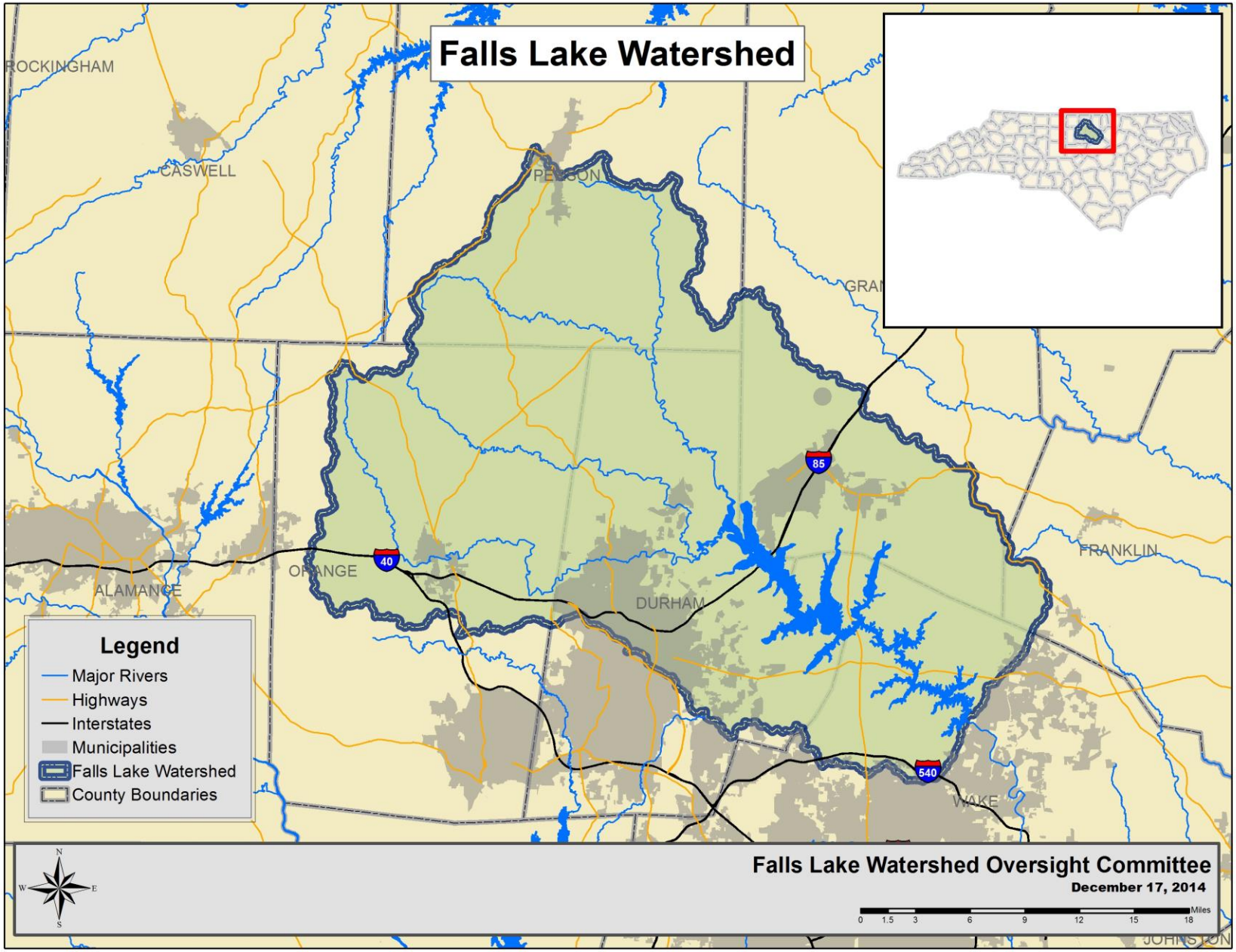
NCDA&CS

2015 Annual Progress Report (Crop Year 2014) on Agricultural Operations' Stage 1 Reductions for the Falls Lake Agriculture Rule (15 A NCAC 02B.0280)

A Report to the Division of Water Resources from the Falls Lake Watershed Oversight Committee: Crop Year 2014


Falls Lake Watershed
ROCKINGHAM
CASWELL
PERSON
GRANVILLE
ORANGE
ALAMANCE
DURHAM
FRANKLIN
WAKE
JOHNSTON
85
40
540
Legend
Major Rivers
Highways
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Municipalities
Falls Lake Watershed
County Boundaries
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Falls Lake Watershed Oversight Committee
December 17, 2014
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Summary

This report provides the annual progress report of collective progress made by the agricultural community to reduce nutrient losses toward compliance with Stage 1 of the Falls Lake Agriculture rule. For this report, the Falls Lake Watershed Oversight Committee (WOC) oversaw the application of accounting methods approved by the Environmental Management Commission's Water Quality Committee in March 2012 to estimate changes in nitrogen loss and phosphorus loss trends in the Falls Lake Watershed. This report is for the period between the strategy baseline (2006) and the most recent crop year (CY) for which data was available, 2014. The Falls Lake WOC received and approved crop year CY2014 annual reports from six counties as part of the Falls Lake Agriculture rule, which is part of the Falls Reservoir Water Supply Nutrient Strategy. To produce this report, Division of Soil and Water Conservation staff received, processed and compiled baseline and current-year reports from agricultural staff in six counties, and the WOC compiled the information and prepared this report. Agriculture has been successfully decreasing nutrient losses in the Falls Lake watershed. In CY2014, agriculture collectively exceeded its 20% Stage I nitrogen reduction goal for cropland, with a 46% reduction compared to the 2006 baseline. This represents an 11% increase in nitrogen loss reduction compared to CY2013. Four out of six counties exceeded the mandated 20% reduction goal this year, with Durham and Wake Counties documenting a 15% and 10% nitrogen loss reduction, respectively. For the small part of Wake County in the Falls Lake Watershed, limited cropland acreage greatly increases the effect of any change in agricultural operations on nitrogen loss estimates.

Falls Lake Watershed Oversight Committee Composition, Falls Agriculture Rule:

1. NC Division of Soil & Water Conservation
2. USDA-NRCS
3. NCDA&CS
4. NC Cooperative Extension Service
5. NC Division of Water Resources
6. Watershed Environmental Interest
7. Watershed Environmental Interest
8. Environmental Interest
9. General Farming Interest
10. Pasture-based Livestock Interest
11. Equine Livestock Interest
12. Cropland Farming Interest
13. Scientific Community

Reductions in nitrogen have been achieved through an overall decrease in cropland in production, a decrease in nitrogen application rates, and an increase in best management practices (BMPs) such as 20 and 50-foot riparian buffers. Since the baseline, reported cropland acres decreased in the watershed by 16,790, and an estimated 4,404 acres of agricultural land were lost to development. Phosphorus qualitative indicators demonstrate that there is no increased risk of phosphorus loss, with a 17% and 8% decrease in animal waste phosphorus production and tobacco acreage, respectively, and an increase in cropland conversion to grass and trees since the 2006 baseline.

Rule Requirements and Compliance

In January 2011, the permanent Agriculture Rule that is part of the Falls Reservoir Water Supply Nutrient Strategy became effective. The Agriculture Rule provides for a collective strategy for farmers to meet nitrogen loss reduction goals in two stages. The strategy goal is to reduce the average annual load of nitrogen and phosphorus to Falls Lake from 2006 baseline levels. Stage I requires that agriculture reach a goal of 20% nitrogen loss reduction and 40% phosphorus reduction by year 2020. This Stage I nitrogen goal requires a 20% reduction from pasture sources. This is reported as a 20 point increase calculated using the pasture points accounting method. Stage II sets reduction goals of 40% and 77% for nitrogen and phosphorus, respectively, by year 2035, which includes at least 40 pasture points for the watershed. A Watershed Oversight Committee (WOC) was established to guide the implementation of the rule and to assist farmers with complying with the rule.

Falls Lake NSW Strategy:
The Environmental Management Commission (EMC) adopted the Falls Reservoir Water Supply Nutrient Strategy rules in 2011. The strategy goal is to reduce the average annual load of nitrogen and phosphorus to Falls Lake from 2006 baseline levels. In addition to point source rules, mandatory controls were applied to addressing non-point source pollution in agriculture, urban stormwater, and riparian buffer protection. The management strategy was modeled after similar strategies for the Neuse River, Tar-Pamlico River, and Jordan Lake.

All county Local Advisory Committees (LAC) submitted their fourth annual reports to the WOC in December 2015. Collectively, agriculture in the six counties is meeting the cropland nitrogen loss reduction goal, with a 46% reduction. Phosphorus qualitative indicators for phosphorus suggest there is no increased risk of phosphorus loss from agriculture in the watershed.

Scope of Report and Methodology

The estimates provided in this report represent county-scale calculations of nitrogen loss from cropland agriculture in the watershed made by soil and water conservation district technicians using the 'aggregate' version of the Nitrogen Loss Estimation Worksheet, or NLEW, and adjusted for the percentage of each county in the Falls Lake Watershed. The NLEW is an accounting tool developed to meet the specifications of the Neuse Rule and approved by the Environmental Management Commission's (EMC) Water Quality Committee in March 2012 for use in the Falls Lake Watershed. The NLEW development team included interagency technical representatives of the NC Division of Water Resources (DWR), NC Division of Soil and Water Conservation (DSWC), United States Department of Agriculture (USDA)-Natural Resources Conservation Service (NRCS) and was led by NC State University (NCSU) Soil Science Department faculty. The NLEW captures application of both inorganic and animal waste sources of fertilizer to cropland. It does not capture the effects of nitrogen applied to pastureland, and is an "edge-of-management unit" accounting tool; it estimates changes in nitrogen loss from croplands, but does not estimate changes in nitrogen loading to surface waters. Assessment methods were developed and approved by the Water Quality Committee of the EMC for pastureland and phosphorus, and are described later in the report.

Nitrogen Reduction from Cropland from 2006 Baseline for CY2014

All counties submitted their fourth progress reports to the WOC in December 2015. In CY2014 agriculture achieved a 46% reduction in nitrogen loss from cropland compared to the average 2006 baseline. Table 1 lists each county's baseline, CY2013 and CY2014 nitrogen (lbs/yr) loss values from cropland, along with nitrogen loss percent reductions from the baseline in CY2013 and CY2014, and Figure 1 shows annual loss percent reductions per year since CY2011.

Figure 1. Collective Nitrogen Loss Reduction Percent 2011 to 2014, Falls Lake Watershed.

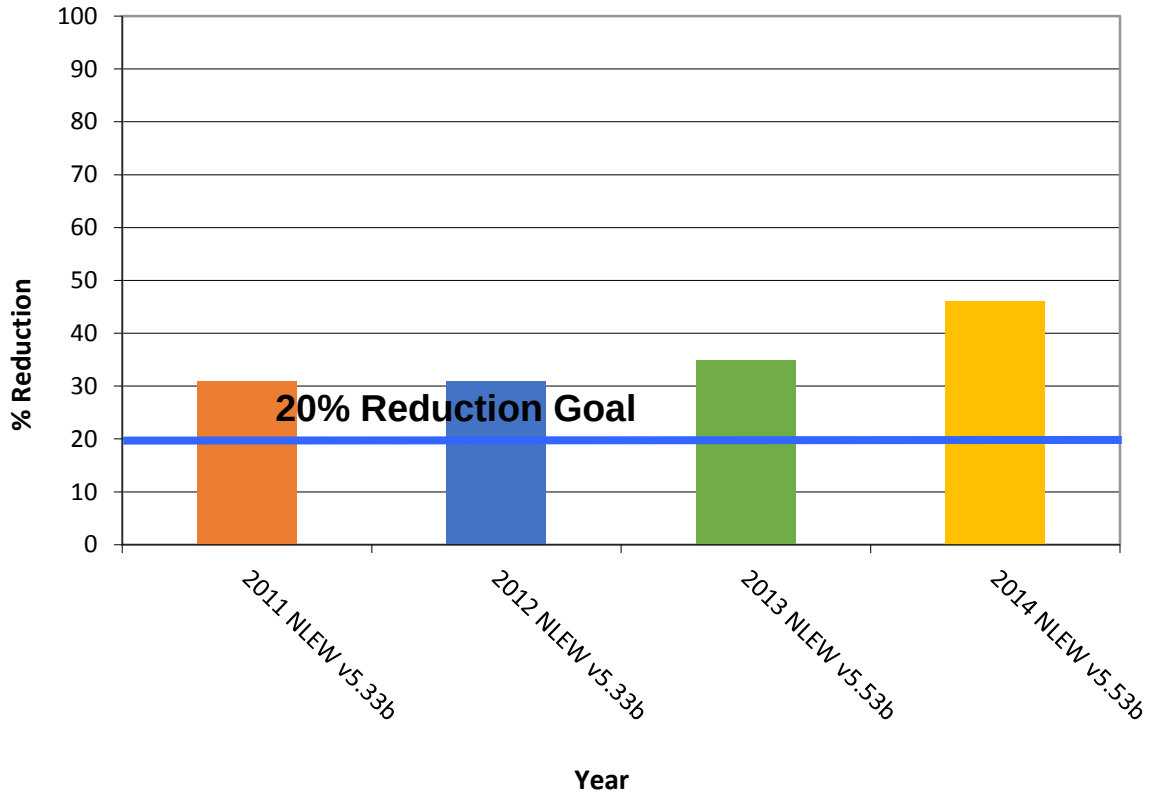


Table 1. Estimated reductions in agricultural nitrogen loss (cropland) from baseline (2006) for CY2013, CY2014, Falls Lake Watershed

County	Baseline N Loss (lb)* NLEW v. 5.33b	CY2013 N Loss (lb)* NLEW v. 5.53b	CY2013 N Reduction	CY2014 N Loss (lb)* NLEW v. 5.53b	CY2014 N Reduction
Durham	135,902	97,972	28%	115,682	15%
Franklin	11,717	5,159	56%	3,496	70%
Granville	127,704	91,469	28%	7,783	94%
Orange	347,402	250,184	28%	168,891	51%
Person	484,123	258,126	47%	290,598	40%
Wake	45,926	50,595	-1%	41,358	10%
Total	1,152,774	753,505	35%	627,808	46%

**Nitrogen loss values are for comparative purposes. They represent nitrogen that was applied to cropland in the watershed and neither used by crops nor intercepted by BMPs in an agricultural management unit, based on NLEW calculations. This is not an in-stream loading value.*

Notably, Granville is currently reporting a 94% nitrogen loss reduction from baseline. During the baseline year, the county reported 4,140 acres of fescue at 100 lbs of nitrogen per acre. This acreage accounted for 66% of their total baseline nitrogen loss. For CY2014 they revised their grass numbers down considerably because the Local Advisory Committee felt that past estimates of fescue acres for hay were probably not representative of current operations. Current estimates include 964 acres of mixed cool season grasses for hay, fertilized at 40 pounds per acre, which is much closer to the fertilization rate reported on these types of grasses elsewhere in the watershed. This resulted in an overall crop acre decrease of 3,891 from baseline for the county, which is a 61% reduction in crop acres. In addition, from CY2013 to CY2014 wheat and tobacco acres decreased by 32% and 51%, respectively, and corn acres decreased by 31%. For reference, the 7,783 lbs nitrogen loss reported for Granville County accounts for 1.2% of the overall nitrogen loss in the Falls Lake Watershed.

Overall, the Falls Lake Watershed is reporting a cropland nitrogen loss reduction of 46% for CY2014, which is 11% higher than the loss reduction reported in CY2013. In addition to the Granville County changes mentioned above, this is primarily due to the fact that Orange County reported a decrease of approximately 20% in wheat acres and an increase of approximately 53% in soybean acres from one year to the next. Wheat is fertilized with nitrogen, while soybeans are not generally fertilized with nitrogen. Orange County has more acres in the Falls Lake Watershed than any other county, and so cropping shifts in this county are expected to have a proportionately larger effect on the overall reduction reported for each crop year.

Best Management Practice Implementation

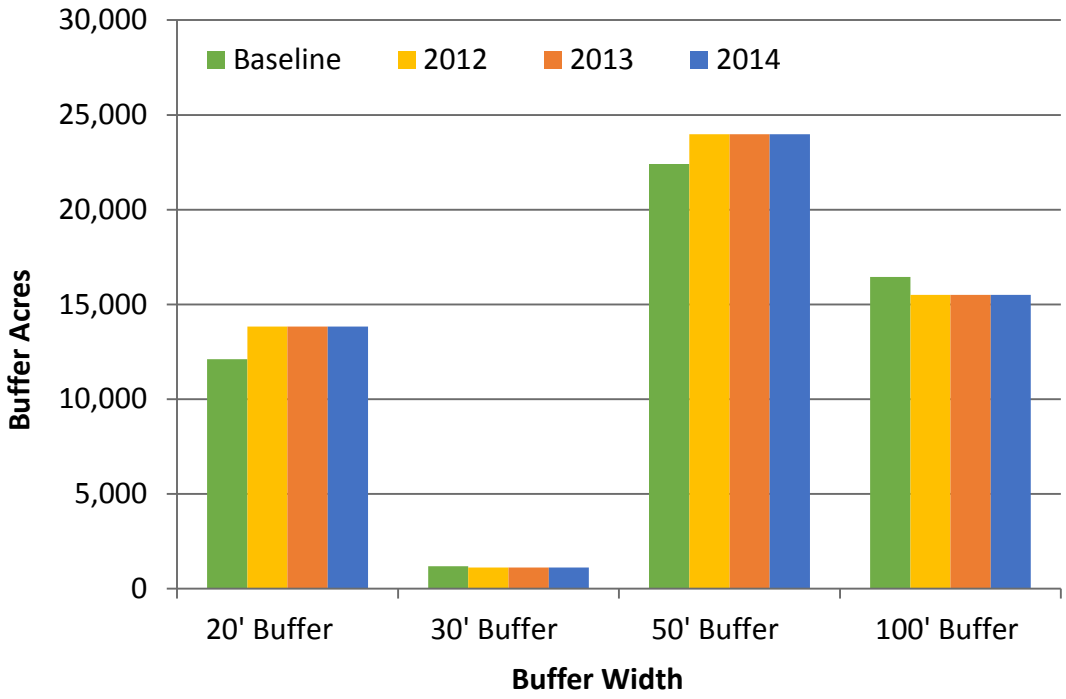
Agriculture is credited with different nitrogen reduction efficiencies, expressed as percentages, for riparian buffer widths ranging from 20 feet to 100 feet. The NLEW version 5.35b for Neuse River Basin provides the following percent nitrogen reduction efficiencies for buffer widths on cropland: 20' receives 20% reduction, 30' receives 25% reduction, 50' receives 30%, and 100' receives 35% reduction (see Table 2). Note that these percentages represent the net or relative percent improvement in nitrogen removal resulting from riparian buffer implementation.

Table 2. Buffer Width Options and Nitrogen Reduction Efficiencies in NLEW

Buffer Width	NLEW v5.35b % N Reduction
20'	20%
30'	25%
50'	30%
100'	35%

Figure 2 illustrates the amount of buffers on cropland in the baseline (2006) and CY2014. Overall, total acres of buffers have slightly increased since the baseline (4.4%). Acres of buffers of 20 and 50 foot widths have increased, while 30 and 100 foot buffers have remained unchanged. The reported buffer acres do not take into account the entire drainage area treated by buffers in the piedmont which is generally 5 to 10 times greater than the actual acres of the buffers shown in Figure 2.[1] Riparian buffers have many important functions beyond being effective in reducing nitrogen. Recent research has shown that upwards of 75% of sediment from agricultural sources is from stream banks and that riparian buffers, particularly trees, are important for reducing this sediment.[2] In addition, riparian buffers can reduce phosphorus and sediment as they move through the buffer and provide other critically important functions such as wildlife habitat and stream shading.

Figure 2. Nitrogen Reducing Buffers installed on Croplands from CY2012 through CY2014, compared to Baseline (CY2006), Falls Lake Watershed*



**The acres displayed represent buffer acres. Acres treated by the buffer could be 5 to 10 times larger in the piedmont than the actual buffer acreage shown above.[1]*

[1] Bruton, Jeffrey Griffin. 2004. Headwater Catchments: Estimating Surface Drainage Extent Across North Carolina and Correlations Between Landuse, Near Stream, and Water Quality Indicators in the Piedmont Physiographic Region. Ph.D. Dissertation. Department of Forestry and Environmental Resources, North Carolina State University, Raleigh, NC 27606.

[2] Osmond, D., D. Meals, D. Hoag, and M. Arabi. 2012. How to Build Better Agricultural Conservation Programs to Protect Water Quality: The NIFA-CEAP Experience. Soil and Water Conservation Society, Ankeny, IA.

Fertilization Management

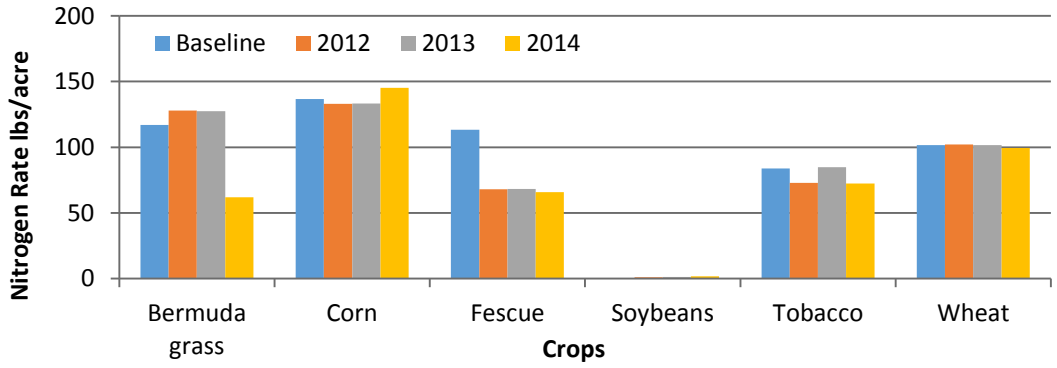
Increased fertilizer cost has impacted the application rates of nitrogen on farms in the Falls Lake Watershed. For most crops, farmers have reduced their nitrogen application rates from baseline levels. Figure 3 displays the nitrogen application rates in pounds per acre for the major crops in the watershed. Nitrogen application rates for fescue hay are still 47 pounds/acre lower than during the baseline. The decrease of hay acres since the baseline is due to increasing costs, cropping shifts, and an overall loss of cropland acres. Nitrogen rates on tobacco decreased from CY2013, and corn application rates increased from baseline. This is likely due to the fact that the growing season began with high corn prices, but due to the subsequent price collapse, the WOC expects lower application rates for corn in future crop years. Soybeans and wheat application rates remained relatively constant in CY2014 compared to the 2006 baseline. Fertilizer rates will be revisited annually by county local advisory committees using data from farmers, commercial applicators and state and federal agencies' professional estimates.

Factors Identified by LACs Contributing to Reduced Nitrogen Application Rates since the Baseline Year:

- Rising fertilizer costs and fluctuating farm incomes.
- Mandatory waste management plans.
- The federal government tobacco quota buy-out reducing tobacco acreage.
- Neuse Nitrogen Strategies.

Agriculture in the six counties within the Falls Lake watershed is focused primarily on pasture-based systems, with hay and/or pasture ranging from 42-74% of the agricultural land use. On hay and pasture nitrogen application rates are significantly less than NC State University recommendations and only small amounts of phosphorus are added. Thus, it appears that hay production acres are underfertilized in the Falls Lake Basin.[3]

Figure 3. Average annual nitrogen fertilization rate (lb/ac) for agricultural crops for the baseline (2006), 2012, 2013, and 2014, Falls Lake Watershed

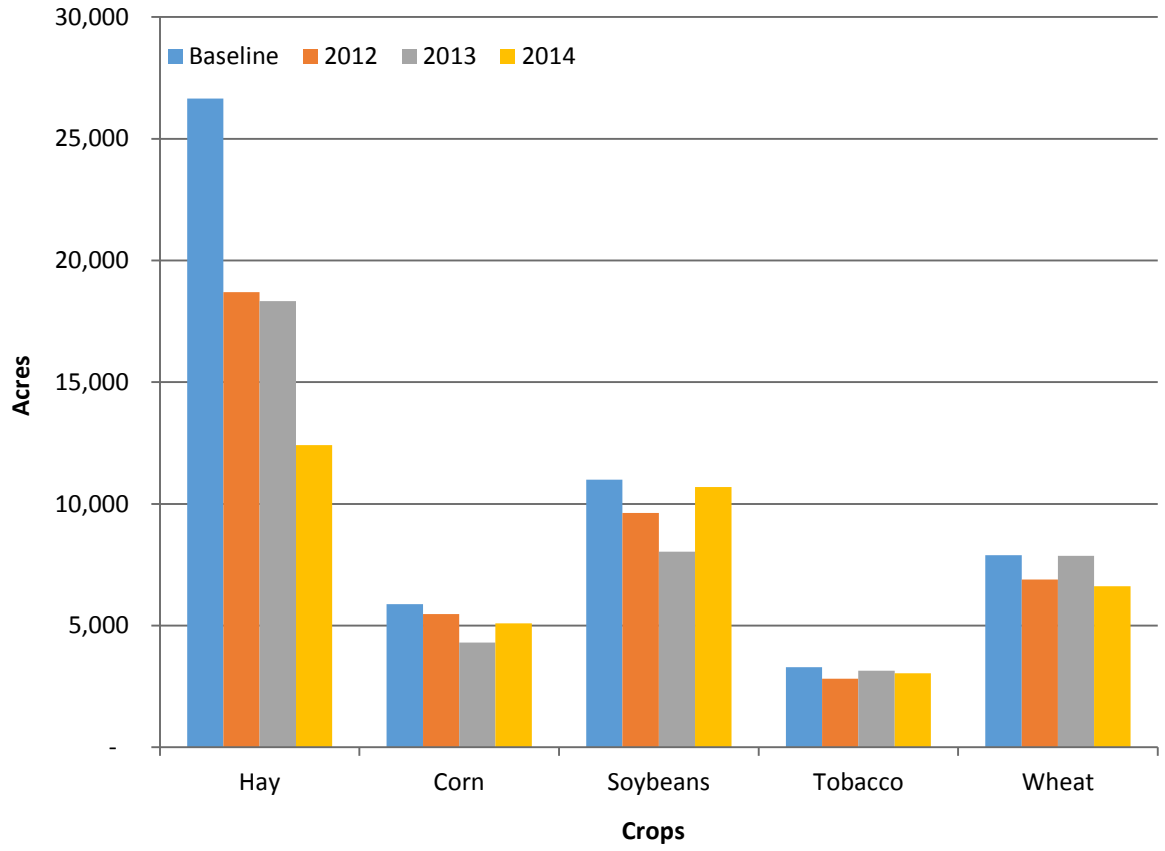


[3] Osmond, D.L., K. Neas. 2011. Delineating Agriculture in the Neuse River Basin. Prepared for NC Department of Environment and Natural Resources (NCDENR), Division of Water Quality. http://content.ces.ncsu.edu/delineating-agriculture-in-the-neuse-river-basin

Cropping Shifts

The LACs recalculate the cropland acreage annually by utilizing crop data reported by farmers to the Farm Service Agency. Because each crop type requires different amounts of nitrogen and uses applied nitrogen with a different efficiency rate, changes in the mix of crops grown can have a significant impact on the cumulative yearly nitrogen loss reduction. Notably, this year there was a significant increase in soybean acres in the watershed, and these acres require little to no fertilization. The WOC anticipates that the watershed will see additional crop shifts in upcoming years based on economic changes. A host of factors from individual to global determine crop choices. Crop acreages are expected to fluctuate yearly with market changes. Figure 4 shows crop acres and shifts for CY2014 compared to the baseline. The reported acres of all major crops have decreased by over 16,857 acres in the watershed since the baseline.

Figure 4. Reported Acreage of Major Crops for the Baseline (2006), 2012, 2013, and 2014, Falls Lake Watershed



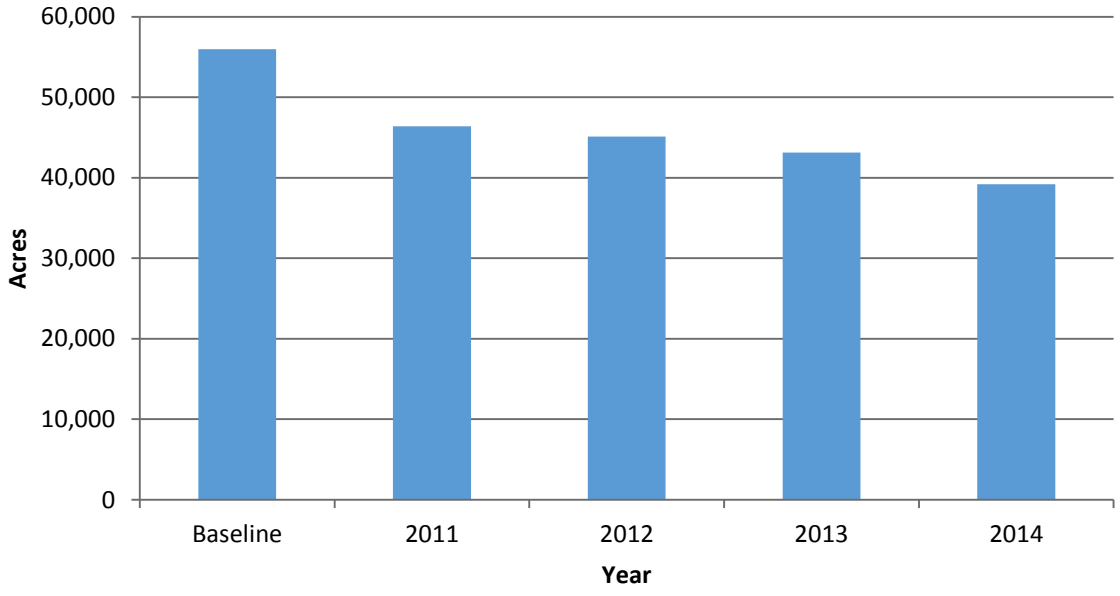
Land Use Change to Development and Cropland Conversion

The number of cropland acres fluctuates every year in the Falls Lake Watershed due to cropland conversion and development. Each year, some cropland is either permanently lost to development or converted to grass or trees and likely to be ultimately lost from agricultural production. Data regarding land use change since the baseline is summarized below.

It is estimated that since the 2006 baseline there has been a decrease in crop production of 16,790 reported acres (30% of total cropland). Of that, 4,404 agricultural acres have been permanently lost to development. Through state and federal cost share programs, 1,853 cropland acres (11% of cropland loss) were converted to grass or trees.

The estimates for agricultural land lost to development come from methodologies developed at the individual county level based on available information and the many and diverse local government reporting requirements associated with development. Each county uses a different method, but these methods are documented and use the best local information available. The remaining acreage could potentially be brought back into agricultural land. These estimates do not separate the amount of cropland versus pastureland lost; the number reported is agricultural land converted to development.

Figure 5. Total Reported Cropland Acres in the Falls Lake Watershed, Baseline (2006), 2011, 2012, 2013, 2014



Phosphorus Indicators for CY2014

The qualitative indicators included in Table 3 show the relative changes in land use and management parameters and their relative effect on phosphorus loss risk in the watershed. This approach was recommended by the Phosphorus Technical Advisory Committee (PTAC) in 2005 due to the difficulty of developing an aggregate phosphorus tool parallel to the nitrogen NLEW tool and the PTAC reconvened to make minor revisions for the tool's use in the Jordan Lake Watershed in April 2010. This modified approach was approved for use in the Falls Lake Watershed by the Water Quality Committee of the EMC. This report includes phosphorus indicator data for the baseline period (2006), CY2012, CY2013 and CY2014. Most of the parameters indicate less risk of phosphorus loss from agricultural management units than in the baseline period.

Factors contributing to the reduced risk of phosphorus loss in the Falls Lake Watershed include:

- Tobacco acres were reduced by 8%
- Animal waste P was reduced by 17% from livestock and poultry
- Cropland conversion to other uses

The soil test phosphorus median number reported for the basin fluctuates each year due to the nature of how the data is collected and compiled. The soil test phosphorus median numbers shown in Table 3 are from agricultural operations and are generated by using North Carolina Department of Agriculture and Consumer Services (NCDA&CS) soil test laboratory results from voluntary soil testing and the data is reported by the NCDA&CS. The number of samples collected each year varies. The data does not include soil tests that were submitted to private laboratories. The soil test results from the NCDA&CS database represent data from entire counties in the basin, and have not been adjusted to include only those samples collected in the Falls Lake Watershed.

Phosphorus Technical Assistance Committee (PTAC):
The PTAC's overall purpose was to establish a phosphorus accounting method for agriculture in the Tar-Pamlico River Basin. It determined that a defensible, aggregated, county-scale accounting method for estimating phosphorus losses from agricultural lands was not feasible due to "the complexity of phosphorus behavior and transport within a watershed, the lack of suitable data required to adequately quantify the various mechanisms of phosphorus loss and retention within watersheds of the basin, and the problem with not being able to capture agricultural conditions as they existed in 1991." (1991 was the Tar-Pamlico Basin's baseline year.) The PTAC instead developed recommendations for qualitatively tracking relative changes in practices in land use and management related to agricultural activity that either increase or decrease the risk of phosphorus loss from agricultural lands in the basin on an annual basis. This is the approved approach for the Falls Lake Watershed.

Table 3. Relative Changes in Land Use and Management Parameters and their Relative Effect on Phosphorus Loss Risk in the Falls Lake Watershed

Parameter	Units	Source	Baseline 2006	CY2012	CY2013	CY2014	Percent '06-'14 change	CY2014 P Loss Risk +/-
Reported Cropland	acres	FSA, LAC	55,969	45,132	43,136	39,179	-30%	-
Cropland conversion (to grass & trees)	acres	USDA-NRCS & NCACSP	1,527	1,822	1,853	1,853	21%	-
CRP / WRP (cumulative)	acres	USDA-NRCS	0	0	0	0	0%	N/A
Conservation tillage	acres	USDA-NRCS & NCACSP	26,787	18,179	19,228	19,607	-27%	+
Vegetated buffers (cumulative)	acres	USDA-NRCS & NCACSP	52,139	54,418	54,419	54,420	4%	-
Scavenger crop	acres	LAC	0	5	605	599	599%**	N/A
Tobacco	acres	FSA, LAC	3,288	2,817	3,145	3,036	-8%	-
Animal waste P	lbs of P/ yr	NC Ag Statistics	586,612	541,096	546,008	487,203	-17%	-
Soil test P median	P Index	NCDA& CS	77	74	67	65	-16%	-

** Conservation tillage is being practiced on additional acres but this number only reflects acres under active cost share contracts, not acres where contracts have expired or where farmers have adopted the use of conservation tillage without cost share assistance. Based on field office reports, conservation tillage acres remain high even after contracts expire due to farmer satisfaction with the practice after initial implementation.*[4]

*** The percent change for scavenger crop acres is assumed to have increased from 1 due to the problem with calculating a percentage difference from zero.*

Given the key role of phosphorus in the Falls Lake nutrient strategy, the Falls WOC recommends that phosphorus accounting and reporting follow a three-pronged approach:

1. Annual Qualitative Accounting: Conduct annual qualitative assessment of likely trends in agricultural phosphorus loss in the Falls watershed relative to 2006 baseline conditions using the method established by the 2005 PTAC report that added tobacco acreages and removed water control structures.

[4] Osmond, D.L., K. Neas. 2011. Delineating Agriculture in the Neuse River Basin. Prepared for NC Department of Environment and Natural Resources (NCDENR), Division of Water Quality. http://content.ces.ncsu.edu/delineating-agriculture-in-the-neuse-river-basin

2. Phosphorus Loss Assessment Tool (PLAT): The PLAT has been developed to assess potential P loss from cropland to water resources. A survey of the Falls Lake watershed counties was conducted in 2010, with the next survey to be conducted in the future if funding is available. The results of the 2010 survey demonstrated that the potential for phosphorus loss is very low (< 0.35 lbs/ac/yr) for four of the five counties surveyed. Phosphorus loss in Orange County is rated at the low end of the medium range (> 1 lb/ac/yr). Even with the installation of buffers along all streams and the discontinuation of phosphorus application (fertilizer, biosolids, or animal waste), there would be limited potential for additional phosphorus loss reduction.
3. Improved understanding of agricultural phosphorus management through studies using in-stream monitoring: quantitative in-stream monitoring should be conducted. Such monitoring is contingent upon the availability of funding and staff resources. An appropriate water quality monitoring design would be a paired-watershed study of subwatersheds with only agricultural land use. This design would allow estimates of phosphorus loading for different management regimes and load reductions after conservation practices have been implemented. However, funding for this study is currently unavailable.

The WOC recommends that no additional management actions be required of agricultural operations in the watershed at this time to comply with the phosphorus goals of the agriculture rule. The WOC will continue to track and report the identified set of qualitative phosphorus indicators to the Division of Water Resources (DWR) annually, and as directed by the rule to the Environmental Management Commission. The WOC expects that BMP implementation may continue to increase throughout the watershed in future years, and notes that BMPs installed for nitrogen, pathogen and sediment control often provide significant phosphorus benefits as well.

Pasture Points Accounting

As described in the first accounting report provided in 2013, the pastureland accounting component of this report can be done only at 5-year intervals because it relies on the Census of Agriculture, which is published every 5 years. Pasture BMPs receive point reduction credit as described in table 4.

Table 4. Points nitrogen reduction from pastureland for different BMPs, Pasture Point System

Pasture BMP	Pasture points
Exclusion fencing with a 10’ stream setback	30 points
Exclusion fencing with a 20’ buffer	50 points
Exclusion fencing with a 30’ buffer	55 points
Exclusion fencing with a 50’ buffer	60 points
Exclusion fencing with a 100’ buffer	65 points

Work to install livestock exclusions is ongoing to assist in meeting the pasture points goal. The WOC will revisit pasture progress in the annual report following the 2017 Census of Agriculture, which will cover activities through 2016, and will offer any rule compliance recommendations called for by the rule to the Water Quality Committee at that time. For more detail, refer to the annual progress report for crop year 2013.

BMP Implementation Not Tracked by NLEW

Not all types of nutrient and sediment-reducing BMPs are tracked by NLEW such as: livestock-related nitrogen and phosphorus reducing BMPs, BMPs that reduce soil and phosphorus loss, and BMPs that do not have enough scientific research to support estimating a nitrogen benefit. The WOC believes it is worthwhile to recognize these practices. Table 5 identifies BMPs and tracks their implementation in the watershed since the end of the baseline period.

Table 5: Nutrient and sediment-reducing installed best management practices, Falls Lake Watershed*

BMP	UNITS	BMPs Installed (CY2006-CY2014)
Critical Area Planting	Acre	9
Composting Facility	Number	4
Cropland Conversion - Grass	Acre	313
Cropland Conversion - Trees	Acre	58
Diversion	Feet	17,338
Dry Stack	Number	8
Fencing (USDA programs)	Feet	57,684
Field Border	Acre	26,722
Grassed Waterway	Acre	8,654
Livestock Exclusion	Feet	32,795
Nutrient Management	Acre	1,152
Pasture Renovation	Acre	326
Stream Crossing	Number	1
Sod-Based Rotation	Acre	11,866
Tillage Management	Acre	19,607
Terraces	Feet	4,163
Trough or Tank	Number	47
Waste Storage Facility	Number	7

**Values represent active contracts in State and Federal cost share programs.*

Looking Forward

The Falls Lake WOC will continue to report on and encourage rule implementation, relying heavily on the local soil and water conservation districts who work directly with farmers to assist with best management practice design and installation.

Because cropping shifts are susceptible to various pressures, the WOC is working with all counties to continue BMP implementation on both cropland and pastureland that provides for a lasting reduction in nitrogen and phosphorus loss in the watershed while monitoring cropping changes. Due to a steep decline in corn prices and based on input from several LACs, the BOC expects a significant reduction in corn acreage in CY2015. Corn requires more nitrogen fertilization than other commodity crops.

The NC Department of Agriculture and Consumer Services (NCDA&CS) understands the importance of using up-to-date technology and data sources in accounting for nutrient loss on agricultural lands. Because of this, Emergency Programs Division staff is currently updating the NLEW software that was written with now outdated software language. New yield expectations and nitrogen use efficiencies are periodically needed to ensure that loss calculations can be reliably assessed for current crop varieties. NCDA&CS staff has developed a web-based version of NLEW and will complete beta testing during the spring of 2016. It is hoped that streamlined and updated functionality will enable the WOC to report more crop types for the counties in the basin, and the revised tool will ensure accurate cropland reporting in future years.

Phosphorus accounting and reporting will continue to address qualitative factors and evaluate trends in agricultural phosphorus loss annually. Periodic land use surveys with associated use of PLAT are needed every five years, but it is unlikely that funding will be available for this activity. Additionally, understanding of agricultural phosphorus management could be improved through in-stream monitoring contingent upon the availability of funding and staff resources.

The WOC recognizes several factors affecting agriculture:

- Urban encroachment
- Market Fluctuations
- Changes in government programs (i.e., commodity support or environmental regulations)
- Weather (i.e., long periods of drought or rain)
- Scientific advances in agronomics (i.e., production of new types of crops or improvements in crop sustainability)
- Plant disease or pest problems (i.e., viruses or foreign pests)

A subcommittee of the Falls and Jordan Lake WOCs has been working with DWR on issues regarding nutrient offsets that arise from trades involving agricultural land. Also, the WOC feels that additional research is needed on accounting procedures for pasture operations, and supports such research being conducted. Additionally, should readily accessible information become available on biosolids applications to agricultural acres in the watershed, the WOC will consider whether separate accounting for those applications of nutrients is feasible and appropriate.

Funding is an integral part in the success of reaching and maintaining the goal through technical assistance and BMP implementation. It is also important for data collection and reporting.

In 2001, grants funded ten basin technicians and two basin coordinators who were employed to assist in the reporting requirements for the Neuse and Tar-Pamlico Agriculture Rules. In 2013 there remained funding for 5.25 full-time basin technicians and one Neuse/Tar-Pamlico Basin Coordinator. Technicians have been essential in promoting and assisting farmers with BMP installation and nutrient management since the rule's adoption, but on June 30, 2015 the last technician funding was expended. In 2015, there is no funding for a coordinator, so an employee within the NCDA&CS Division of Soil and Water Conservation has been assigned the data collection and reporting duties for the Agriculture Rules for all existing Nutrient Sensitive Waters Strategies.

Financial constraints will affect future reporting:

- The Falls Lake Watershed has lost all funding for basin technicians. LACs are being asked to take on a more active role in the data collection and synthesis that these positions conducted previously. It should be noted that farmers and agency staff personnel with other responsibilities serve on the LACs in a voluntary capacity.
- The Neuse/Tar-Pam Basin Coordinator position is no longer funded, and the Division of Soil and Water Conservation has had to restructure current staff workloads to ensure that Falls Lake reporting can be completed. Therefore, less time is available to support local efforts to do the reporting and assist with BMP implementation and outreach.
- Periodic land use surveys critical to understanding watershed agricultural activities are contingent upon future funding.