TESTIMONY to INFORM SB 496
Poultry Litter Management Act, Sens. Madaleno & Carter Conway

To: Hon. Joan Carter Conway, Chair, and members of the Senate Educations, Health and Environment Committee

From: Scott Phillips, U.S. Geological Survey (USGS), Chesapeake Bay Coordinator; Joel Blomquist, USGS Hydrologist; and Doug Moyer, USGS Hydrologist

Date: February 23, 2016

Thank you for the opportunity to present water-quality trends in Maryland and their relation to land practices. The U.S. Geological Survey (USGS) works with partners to monitor rivers and explain water-quality conditions in the Chesapeake Bay watershed. Our role is to provide scientific results to states and the U.S. Environmental Protection Agency (EPA) so they can better assess progress toward the goal of reducing nutrient and sediment levels to meet the Chesapeake Bay Total Maximum Daily Load (TMDL). The USGS does not have a position on the Poultry Litter Management Act but is providing this information to help inform the discussion.

Water-quality data are collected to help assess efforts to reduce nutrients and sediment in the Chesapeake Bay watershed. The USGS collects water-quality monitoring data, through a coordinated program among all the states in the watershed; Washington, D.C.; and the EPA in support of the Chesapeake Bay Restoration effort. On February 3, 2016, the USGS published updated information on nutrient and sediment trends in nontidal rivers across the Bay watershed. The nitrogen and phosphorus results presented in this testimony focus on data collected at 20 sites in Maryland during 2005-2014, and are available on the USGS Load and Trends in the Chesapeake Watershed Web site: http://cbrim.er.usgs.gov/.

The monitoring data for nitrogen and phosphorus in Maryland over the last 10 years show mixed results. Phosphorus loads during 2005-2014 improved at just over half the sites (figure 1 of testimony), with conditions at 11 sites improving, 6 sites degrading, and 3 sites having no change. Trends in nitrogen loads were similar overall (figure 2 of testimony), but trends at individual sites were not always the same as those for phosphorus.

Water-quality improvements are related to practices and policies to reduce nutrients and sediment. Based on a report led by the University of Maryland Center for Environmental Science (UMCES, 2014), water-quality improvements in the Chesapeake Bay watershed are related to three major groups of best management practices (BMPs): (1) upgrades to wastewater-treatment plants; (2) reductions in the amount of nitrogen in air emissions; and (3) selected agricultural management practices, including growing cover crops, managing fertilizer and manure applications, and installing stream-bank fencing.

Degrading nutrient conditions are influenced by changing land use and lag times. The UMCES report stated that two major challenges have impeded progress despite implementation of BMPs: (1) counteracting influences of population growth and intensified agriculture; and (2) delays between BMP implementation and observable water-quality improvements, known as "lag times." The UMCES report concluded that "intensified agriculture (increased use of fertilizer and greater livestock densities) and land use conversion from forests to agriculture and urban development are driving forces of declining water quality in the Bay watershed."

The production of broilers and associated manure has increased on the Eastern Shore. The majority of the intensified agriculture on Maryland's Eastern Shore is related to poultry production. The USGS recently released a report about water quality on the Eastern Shore (Ator and Denver, 2015) that was based on a review of 130 scientific articles. One finding, based on the U.S. Department of Agriculture National Statistics Service data, was that poultry production increased from less than 4 million broilers in 1919 to nearly 600 million by 2007, meaning that the amount of manure generated and spread on the Eastern Shore has increased (figure 3 of testimony). Additionally, application of commercial fertilizer increased from 1950 through about 1980, although nitrogen fertilizer application has been relatively stable since 1980, and phosphorus fertilizer use has decreased.

Nutrients from fertilizer and manure are the major sources of degraded water quality on the Eastern Shore. Agricultural sources make up 90 percent of the nitrogen and almost 100 percent of the phosphorus inputs on the Eastern Shore. Based on data from the Mid-Atlantic Water Program (in Ator and Denver references), applications of nitrogen and phosphorus from fertilizer and manure to croplands have exceeded crop uptake since at least the 1980s. Mobile forms of nitrogen and phosphorus not used by crops can be transported to streams, resulting in nutrient concentrations that are typically well above natural levels, and are among the highest in the Nation. These elevated nutrient concentrations have contributed to degraded stream conditions on the Eastern Shore, which range from fair to very poor (figure 4 of testimony). In summary, the data suggest manure from poultry production is one of the major factors degrading water quality on the Eastern Shore.

Additional information for this testimony is publicly available from these references:

USGS 2016, Water-quality loads and trends at nontidal monitoring stations in the Chesapeake Bay watershed: available at http://cbrim.er.usgs.gov/.

University of Maryland Center for Environmental Science (UMCES), U.S. Geological Survey, and U.S. Environmental Protection Agency, 2014, New insights*:* Science-based evidence of water quality improvements, challenges, and opportunities in the Chesapeake: available at http://ian.umces.edu/press/reports/publication/438/new_insights_science_based_evidence_of_water_quality_improvements_challenges_and_opportunities_in_the_chesapeake_2014-02-24.

Ator, S.W., and Denver, J.M., 2015, Understanding nutrients in the Chesapeake Bay watershed and implications for management and restoration—The Eastern Shore: U.S. Geological Survey Circular 1406, 72 p., http://pubs.usgs.gov/circ/1406/.

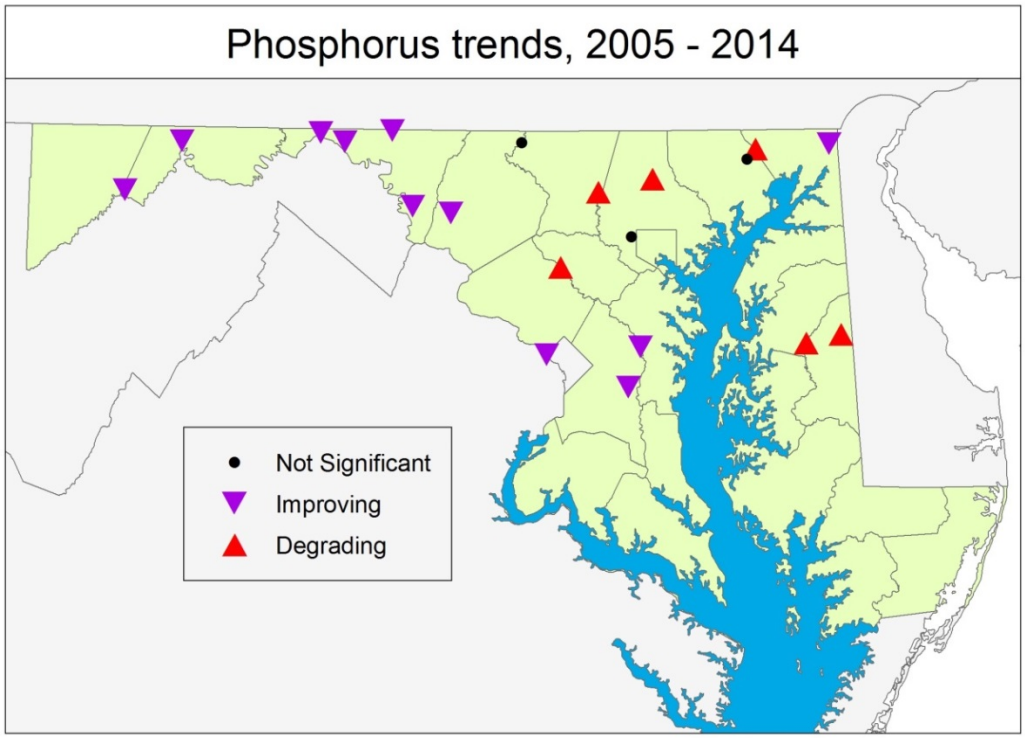


Figure 1. Phosphorus load trends in Maryland, 2005-2014 (From USGS Loads and Trends in Chesapeake Website, 2016).

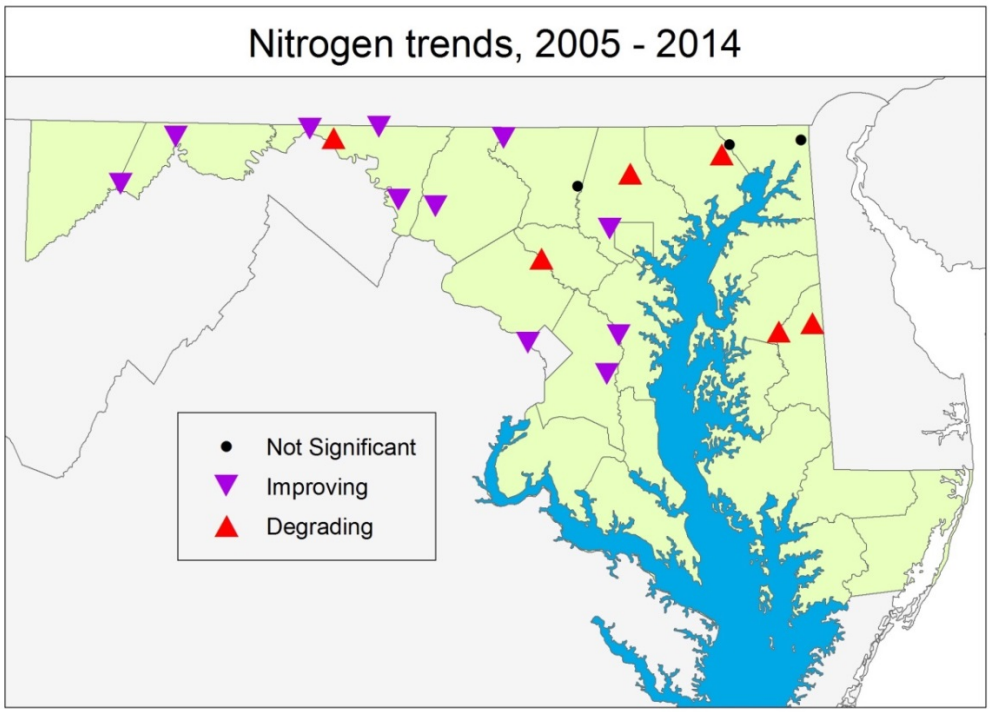
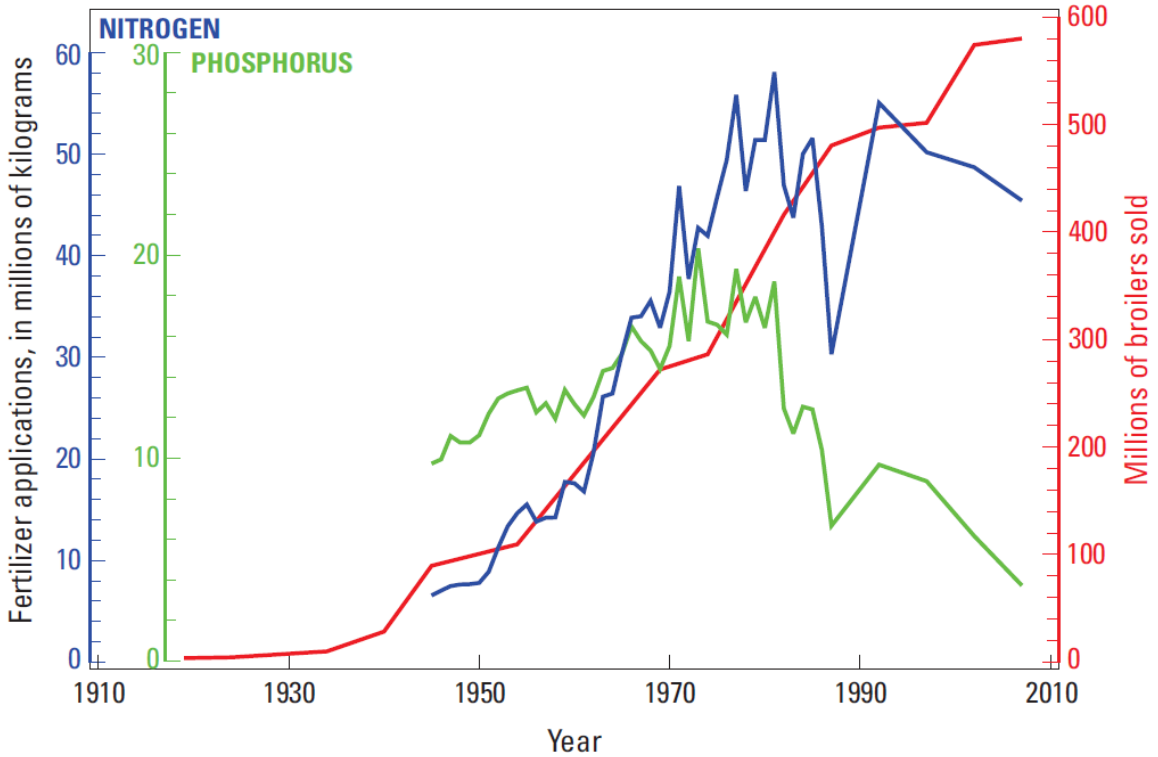


Figure 2. Nitrogen load trends in Maryland, 2005-2014 (From USGS Load and Trends in Chesapeake Website, 2016).



[Broiler data are from U.S. Department of Agriculture, 2009. Estimates prior to 1950 are for total chickens or broilers raised. Fertilizer inputs are from Alexander and Smith, 1990, Battaglin and Goolsby, 1995, and Mid-Atlantic Water Program, 2012.]

Figure 3. Changes in fertilizer and poultry production on the Eastern Shore, 1919-2007 (From Ator and Denver, 2015).

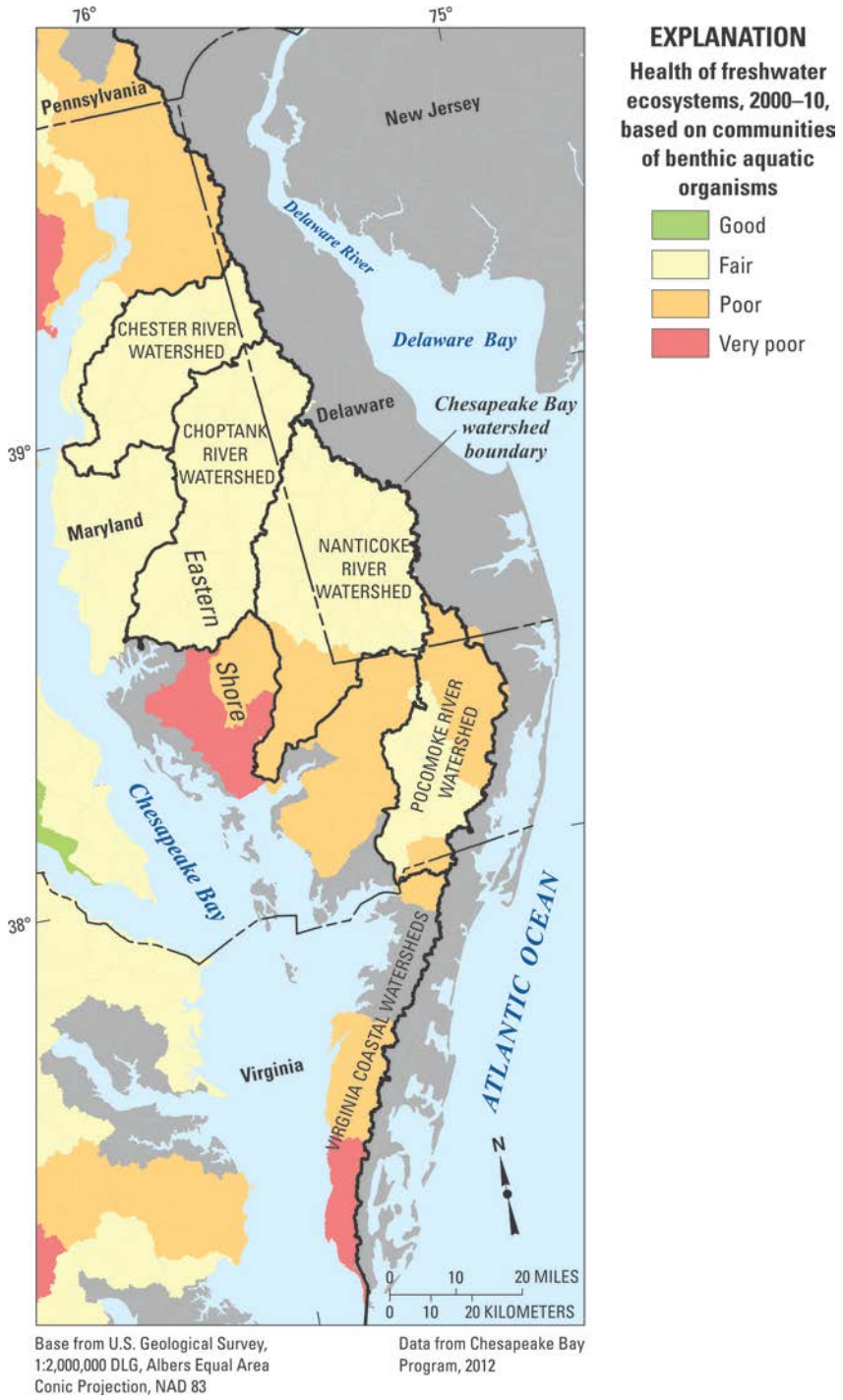


Figure 4: Stream conditions on the Eastern Shore (From Ator and Denver, 2015)