six states (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and Washington, DC. The TMDL implementation process was developed by incorporating adaptive management as a major component. Ultimately, each state is responsible for significantly reducing the loads of nitrogen, phosphorus, and sediment that enter the main stem of the Chesapeake Bay, between 20% and 25% overall, based on loading rates calculated using data from 2009. In turn, the state governments asked local governments and stakeholders to identify how these reductions could be achieved at the local level through the development of Watershed Implementation Plans. Many people associated with the Chesapeake Bay TMDL have referred to the implementation process as an adaptive management process. Adaptive management is a structured and iterative process of decision making under uncertain conditions that require monitoring activities to incorporate new knowledge into the management process. Because the Chesapeake Bay TMDL required a three tiered watershed implementation process and two-year milestone reviews, it does seem to follow an adaptive management protocol at the state and Federal level, but it was unclear if local, county and city, level municipal watershed managers

were able to use adaptive management in their implementation of the Chesapeake Bay TMDL. If the EPA, state, and local governments want the Chesapeake Bay TMDL to be effective, it was important to gauge the understanding that municipal watershed managers had of adaptive management and the available time, resources, staff and knowledge to dedicate to the implementation process. There have been very few opinion or capacity surveys of this population or about the general public's perception of the Chesapeake Bay. This dissertation was planned to fill that gap. Results from this research project indicated that all of the Maryland and Virginia portions of three watersheds studied here (Patuxent, Potomac, and Rappahannock River watersheds) had room to improve local understanding of adaptive management and other implementation strategies for the Chesapeake Bay TMDL and use of adaptive management. Specifically, in watersheds with fewer Municipal Separate Storm Sewer System permits, such as the Rappahannock River watershed, there remains information to be gathered and capacity building needed to successfully implement the Chesapeake Bay TMDL. Further, it appeared clear that without a state level or local legal requirement for localities to implement the TMDL and use adaptive management, several localities throughout the watershed will be unsuccessful in their implementation strategy.