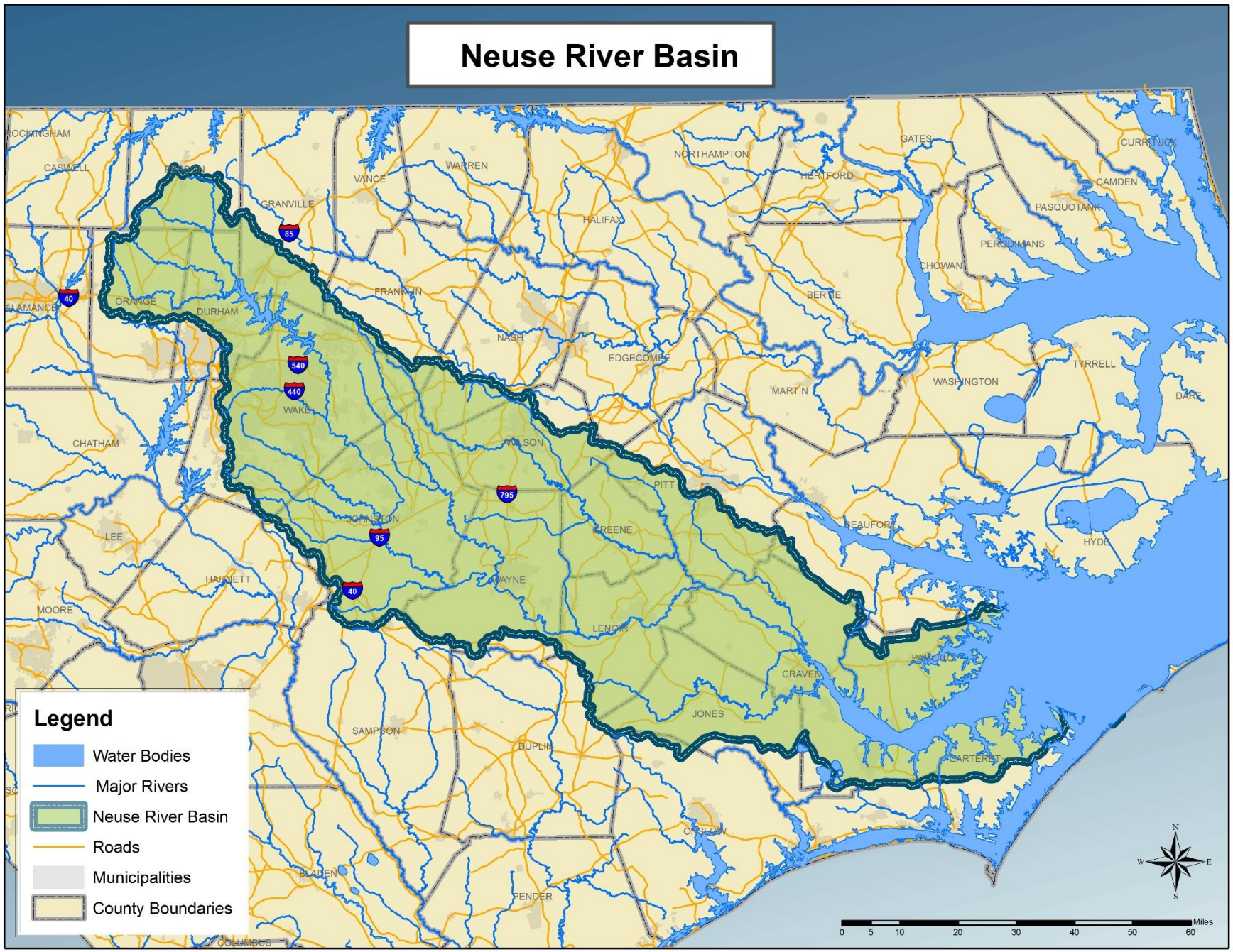
NCDA&CS

2020 Annual Progress Report (Crop Year 2019) on the Neuse Agricultural Rule (15 A NCAC 2B.0712)

A Report to the Division of Water Resources from the Neuse Basin Oversight Committee: Crop Year 2019


Neuse River Basin
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ALAMANCE
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DURHAM
GRANVILLE
VANCE
WARREN
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WAKE
CHATHAM
LEE
HARNETT
MOORE
JOHNSTON
WILSON
EDGECOMBE
NORTHAMPTON
HALIFAX
GATES
HERTFORD
CHOWAN
PERQUIMANS
PASQUOTANK
CAMDEN
CURRITUCK
BERTIE
MARTIN
WASHINGTON
TYRRELL
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HYDE
BEAUFORT
PITT
GREENE
WAYNE
LENOIR
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Summary

The Neuse Basin Oversight Committee (BOC) received and approved crop year (CY[1]) 2019 annual reports estimating the progress from the seventeen Local Advisory Committees (LACs) operating under the Neuse Agriculture rule as part of the Neuse Basin Nutrient Management Strategy. This report demonstrates agriculture's ongoing collective compliance with the Neuse Agriculture Rule and estimates further producer progress in decreasing nutrients. In CY2019, agriculture collectively achieved an estimated 50% reduction in nitrogen loss from agricultural lands compared to the 1991-1995 baseline, continuing to exceed the rule-mandated 30% reduction. Fifteen of the seventeen LACs exceeded the 30% reduction goal established by the BOC. The main reason for the greater nitrogen reduction in these counties is cropping shifts to crops with lower nitrogen demands and application rates.

Rule Requirements and Compliance History

Neuse Nutrient Sensitive Waters (NSW) Strategy

The Environmental Management Commission (EMC) adopted the Neuse nutrient strategy in December, 1997. The NSW strategy goal was to reduce the average annual load of nitrogen delivered to the Neuse River Estuary by 2003 from both point and non-point source pollution by a minimum of 30% of the average annual load from the baseline period (1991-1995). Mandatory nutrient controls were applied to address non-point source pollution in agriculture, urban stormwater, nutrient management, and riparian buffer protection. The overall 30% nitrogen loading reduction target for the Neuse River Estuary has not yet been reached.

Effective December 1997, the rule provides for a collective strategy for farmers to meet the 30% nitrogen loss reductions within five years. A BOC and seventeen LACs were established to implement the Neuse Agriculture rule and to assist farmers with complying with the rule.

All seventeen Local Advisory Committees (LACs) met as required in 2020. The LACs submitted their first annual report to the BOC in May 2002. That report estimated a collective 38% reduction in nitrogen loss with 12 of the 17 LACs exceeding 30% individually. In 2003, all LACs achieved their BOC recommended reduction goal. All counties are currently meeting their goal with the exception of Pamlico County, which reported a 15% reduction, and Carteret County, which reported a 28% reduction. Division of Soil and Water Conservation staff uses input from the LACs to calculate their annual reductions using the Nitrogen Loss Estimation Worksheet (NLEW). Adjustments are made to reflect the most up-to-date scientific research. These revisions lead to adjustments in both individual LAC and basinwide nitrogen loss reduction rates.

[1] The 2019 crop year began in October 2018 and ended in September 2019.

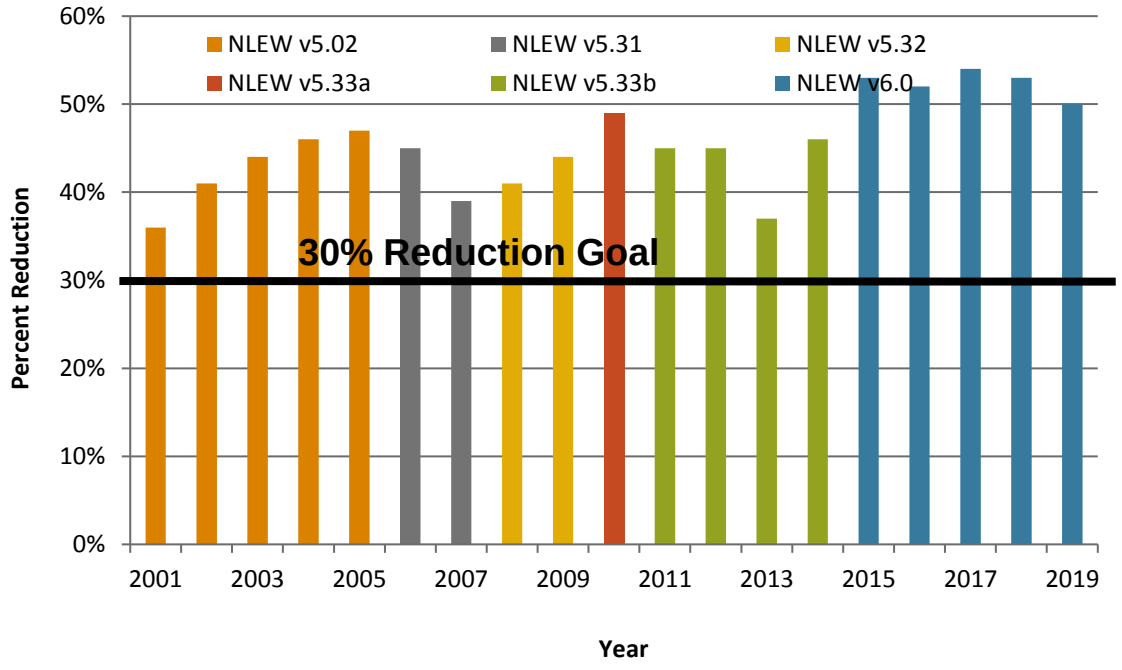
Scope of Report and Methodology

The estimates provided in this report represent whole-county scale calculations of nitrogen loss from cropland agriculture adjusted for acreage in the basin. These estimates were made by NC Division of Soil and Water Conservation (DSWC) staff using the 'aggregate' version of the Nitrogen Loss Estimation Worksheet, or NLEW, an accounting tool developed to meet the specifications of the Neuse Rule and approved by the EMC. The development team included interagency technical representatives of the NC Division of Water Resources (DWR), NC DSWC and USDA-Natural Resources Conservation Service (NRCS) and was led by NC State University 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 NLEW 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.

Annual Estimates of Nitrogen Loss and the Effect of NLEW Refinements

The NLEW software is periodically revised to incorporate new knowledge gained through research and improvements to data. These changes have incorporated the best available data, but changes to NLEW must be considered when comparing nitrogen loss reduction in different versions of NLEW. Further updates in soil management units are expected as NRCS produces updated electronic soils data. The small changes in soil management units are unlikely to produce significant effects on estimates of nitrogen loss reductions. Figure 1 represents the annual percent nitrogen loss reduction from the baseline for 2001 to 2019.

Figure 1. Collective Nitrogen Loss Reduction Percent 2001 to 2019 Based on NLEW, Neuse River Basin.



The first NLEW reports were run in 2001, and agriculture has continued to exceed its collective 30% nitrogen reduction goal since that time. The first NLEW revision (v5.31) marked a significant decrease in the nitrogen reduction efficiencies of buffers based on the best available research information, so baseline and CY2005 were re-calculated, and soil management units were revised. The second (v5.32) and third (v5.33a) revisions were minor updates of soil mapping units. In April of 2011 the NLEW Committee established further reductions (v5.33b) in nitrogen removal efficiencies for buffers based on additional research. In 2016 NLEW software was updated (v6.0) from outdated software and transferred to a web-based platform on NCDA&CS servers. Revised realistic yield and nitrogen use efficiency data from NCSU was incorporated, and some minor calculation errors were corrected for corn, sweet potatoes, and sweet corn. Table 1 lists the changes in buffer nitrogen reduction efficiencies over time.

Table 1. Changes in Buffer Width Options and Nitrogen Reduction Efficiencies in NLEW

Buffer Width	**NLEW v5.02 % N Reduction 2001-2005**	**NLEW v5.31, v5.32, v5.33a % N Reduction 2006-2010**	**NLEW v5.33b, v6.0 % N Reduction 2011-Current**
20’	40% (grass)* 75% (trees & shrubs)*	30%	20%
30'	65%	40%	25%
50'	85%	50%	30%
70'	85%	55%	30%
100'	85%	60%	35%

**NLEW v5.02 - the vegetation type (i.e. trees, shrubs, grass) within 20' and 50' buffers determined reduction values. Based on research results, this distinction was dropped from subsequent NLEW versions.*

Current Status

Nitrogen Reduction from Baseline for CY2019

All seventeen LACs submitted their eighteenth annual reports to the BOC for approval in August 2020. For the entire basin, in CY2019 agriculture achieved a 50% reduction in nitrogen loss compared to the 1991-1995 baseline. This percentage is 3% lower than the reduction reported for CY2018. Table 2 lists each county's baseline, CY2018 and CY2019 nitrogen (lbs/yr) loss values, and nitrogen loss percent reductions from the baseline in CY2018 and CY2019.

*Table 2. Estimated Reductions in Agricultural Nitrogen Loss from Baseline (1991-1995) for 2018 and 2019, Neuse River Basin**

County	Baseline N Loss (lb)	CY2018 N Loss (lb)*	CY2018 N Reduction (%)	CY2019 N Loss (lb)*	CY2019 N Reduction (%)
Carteret	1,292,586	386,374	70%	924,212	28%
Craven	4,153,187	1,689,533	59%	2,212,062	47%
Durham	220,309	56,971	74%	33,200	85%
Franklin	219,209	32,255	85%	32,658	85%
Granville	193,197	22,829	88%	35,648	82%
Greene	4,439,036	2,129,818	52%	2,163,599	51%
Johnston	6,728,638	2,989,292	56%	3,258,752	52%
Jones	3,283,906	1,965,990	40%	2,137,675	35%
Lenoir	4,455,752	2,917,366	35%	3,017,003	32%
Nash	1,042,072	397,240	62%	409,114	61%
Orange	787,040	66,519	92%	70,078	91%
Pamlico	2,023,294	1,445,657	29%	1,726,786	15%
Person	616,669	91,053	85%	53,223	91%
Pitt	3,399,455	1,876,674	45%	2,001,001	41%
Wake	1,434,602	297,438	79%	264,197	82%
Wayne	8,297,408	3,485,566	58%	3,142,220	62%
Wilson	3,273,647	1,688,676	48%	1,692,240	48%
Total	45,860,007	21,539,251	53%	22,957,806	50%

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

Nitrogen loss reductions were achieved through a combination of fertilization rate decreases, cropping shifts, BMP implementation, and cropland acreage fluctuation. Some of this cropping shift is due to the need for regular rotations on agricultural operations. In order to minimize the threat of disease the double-crop planting of wheat and soybeans is usually followed by a corn crop. This means that fluctuations within this rotation are to be expected from year to

year even in the face of similar weather conditions. A high cotton price in the spring of 2019 resulted in a notable increase in cotton acres from CY2018. As a result of these two factors, overall corn and cotton planting increased by roughly 31,000 acres and overall soybean acres decreased by roughly 30,000 acres. The winter of 2018/19 was unseasonably wet, so overall wheat acres fell by 18,000 during those months because in many cases it was too wet for producers to access fields in time for planting. Factors that influence agricultural nitrogen reductions are shown in Table 3.

Pamlico and Carteret Counties are working to improve their reduction, which decreased this year primarily due to a transition from crops with lower nitrogen input to crops with higher nitrogen input, as well as a methodological adjustment of cumulative BMP acres (practices did not change - see "BMP Implementation" section). From CY2018 to CY2019 Pamlico experienced an increase of 979 acres of corn and a decrease of 834 acres of soybeans and 1,265 acres of wheat. The Pamlico Soil and Water Conservation District Board has made water control structure implementation the top priority in their FY2021 NC Agriculture Cost Share Program (ACSP) strategy plan. As of CY2018 it was estimated that over 40% of agricultural land in Pamlico County currently has some form of controlled drainage utilizing water control structures. Meanwhile, Carteret County consists of only Open Grounds Farm, where 5,000 acres were transitioned from soybeans to corn as part of regular cropping rotations. The DSWC, LACs and additional stakeholders are working with others in the agricultural community in this county and the surrounding area to communicate the need for more BMP installation at existing commodity outreach events. The BOC will continue to focus its efforts to monitor this county's progress and encourage BMP implementation.

The NLEW outputs and staff calculations estimate the factors that contributed to the nitrogen reduction by the percentages shown in Table 3.

*Table 3. Factors That Influence Nitrogen Reduction on Agricultural Lands (by percentage), Neuse River Basin**

Practice	CY2016	CY2017	CY2018	CY2019
BMP implementation	9%	10%	9%	6%
Fertilization management	11%	13%	9%	13%
Cropping shift	18%	19%	19%	15%
Cropland converted to grass/trees	2%	2%	2%	2%
Cropland lost to idle land	4%	2%	6%	6%
Cropland lost to development	8%	8%	8%	8%
Total	52%	54%	53%	50%

**Percentages are based on a total of the reduction, not a year-to-year comparison.*

BMP Implementation

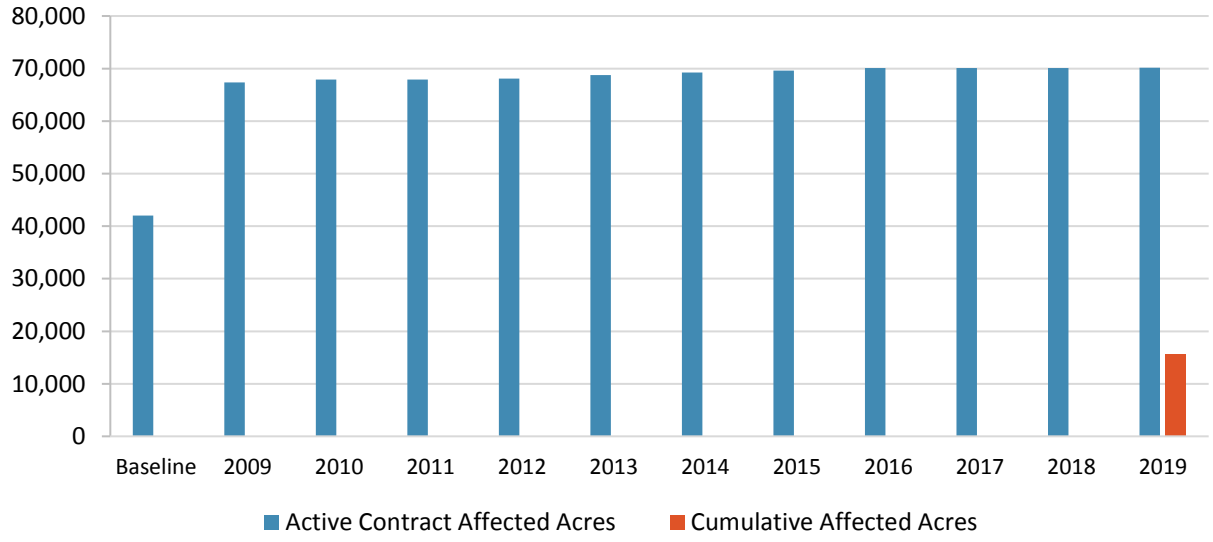
BMP implementation is one of the factors that influence nitrogen reduction on agricultural land. In low elevation coastal counties near and around the Neuse estuary the predominant BMPs being implemented by agricultural producers are water control structures. For example, since baseline Craven and Pamlico Counties have implemented controlled drainage on roughly 18,000 and 15,000 acres respectively. These practices are normally implemented to control salinity and soil moisture, but they have an additional benefit of allowing for increased denitrification. Every effort is being made to ensure that BMPs currently being reported continue to function as designed. Verification of this functionality requires site visits to individual farm owners who may or may not have this BMP under an active cost-share contract. Coastal counties have reported that despite contract expirations for practices installed more than 10 years ago, the water control structures which have been checked and which are no longer covered by an operation and maintenance agreement are still being actively managed by producers.

Beginning with this report all acres affected by water control structures reported in CY2009 were manually removed from each county's total to ensure that all affected acres currently being reported are for active contracts only. Members of each LAC in coastal counties have been notified that these acres are being removed until each District can either manually confirm that the older structures are still operational and being actively managed, or until the producer can be encouraged to sign a new cost share contract. This will ensure that affected acres are not being reported for farms which are no longer in operation. Each producer who still farms and who actively manages their operation's drainage is eligible for a repair contract to replace worn out materials, an upgrade contract to improve to newly available technology, or a discounted payment to restart the 10-year operation and maintenance agreement if no repair is necessary. Any of these three options will render each producer's structures eligible for periodic spot checks to verify functionality and compliance with Soil & Water Conservation Commission policies. Contracts which are re-enrolled in the Agriculture Cost Share Program or structures which are field-verified as still functioning will be re-added to the cumulative acre total in future reports, but beginning in CY2019 acres reported as cumulative more than 10 years ago will be removed on a rolling basis. Several Districts have indicated an interest and willingness in re-engaging some of these past cooperators.

The removal of most of these acres from annual reports has resulted in a smaller nitrogen loss reduction mainly in coastal counties in CY2019. This includes significant changes in Carteret, Craven, Pamlico, Jones, Lenoir, Pitt, and Wayne counties. It is important to note that this abrupt reduction is primarily based on a methodological change and not on farmer behavior or BMP functionality. The BOC still expects that most acres where controlled drainage practices were implemented are still actively being managed, but in order to ensure ongoing engagement with landowners the BOC has decided to adjust reporting guidelines. Due to ever-present landowner demand, increased prioritization and implementation of water control structure contracts is still evident in many of these counties, and the BOC expects this trend to continue into the future as precipitation patterns change.

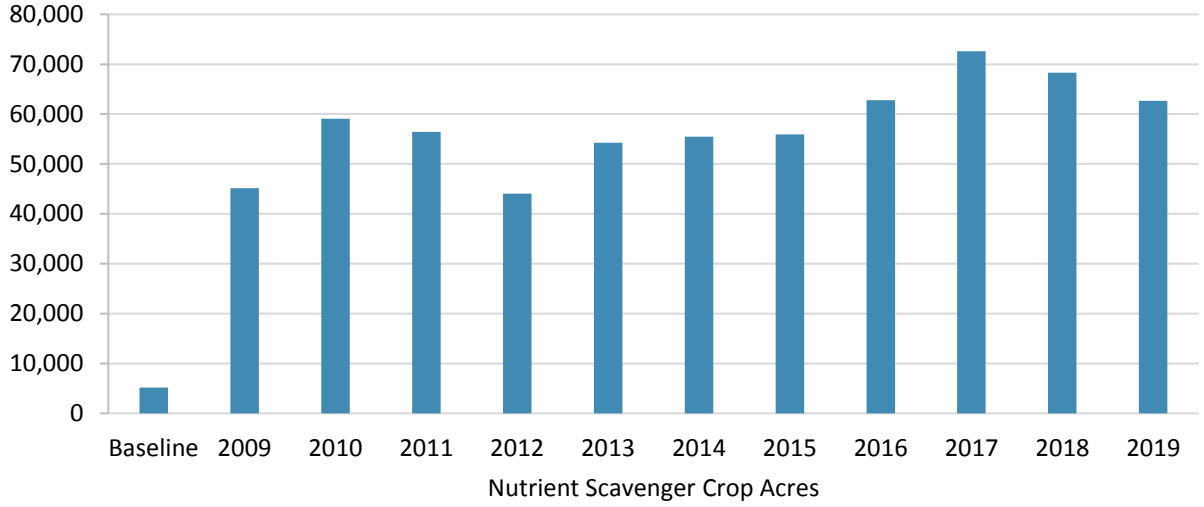
Carteret County's only agricultural producer left is Open Grounds Farm. This facility, which is owned by a foreign company, cultivates over 20,000 acres annually. Carteret Soil & Water Conservation District staff has confirmed with the Open Grounds farm manager that approximately 60% of their overall acres are under controlled drainage via water control structures. As a result, the total cumulative acres in this BMP category have been adjusted to 60% of their annual crop total, since all practices which were originally installed at Open Grounds Farm are being maintained for their original purpose. All other contracts have been removed from the active contract total since most of those properties are no longer under active cultivation.

Figure 2. Acres Affected by Water Control Structures for Baseline (1991-1995) and Installed from CY2009 to CY2019, Neuse River Basin



The Division of Soil and Water Conservation, Soil and Water Conservation Districts and Natural Resources Conservation Service staff continue to make refinements to the NLEW accounting process as opportunities arise. LAC members estimate annual nutrient scavenger crop acres based on crop rotations, producer cropping history, state and federal incentive programs, weather patterns, and seed prices. Buffer and water control structure BMP data is collected from state and federal cost share program active contracts, and in some cases (especially nutrient scavenger crops) BMPs that were installed without cost share funding. While there is some opportunity for variability in the data reported, LACs are including data that is the best information currently available. As additional sound data sources become available, the LACs will review these sources and update their methodology for reporting if warranted. As illustrated in Figure 3, CY2019 BMP implementation yielded a net decrease of 5,623 nutrient scavenger crop acres.

Figure 3. Nutrient Scavenger Crop Acres Planted Annually on Agricultural Lands for Baseline (1991-1995) and Installed from CY2009 through CY2019, Neuse River Basin



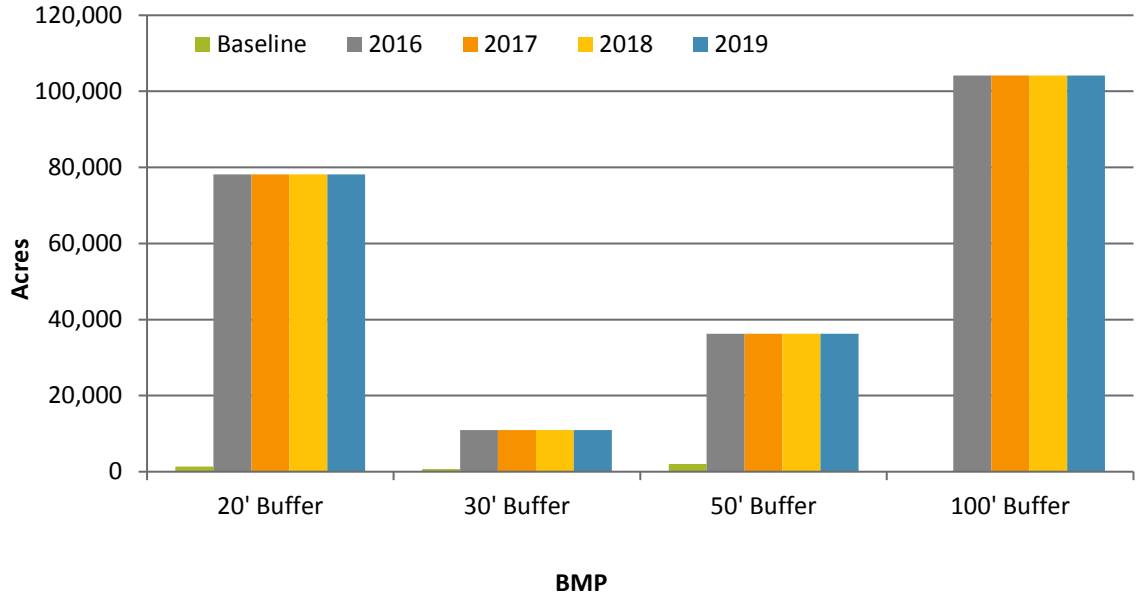
An accurate reassessment of active agricultural land and remaining buffer systems is badly needed due to the rate at which urbanizing counties have lost agricultural land. The feasibility of a countywide GIS analysis of agricultural land buffers in Durham County is being explored for future reporting. This assessment will depend on data availability from state and federal agencies, and the BOC plans to reexamine the suitability of these data sources in the future.

Based on the comparison of total cropland acres and state or federal cost share program BMPs, it is estimated that over a third of the Neuse River Basin's cropland receives treatment from reported nitrogen reducing BMPs.[2] This does not include farmer-installed BMPs that are not funded by cost share programs except in some cases where SWCD staff is made aware of work that has been completed. Additionally, the estimated acres do not take into account the entire drainage area treated by buffers in the piedmont, which is generally 5 to 10 times higher than the actual acres of the buffer shown in Figure 2.[3] Overall, the total acres of implementation of BMPs have increased since the baseline, as illustrated in Figure 2. The BMP installation goals were set by the local nitrogen reduction strategy, which was approved by the EMC in 1999. Agriculture exceeded all of these goals in CY2008. As shown in Figure 4, an additional 18 acres of 100' buffers were implemented in CY2019.

[2] 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

[3] 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. http://www.lib.ncsu.edu/theses/available/etd-03282004-174056/

*Figure 4. Buffer Acres Present on Agricultural Lands for Baseline (1991) and Installed from CY2016 through CY2019, Neuse River Basin**



The acres of buffers listed represent actual acres. Acres affected by the buffer could be 5 to 10 times larger in the piedmont than the acreage shown above. [4]

Additional Nutrient BMPs

Not all types of nutrient-reducing BMPs are tracked by NLEW. These include 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 a nitrogen reduction benefit. The BOC believes it is worthwhile to recognize these practices. Table 4 identifies BMPs not accounted for in NLEW and tracks their implementation in the basin since CY1996.

Increased implementation numbers are evident in CY2019 across most BMP types. Some of these BMPs will yield reductions in nitrogen loss that are not reflected in the NLEW accounting in this report but will benefit the estuary.

*Table 4. Nutrient-Reducing BMPs Not Accounted for in NLEW, 1996 to 2019, Neuse River Basin**

BMP	Units	1996-2015	2016	2017	2018	2019
Diversion	Feet	166,199	166,600	178,554	180,717	183,017
Fencing (USDA programs)	Feet	214,748	228,216	234,791	234,827	239,587
Field Border	Acres	5,219	5,225	5,916	5,949	5,955
Grassed Waterway	Acres	2,358	2,377	2,424	2,501	2,517
Livestock Exclusion	Feet	118,178	125,190	131,473	149,501	151,648
Precision Agriculture	Acres	3,660	3,664	3,664	4,672	4,672
Sod Based Rotation	Acres	101,429	102,752	107,572	109,314	111,304
Tillage Management	Acres	59,057	59,680	60,919	61,384	62,478
Terraces	Feet	76,175	76,175	77,625	77,633	77,633

**Cumulative data provided using active contracts in State and Federal cost share programs.*

[4] Ibid.

Fertilization Management

Better nutrient management in the Neuse River has resulted in a reduction of fertilizer application rates from baseline levels. Despite annual fluctuations, fertilization rates for all major crops in the basin have been reduced from the baseline period.

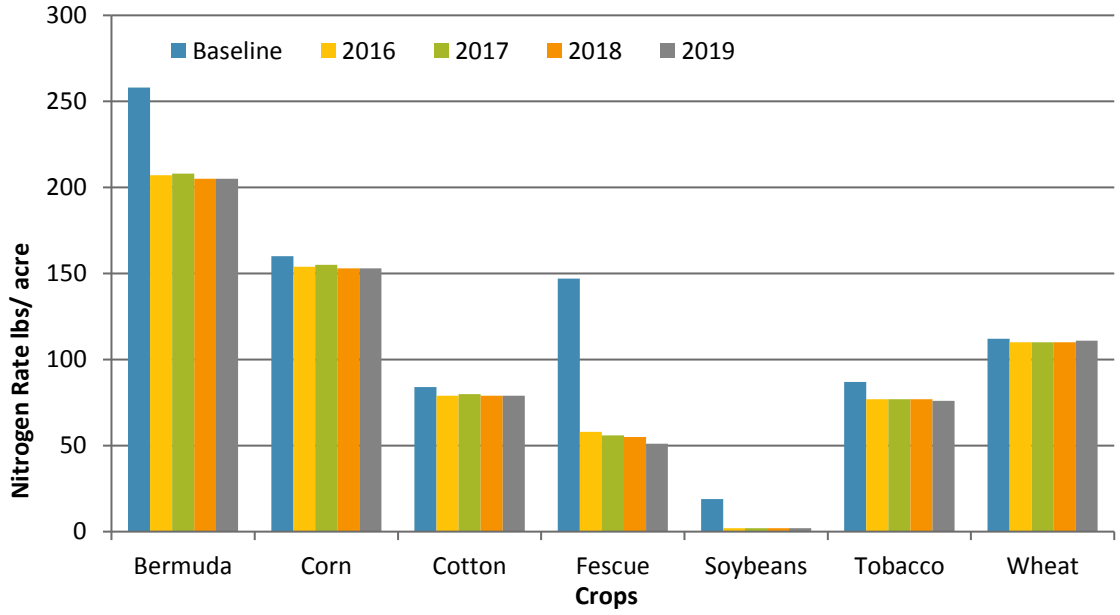
Between CY2018 and CY2019 nitrogen application rates decreased by 4 lbs/acre on fescue. Application rates were stable for bermuda, corn, cotton, soybeans, tobacco, and wheat. Figure 5 shows these application rates.

Factors Identified by LACs Contributing to Reduced Nitrogen Application Rates

- Economic decisions and fluctuating farm incomes.
- Increased education and outreach on nutrient management (NC Cooperative Extension held 21 nutrient management training sessions and approximately 2,000 farmers and applicators received training.)
- Mandatory animal waste management plans
- The federal government tobacco quota buy-out reducing tobacco acreage.
- Neuse and Tar-Pamlico Nutrient Strategies

Over time there has been an economic incentive for producers to improve nitrogen management. Fertilizer rates and standard application practices are revisited annually by LACs using data from farmers, commercial applicators and state and federal agencies' professional estimates.

Figure 5. Average Annual Nitrogen Fertilization Rate (lbs/ac) for Agricultural Crops for the baseline (1991-1995) and 2016-2019, Neuse River Basin

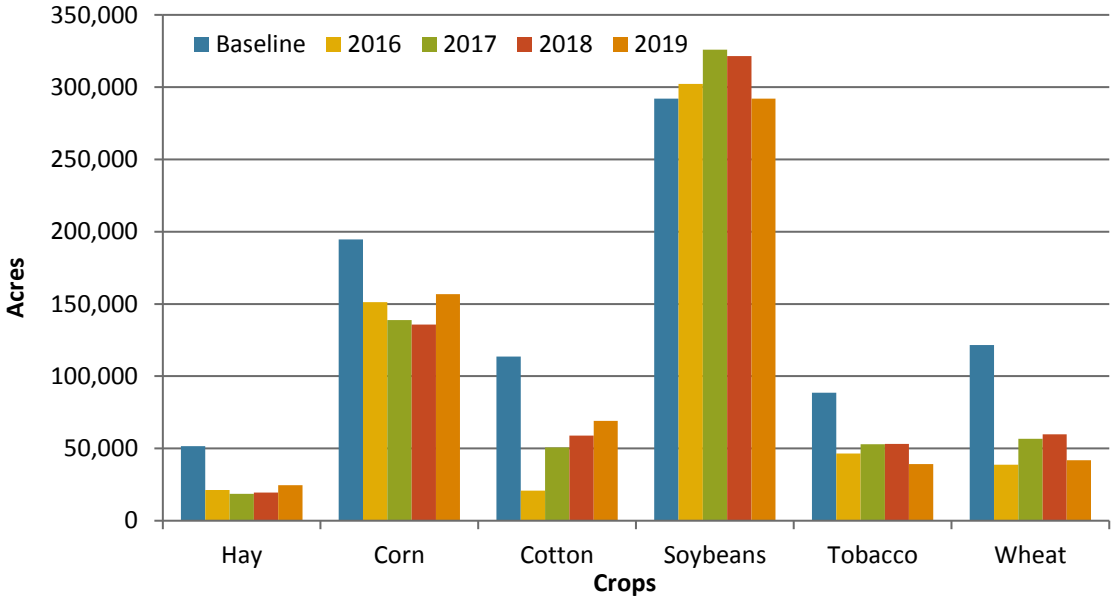


Cropping Shifts

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 utilizes applied nitrogen with a different efficiency rate, changes in the mix of crops grown can have significant impact on the cumulative yearly nitrogen loss reduction. The BOC anticipates that the basin will see additional crop shifts in the upcoming year based on changing commodity prices and weather patterns.

Corn requires higher nitrogen application rates than other crops, and corn acres increased by almost 21,000 acres from CY2018 to CY2019. Cotton prices remained high in CY2019, so cotton acres increased by over 10,000 acres from CY2018 to CY2019. Soybean acres, which require no nitrogen input, decreased over 29,200 acres between CY2018 and CY2019 due to low prices. Wheat acres, many of which are planted in a double-crop rotation with soybeans, decreased by over 18,000 acres, and tobacco acres decreased by almost 14,000 acres between CY2018 and CY2019. These cropping shifts caused a slight increase in overall nitrogen loss. A host of factors from individual to global determine crop choices.

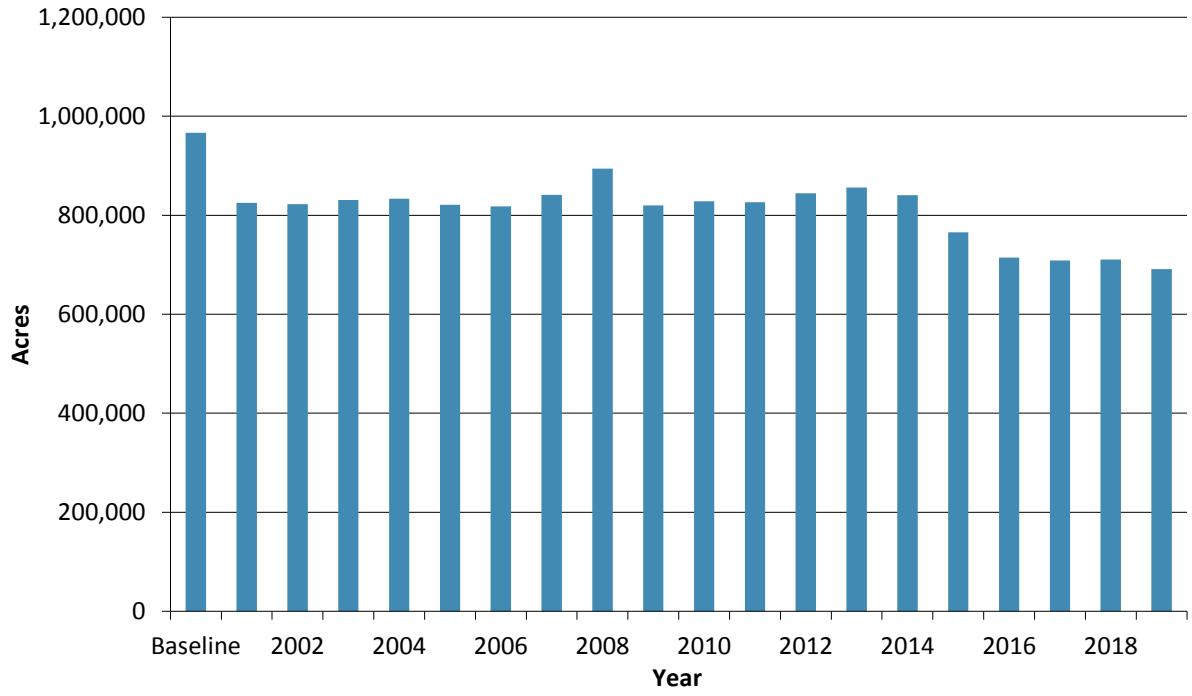
Figure 6. Acreage of Major Crops for the Baseline (1991-1995) and 2016-2019, Neuse River Basin



Land Use Change to Development, Idle Land and Cropland Conversion

The number of cropland acres fluctuates every year in the Neuse River Basin. Each year, some cropland is permanently lost to development or converted to grass or trees. However, idle land is agricultural land that is currently out of production but could be brought back into production at any time. Cropland conversion and cropland lost to development is land taken out of agricultural production and is unlikely to be returned to production. Currently it is estimated that more than 81,000 acres have been lost to development, and currently more than 22,865 acres have been converted to grass or trees since the baseline. For CY2019 there were approximately 59,236 idle acres and a total of 691,264 NLEW-accountable crop acres. These estimates come from the LAC members' best professional judgment, USDA-FSA records and county planning departments. The total crop acres are obtained from USDA-FSA and NC Agricultural Statistics annual reports. Cropland acres have continued to decrease from the baseline period, and CY2019 experienced a decrease of over 19,143 crop acres from CY2018 (see Figure 5).

Figure 7. Total NLEW Accounted Crop Acres in the Neuse River Basin, Baseline (1991-1995) and 2001-2019.



Looking Forward

The Neuse BOC will continue to report on rule implementation, relying heavily on Soil and Water Conservation District staff to compile crop reports. The BOC continues to encourage counties to implement additional BMPs to further reduce nitrogen loss.

Because cropping shifts are susceptible to various pressures, the BOC is working with LACs in all counties to continue BMP implementation that provides lasting reduction in nitrogen loss in the basin.

The Neuse BOC will continue to monitor and evaluate crop trends. The current shift to and from crops with higher nitrogen requirements may continue to influence the yearly reduction.

Basin Oversight Committee recognizes the dynamic nature of agricultural business.

- Changes in world economies, energy or trade policies.
- 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 performance)
- Plant disease or pest problems (i.e., viruses or foreign pests)
- Urban encroachment (i.e., crop selection shifts as fields become smaller)
- Age of farmer (i.e, as retirement approaches farmers may move from row crops to cattle)

Funding

Ongoing agriculture rule reporting has incorporated data processing efficiencies and improvements in recent years. NLEW upgrades have allowed LAC members to more actively participate in the compilation of data and analysis of nitrogen loss trends, and a new Division of Soil and Water Conservation contracting system has helped optimize BMP documentation efforts.

In CY2019 soil and water conservation districts spent over $1,084,000 through the Agriculture Cost Share Program in the Neuse River Basin, and the Natural Resources Conservation Service spent over $2,817,000 through the Environmental Quality Assistance Program in the counties of the Neuse River Basin. These programs have all helped fund erosion and nutrient reducing BMPs in the Neuse Basin.

The EPA 319(h) grant program, which is administered by the Department of Environmental Quality, has approximately $1.5 million in competitive grant funds available statewide for implementation of approved nonpoint source management programs. Grant funds from the 319(h) program can be used to supplement technical assistance, match cost share funding, and support BMP implementation. The Division of Soil and Water Conservation, funded through an EPA 319(h) grant, expends approximately $50,000 on agricultural reporting staff support annually.

Each year, 150 LAC members contribute to agriculture rule reporting to ensure accurate documentation of agricultural acres and fertilization rates. Farmers and agency staff personnel with other responsibilities serve on the LACs in a voluntary capacity. Basin Oversight

Committee members meet at least once per year to review and approve this annual progress report, which includes time spent outside of that annual meeting to review draft documents and approve methodology changes. Participation by so many members of the local agricultural community demonstrates a commitment toward achieving the nutrient strategy's long-term goals.

With less funding available for reporting support at the state level, responsibility for compilation of annual local progress reports falls on these LACs and Soil and Water Conservation District staffs. Few currently serving LAC members were active during the stakeholder process for the Agriculture Rule, so some institutional knowledge about annual reporting requirements has been lost. As a result, training of new Soil and Water Conservation District staff and LAC members regarding rule requirements and reporting is ongoing.

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.

At the present time there is also no funding for a basin coordinator. Part of the responsibilities of the technicians and basin coordinators was to assist with the reporting requirements for the Neuse and Tar-Pamlico Agriculture Rules. In addition to his other duties, the NCDA&CS Division of Soil and Water Conservation Nonpoint Source Planning Coordinator has been assigned the data collection, compilation and reporting duties for the Agriculture Rules for all existing Nutrient Sensitive Waters Strategies.

Now that watershed technician funding has been eliminated, a more centralized approach to data collection and verification is necessary. This evolving approach will involve GIS analysis and more streamlined FSA acreage documentation. GIS data layers and script tools are currently under development for future reports, and these tools will be vetted by the BOC and may be incorporated into the agriculture rule accounting methodology whenever practical. As methods change, LACs will be trained to handle the changing workloads to the best of their ability. Because most district staffs have neither the time nor financial resources to synthesize county level data, centralized collection approaches will come at the expense of local knowledge. Annual agricultural reporting is required by the rules; therefore, continued funding for the Division's only remaining nutrient coordinator position is essential for compliance.

Previously, funding was available for research on conservation practice effectiveness, realistic yields, and nitrogen use efficiencies. Due to eligibility changes and other funding constraints, it is unlikely that new data will be developed. Prior funding sources for such research, which provided much of the scientific information on which NLEW was based, are no longer available. Should new funding be made available, additional North Carolina-specific research information could be incorporated into future NLEW updates.

Conclusion

Significant progress has been made in agricultural nitrogen loss reduction, and the agricultural community consistently reaches its 30% reduction goal. However, the measurable effects of these BMPs on overall in-stream nitrogen reduction may take years to develop due to the nature of non-point source pollution. Nitrogen reduction values presented in this annual summary of agricultural reductions reflect “edge-of-management unit” calculations that contribute to achieving the overall 30% nitrogen loss reduction goal. Significant quantities of agricultural BMPs have been installed since the adoption and implementation of the nutrient management strategy, and agriculture continues to do its part towards achieving the overall goal of a 30% reduction of nitrogen delivered to the Neuse estuary.