Agriculture’s Progress Towards Achieving the Falls Lake Nutrient Strategy Stage I Reduction Objectives

For the November 9-10, 2016 Meeting of the N.C. Environmental Management Commission

Developed by the N.C. Division of Water Resources Nonpoint Source Planning Branch
Purpose
The Falls Lake Nutrient Management Strategy is a comprehensive set of rules implemented in January 2011 to reduce nutrient inputs from both point and nonpoint sources to Falls Lake. Pursuant to the Falls Agriculture Rule (15A NCAC 02B .0280), the Division of Water Resources is tasked with providing the Environmental Management Commission a report in 2016 that gauges the extent to which agriculture in the watershed has achieved reasonable progress towards achieving its Stage I nutrient reduction objectives. This assessment is provided to the Commission in conjunction with the Falls Lake Watershed Oversight Committee’s Annual Agriculture Progress Report, which provides additional details on agriculture’s implementation activities and in the watershed through crop year 2015.

Overview of Falls Agriculture Rule Requirements
The Falls Lake Agriculture Rule implements a collective compliance approach for farmers to meet nitrogen loss reduction goals in two stages. The Stage I goal is a 20 percent nitrogen loss reduction and 40 percent phosphorus reduction by calendar year 2020. Stage II goals are 40 and 77 percent for nitrogen and phosphorus, respectively, by 2035. If Stage I goals are not met individual operators may also be required to meet specific implementation requirements within the first five years of Stage II.

A Watershed Oversight Committee (WOC) administers the rule, and state and local Soil and Water staff assist farmers with implementation. The WOC developed accounting methods for tracking nitrogen and phosphorus loss from agriculture in the watershed, which were approved by the Commission in March 2012. An initial accounting report was submitted to the Commission in March 2013. Reductions in cropland nitrogen, pasture nitrogen and overall phosphorus loss from agriculture are accounted for separately in the WOC’s annual progress reports. This is driven by fundamental differences in how nutrient loss occurs across these categories. The WOC continues to submit annual progress reports to the Division each October.

Stage I Nitrogen Reductions – Cropland
Annual progress reports submitted by the WOC provide nitrogen loss estimates that aggregate county-scale nitrogen loss estimates from cropland agriculture in the watershed using the Nitrogen Loss Estimation Worksheet (NLEW) accounting tool. NLEW estimates changes in nitrogen loss for the current crop year relative to nitrogen loss during the 2006 baseline. It does not estimate changes in nitrogen loading to surface waters.

The WOC’s initial assessment in 2013 reported that agriculture as a whole had achieved a 31 percent reduction in nitrogen loss since the baseline. Subsequent annual reports in 2014 and 2015 showed continued improvement with 35 percent and 46 percent reductions respectively.

In the WOC’s 2016 annual report, which covers agriculture activities through crop year 2015, agriculture estimates that it has collectively achieved a 70 percent reduction in nitrogen loss relative to the baseline. This exceeds the Stage I required nitrogen reduction of 20 percent.

Reductions in nitrogen loss from cropland agriculture are achieved through a combination of decreases in cropland acres, reductions in nitrogen application rates, and an increase in implementation of nutrient reducing best management practices (BMPs). Of the three, the main factor behind agriculture
achieving more than triple the Stage I reduction goal of 20 percent is the overall loss of cropland in the watershed. According the WOC’s 2016 progress report there were approximately 31,000 acres of cropland in the Falls watershed in crop year 2015. This represents a decrease of approximately 24,000 cropland acres since the 2006 baseline.

Stage I Nitrogen Reductions – Pasture
Agriculture is also required to account for pasture-based livestock operations that also contribute to nutrient loading. Reductions in nitrogen loss from pasture are achieved through the implementation of fencing along a stream as a physical barrier to pastured animals trampling banks and entering the stream, a BMP referred to as livestock exclusion. The practice eliminates cattle-induced bank and bed erosion and the direct deposition of animal waste in the stream. It also allows for re-establishment of a buffer zone to intercept and filter runoff from upgradient pastures.

Pasture accounting is only possible on 5-year intervals because only the 5-year Census of Agriculture captures data on pastures. The pasture calculations using the NLEW tool are run separately from the cropland calculations. This allows for a separate assessment of nutrient reduction progress from pasture. It also makes it possible to account for factors unique to pasture operations such as adjusting nitrogen application rates in the tool to account for direct deposit of nitrogen from pastured animals. and other factors unique to pasture operations.

The most recent Census of Agriculture data available captures conditions in 2012, allowing the WOC to report on pasture nitrogen loss reductions for the first time since the 2006 baseline. Based on the 2012 pasture and livestock numbers in the Falls watershed, and number of exclusion practices implemented since the 2006 baseline, agriculture estimates a 36% reduction in nitrogen loss from pasture operations throughout the watershed. Much like the nitrogen reductions achieved from cropland, while lower fertilization rates contributed to achieving nitrogen reductions from pasture, and BMP implementation contributed a smaller amount, the dominant force behind these reductions is the overall loss of pastureland, which has dropped from approximately 40,000 acres to approximately 30,000 acres between 2006 and 2012.

Stage I Phosphorus Reductions
The Falls WOC uses a qualitative phosphorus loss accounting approach to evaluate relative changes in nine different land use and management factors and their relative effect on phosphorus loss in the watershed. This qualitative method, which is also used for accounting in the Tar-Pamlico, and Jordan Lake watersheds was developed by a Phosphorus Technical Advisory Committee in 2005 after the technical group determined that a defensible, aggregated, county-scale accounting method for estimating phosphorus losses from agricultural lands was not feasible given the complexity of phosphorus behavior and transport in agricultural landscapes.

The WOC’s 2016 annual report indicates that the risk of phosphorus loss from agriculture has decreased in the Falls Watershed since the 2006 baseline. This represents a continued trend in decreased risk of phosphorus loss from Falls agriculture operations since the initial accounting report first submitted by the WOC in 2013. Some of the primary factors contributing to the reduced risk in phosphorus loss include reductions in animal waste generated, cropland conversion to grass and trees, and an overall reduction of cropland acres.
While the current phosphorus accounting method does not provide a quantitative estimate of phosphorus reductions for a direct comparison to the Stage I 40 percent reduction goal, this qualitative approach remains the best available method for evaluating phosphorus loss from agricultural lands in the Falls watershed at this time.

**Assessment of Progress**

This assessment of agriculture’s progress towards achieving the Falls Stage I goals was added to the rule to address concerns expressed during the rulemaking process about agriculture’s ability to achieve the necessary reductions. These concerns stemmed from the fact that the Falls strategy calls for large nutrient reductions on top of the reductions agriculture has already achieved under the existing Neuse management strategy. Given the long-term nature of the Falls strategy, evaluating agriculture’s progress at the Stage I halfway point provides an opportunity to identify adjustments to implementation as needed in order to achieve the required reductions.

As of crop year 2015, based on the accounting processes outlined in this report, agriculture in the Falls Lake watershed has demonstrated reasonable progress towards its Stage I 20 percent nitrogen reduction goals and is actually exceeding them for both cropland and pastureland. It is important to note however that these best available accounting estimates have their limitations, chief among them being they do not represent changes in loading to surface water. A fundamental limitation in the assessment of progress toward the phosphorus goal is that a quantitative accounting of annual progress toward the Stage I reduction goal is not possible with currently available accounting methods. In lieu of that, annual reporting from the Falls WOC indicates that there is an overall decrease in phosphorus loss risk from agriculture in the watershed.

Nutrient reductions from agriculture are susceptible to various economic and market pressures that can influence the amount and types of crops grown in the watershed and the amount of fertilizer applied. Uncertainty also stems from an inherent element of the agriculture nitrogen loss accounting methods that results in essentially 100 percent reduction credit for the acreage that represents a net reduction in agricultural acreage relative to the baseline. In the long run, this will largely be the land that is permanently lost to development. Staff have identified this as a concern and have engaged the agriculture community over time about possible ways to address this issue. However, consistently obtaining accurate data on agriculture land lost to development has proven problematic. There has also been opposition from the agriculture community to modifying the current accounting approach to address this issue. Staff continue to explore ways to better track and quantify agriculture land that goes to development and work with the agriculture community on this matter.

Given this inherent variability in reductions, staff believes it is important that agriculture operations in the Falls watershed continue to work toward increasing implementation of BMPs, which provide lasting, tangible reductions that better ensure the Stage I goals continue to be met.

**Qualifications on Implementation**

While the agriculture community in the Falls Watershed is currently meeting its Stage I goals additional reductions will be required during Stage II of rule implementation. However, recent legislation passed by the North Carolina General Assembly requires the evaluation of the Jordan and Falls Lake Nutrient Management Strategies and directs the Commission to begin a rules readoption process, with
stakeholder input, for both sets of rules by March 2019. Additionally, the adaptive management approach of the Falls Lake Management Strategy allows for a reexamination of the Stage II reduction goals and implementation requirements by 2025. The implementation requirements of the Falls Nutrient Management Strategy and the current Stage II reduction goals may be revised as a result of these two processes. The Division will continue to engage the agriculture community as the rules readoption process moves forward. In the meantime, implementation of agriculture’s Stage I reduction requirements remains unaffected and the WOC will continue to provide progress reports to the Division on an annual basis.