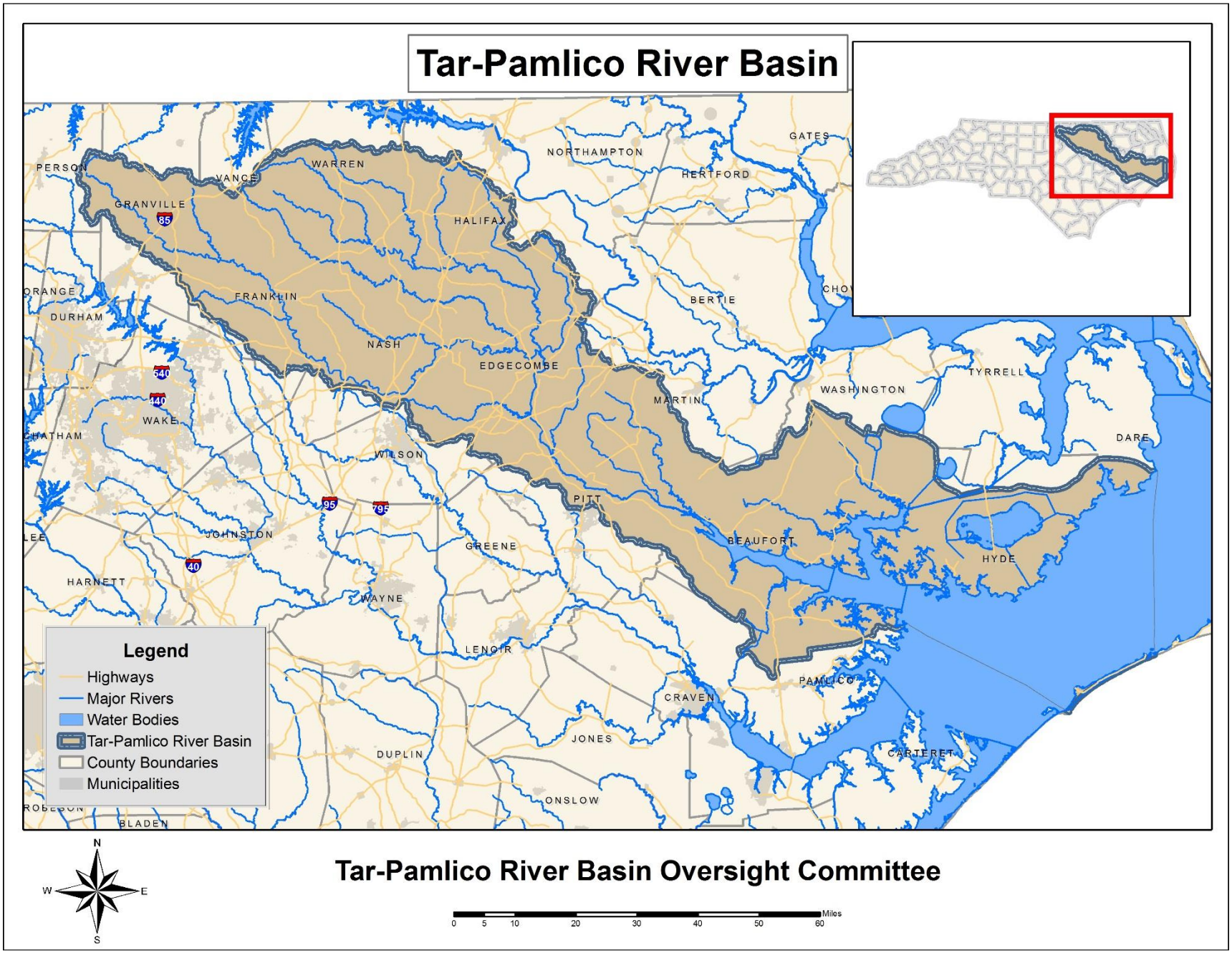
NCDA&CS

2017 Annual Progress Report (Crop Year 2016) on the Tar-Pamlico Agricultural Rule (15A NCAC 02B .0256)

A Report to the Environmental Management Commission from the Tar-Pamlico Basin Oversight Committee: Crop Year 2016


Tar-Pamlico River Basin
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BERTIE
TYRRELL
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Summary

The Tar-Pamlico Basin Oversight Committee (BOC) received and approved crop year[1] (CY) 2016 annual reports from the fourteen Local Advisory Committees (LACs) operating under the Tar-Pamlico Agriculture Rule as part of the Tar-Pamlico Basin Nutrient Management Strategy. The report demonstrates agriculture's ongoing collective compliance with the Tar-Pamlico Agriculture Rule and estimates further progress in decreasing nutrient losses. In CY2016, agriculture collectively achieved an estimated 56% reduction in nitrogen loss compared to the 1991 baseline, continuing to exceed the rule-mandated 30% reduction. All fourteen LAC's exceeded the 30% reduction goal established by the BOC. Phosphorus tracking in the basin indicates less risk of phosphorus loss during CY2016 than in the baseline year for 7 of the 9 qualitative indicators.

Rule Requirements and Compliance History

Tar-Pamlico NSW Strategy

The Environmental Management Commission (EMC) adopted the Tar-Pamlico nutrient strategy in 2000. The management strategy built upon the precedent-setting Neuse River Basin effort established three years earlier, which for the first time set regulatory reduction measures for nutrients on cropland acres in the state. The NSW strategy goal is to reduce the average annual load of nitrogen to the Pamlico estuary by 30% from 1991 levels and to limit phosphorus loading to 1991 levels. Mandatory controls were applied to address non-point source pollution in agriculture, urban stormwater, nutrient management, and riparian buffer protection. As of 2016, the Pamlico estuary is still classified as impaired and is not meeting its 30 percent nitrogen loading reduction goals.

Effective September 2001, the Tar-Pamlico Nutrient Sensitive Waters Management Strategy (NSW) provides for a collective strategy for farmers to meet the 30% nitrogen loss reduction and no-increase phosphorus goals within five years. A BOC and fourteen LACs were established to implement the rule and to assist farmers with complying with the rule.

All fourteen Local Advisory Committees (LACs) submitted their first annual report to the BOC in November 2003, which collectively estimated a 39% nitrogen loss reduction, and 10 of 14 LACs exceeded the 30% individually. Collective reductions gradually increased in succeeding years, and by CY2007 only one LAC was shy of the 30% individually. As of CY2016 all LACs now exceed the 30% reduction individually.

Division of Soil and Water Conservation staff uses input from the LACs to calculate their annual reductions using the Nitrogen Loss Estimation Worksheet (NLEW). All fourteen LACs met as required in 2017, and based on their input the collective reduction of 56% exceeded the mandated 30% in CY2016.

[1] The 2016 crop year began in October 2015 and ended in September 2016.

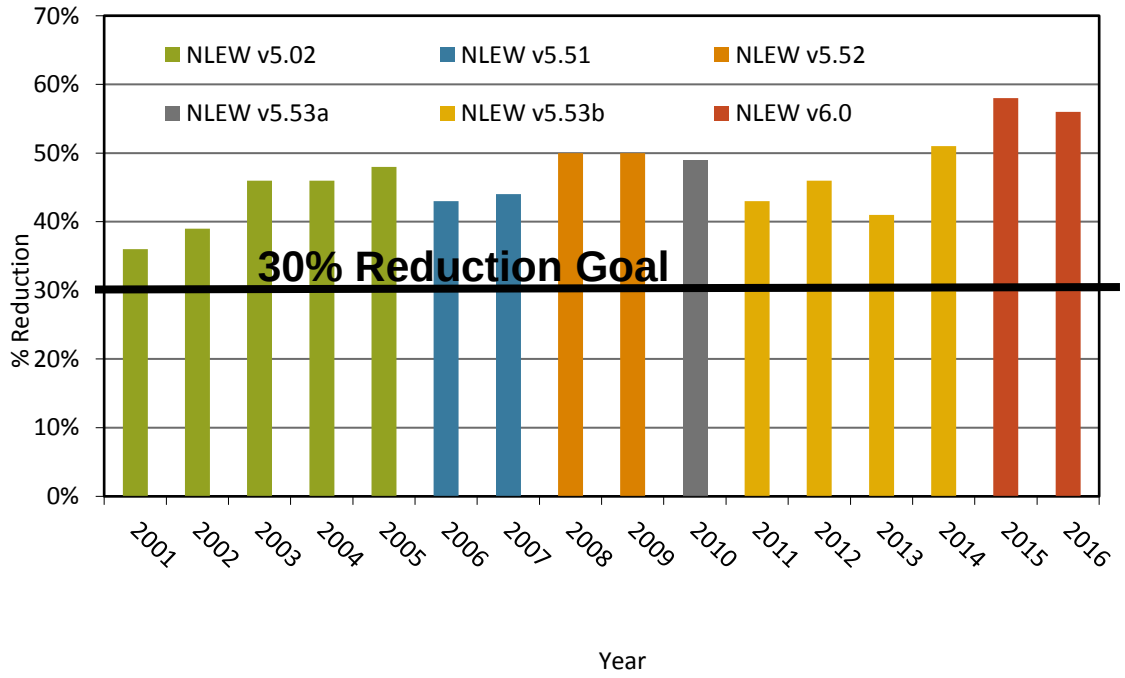
Scope of Report and Methodology

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 Division of Soil and Water Conservation staff using the 'aggregate' version of NLEW, an accounting tool developed to meet the specifications of the Neuse Rule and approved by the EMC for use in the Tar-Pamlico Basin. The development team included interagency technical representatives of the NC Division of Water Resources (DWR), NC Division of Soil and Water Conservation (DSWC), USDA-NRCS and was led by NC State University Soil Science Department faculty. NLEW captures application of both inorganic and animal waste sources of fertilizer to cropland. It is an "edge-of-management unit" accounting tool that estimates changes in nitrogen loss from croplands, but does not estimate changes in nitrogen loading to surface waters. An assessment method was developed for phosphorus, approved by the EMC, and is described later in the report.

Annual Estimates of N 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 nitrogen loss reductions. Figure 1 represents the annual percent nitrogen loss reduction from the baseline for 2001 to 2016.

Figure 1. Collective Cropland Nitrogen Loss Reduction Percent 2001 to 2016, Tar Pamlico 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 (v5.51) updated soil management units and marked a significant change in the nitrogen reduction efficiencies of buffers, so both the baseline and CY2005 were re-calculated based on the best available information. The second (v5.52) and third (v5.53a) revisions were administrative and included minor updates to soil mapping units and realistic yields. In April of 2011 the NLEW Committee established further reductions (v5.53b) 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 and sweet potatoes. 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 v5.51, v5.52, v5.53a % N Reduction 2006-2010	NLEW v5.53b, 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 CY2016

All fourteen LACs submitted their sixteenth annual report to the BOC in September 2017. For the entire basin, in CY2016 agriculture achieved a 56% reduction in nitrogen loss compared to the 1991 baseline. This year all 14 LACs achieved the at-least 30% nitrogen loss reduction goal set by the BOC. Table 2 lists each county's baseline, CY2015 and CY2016 nitrogen (lbs/yr) loss values, and nitrogen loss percent reductions from the baseline in CY2015 and CY2016.

*Table 2. Estimated Reductions in Agricultural Nitrogen Loss from Baseline (1991) for CY2015 and CY2016, Tar-Pamlico River Basin**

County	Baseline N Loss (lb)*	CY2015 N Loss (lb)	CY2015 N Reduction (%)	CY2016 N Loss (lb)	CY2016 N Reduction (%)
Beaufort	9,178,262	4,244,911	54%	4,670,866	49%
Edgecombe	5,037,742	2,630,701	48%	2,793,610	45%
Franklin	2,183,680	445,045	80%	452,658	79%
Granville	890,371	128,408	86%	173,484	81%
Halifax	2,902,105	1,488,405	49%	1,462,668	50%
Hyde	5,501,161	2,335,580	58%	2,109,730	62%
Martin	782,152	564,012	28%	497,067	36%
Nash	4,693,868	1,430,501	70%	1,525,161	68%
Person	153,228	70,349	54%	54,137	65%
Pitt	6,229,921	2,391,709	62%	2,878,593	54%
Vance	419,485	96,401	77%	80,131	81%
Warren	535,517	108,974	80%	134,723	75%
Washington	939,912	432,816	54%	440,550	53%
Wilson	890,691	428,189	52%	445,830	50%
Total	40,338,095	16,796,001	58%	17,698,887	56%

**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 the combination of fertilization rate decreases, cropping shifts, BMP implementation, and cropland acreage fluctuation. In addition to wet weather which has significantly reduced wheat acres over the past three years, the most significant factor is shifts from crops which require high nitrogen inputs to crops which require little or no nitrogen. Overall, NLEW estimates the following factors contributed to the total nitrogen loss reduction according to the percentages shown in Table 3.

*Table 3. Factors that Influence Nitrogen Reduction by Percentage on Agricultural Lands, Tar-Pamlico River Basin**

Factor	CY2013 NLEW v5.53b	CY2014 NLEW v5.53b	CY2015 NLEW v6.0	CY2016 NLEW v6.0
BMP implementation	8%	12%	14%	14%
Fertilization Management	20%	18%	15%	17%
Cropping shift	6%	10%	17%	14%
Cropland converted to grass/trees	5%	5%	5%	5%
Cropland lost to idle land	1%	5%	6%	5%
Cropland lost to development	1%	1%	1%	1%
TOTAL	41%	51%	58%	56%

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

BMP Implementation

As illustrated in Figure 2, CY2016 yielded an increase of 900 acres affected by water control structures and an increase of 729 acres of nutrient scavenger crops from CY2015, while buffer acres remained the same.

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. The BMP data is collected from state and federal cost share program active contracts, and in some cases 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.

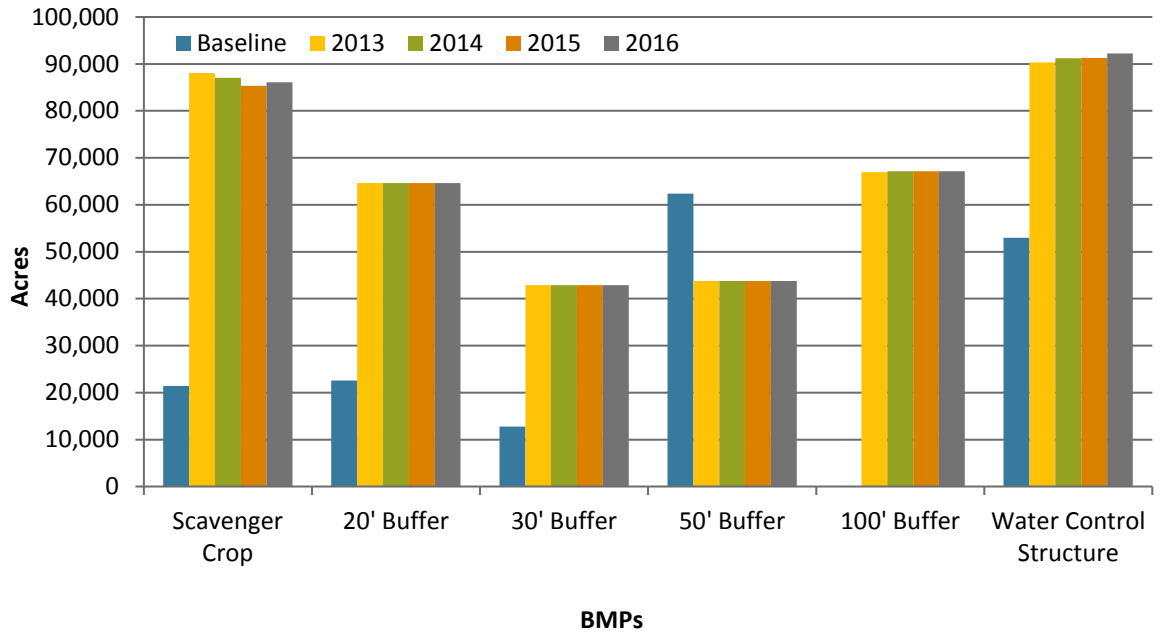
Overall, the total acres of implementation of BMPs have increased since the baseline, as illustrated in Figure 2. When actual acres of BMPs installed through federal, state and local cost share programs are compared to the total cropland (593,530 acres), over half of all reported cropland receives some kind of BMP treatment. The treatment estimate is probably greater, however, because it does 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.[2]

From 2001 through 2006, the NLEW program captured buffers 50’ and wider as one category. After the 2007 update, categories for 70’ and 100’ buffers were added. In CY2006 the buffers

[2] **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/**

larger than 50’ were redistributed into these new categories. In CY2011 50’ and 70’ buffers were combined into a single category for everything larger than 50’ but less than 100’.

*Figure 2: Nutrient Reducing BMPs Present on Agricultural Lands for Baseline (1991) and Installed from 2013-2016, Tar-Pamlico 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*[1]

Additional Nutrient BMPs

At the field level, a number of BMPs contribute to nutrient reduction and subsequent water quality improvement. Not all BMP types 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 estimating a nitrogen 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 CY2013.

Increased implementation numbers are evident in CY2016 across all BMP types since the baseline. 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 Best Management Practices Not Accounted for in NLEW, 2013-2016, Tar-Pamlico River Basin**

BMP	Units	2013	2014	2015	2016
Diversion	Feet	425,596	428,696	433,166	440,614
Fencing (USDA Programs)	Feet	256,384	256,384	261,884	262,519
Field Border	Acres	1,284	1,289	1,297	1,303
Grassed Waterway	Acres	2,518	2,524	2,569	2,587
Livestock Exclusion	Feet	238,676	238,676	239,281	239,868
Sod Based Rotation	Acres	70,456	70,596	80,836	90,911
Tillage Management	Acres	52,185	52,428	55,878	62,151
Terraces	Feet	371,936	371,936	371,936	371,936

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

Fertilization Management

Better nutrient management has resulted in farmers in the Tar-Pamlico River Basin reducing their nitrogen application from baseline levels. Figure 3 indicates that nitrogen rates for the major crops in the basin have reduced from the baseline period.

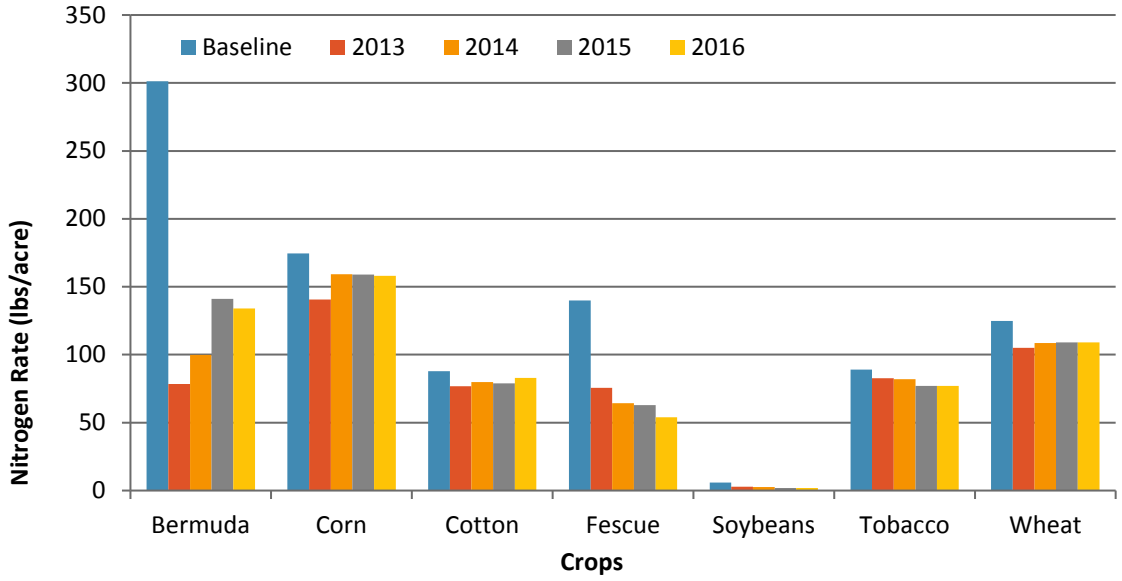
In CY2016 nitrogen rates were stable for corn, soybeans, tobacco, and wheat, increased for cotton, and decreased for bermuda and fescue compared to CY2015. Most pastures are under-fertilized throughout the Tar-Pamlico basin. Pasture and hayland are typically not supplemented with inorganic fertilizers.

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

- Economic decisions and fluctuating farm incomes.
- Increased education & outreach on nutrient management (NC Cooperative Extension held nutrient management training sessions, since 2004 approximately 2,000 farmers and applicators received training)
- Mandatory waste management plans
- The federal government tobacco quota buy-out reducing tobacco acreage.
- Neuse & Tar-Pamlico Nutrient Strategies.

Due to lower commodity prices, there has been an economic incentive for producers to consider more efficient nitrogen rates, timing, and placement alternatives. 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 3. Average Annual Nitrogen Fertilization Rate (lb/ac) for the Major Agricultural Crops for the Baseline (1991) and 2013-2016, Tar-Pamlico River Basin

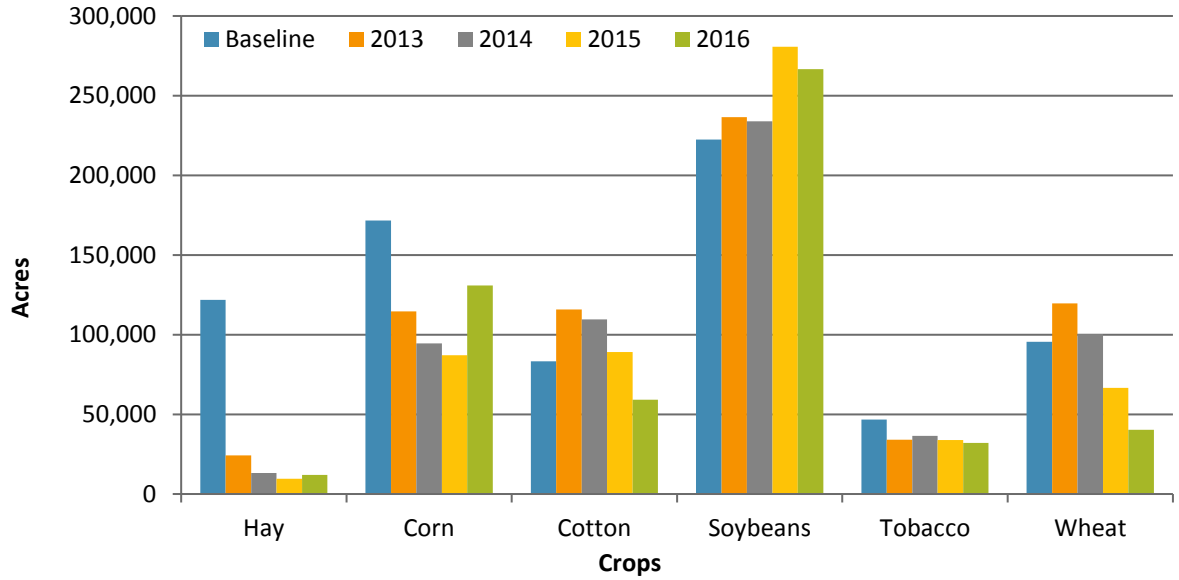


Cropping Shifts

The LACs calculated the cropland acreage by utilizing crop data reported by farmers to the USDA-Farm Service Agency. Each crop requires different amounts of nitrogen and utilizes the nitrogen applied with different efficiency rates. Changes in the mix of crops grown can have a 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 wet weather.

Figure 4 shows crop acres and shifts for the last four years compared to the baseline. Some crops have remained relatively stable, while others show more volatility. Cotton prices have fallen almost 56% from a 2011 peak, so cotton acreage continued a steady decline in CY2016. Due to a temporary price increase in the winter and spring of 2016 corn increased by approximately 43,862 acres, with some of the increase likely resulting in a soybean decrease of 14,001 acres. In addition, several consecutive extremely wet falls prevented many farmers from accessing their fields in time to plant a crop of winter wheat. In most cases wheat acres are "double cropped" with soybeans, which means that wheat acres are planted on the same acreage before a spring soybean crop. In CY2016, soybean acreages were accounted for in these double cropped systems, but some of those acres were not fertilized over the winter months because a wheat crop was not planted. This resulted in an overall decrease of over 26,000 wheat acres between CY2015 and CY2016, continuing a trend since CY2014. A host of factors from individual to global determine crop choices.

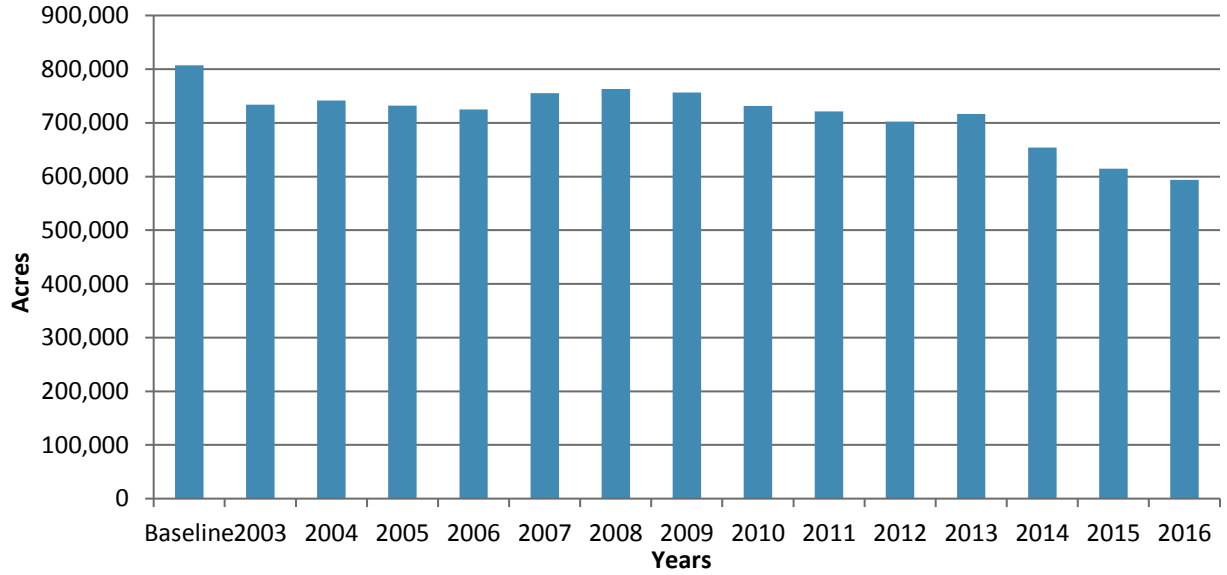
Figure 4. Acreage of Major Crops for the Baseline (1991) and 2013-2016, Tar-Pamlico River Basin



Land Use Change to Development, Idle Land and Cropland Conversion

The number of cropland acres fluctuates every year in the Tar-Pamlico River Basin due to cropland conversion, idle land and development. Each year, some cropland is permanently lost to development or converted to grass or trees and likely to be ultimately lost from agricultural production. Idle land is agricultural land that is currently out of production but could be brought back into production at any time. Currently it is estimated that over 12,000 acres have been permanently lost to development in the basin and more than 47,134 acres have been converted to grass or trees since the 1991 baseline. For CY2016 it is estimated that there are approximately 46,117 idle acres. There is a total of 593,530 NLEW-accountable acres of cropland (see Fig. 5). In addition to these changes, LACs have noted that over 2,500 cropland acres have been lost to newly leased and constructed solar facilities. This total will be updated in future years, but it is uncertain if this should be considered a permanent or temporary loss of cropland. All of the above estimates come from the LAC members' best professional judgment, USDA-FSA records and county planning department data. 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 (see Figure 5).

Figure 5. NLEW-Accounted Cropland Acres in the Tar-Pamlico River Basin, Baseline (1991) - 2016



**Some of the acres represented here are acres counted twice due to double-cropping on the same field. Some acreage reduction represents double-cropped wheat-soybeans converted to a full-season soybean crop.*

Phosphorus

Phosphorus Indicators for CY2016: The qualitative indicators included in Table 5 show the relative changes in land use and management parameters and their relative effect on phosphorus loss risk in the basin. 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 was approved by the EMC. Table 5 builds upon the data provided in the 2005 PTAC report, which included all available data at the time ending with data from 2003. This report adds phosphorus indicator data for CY2013 through CY2016. With the exception of animal waste P and soil test P, all other parameters indicate less risk of phosphorus loss than in the baseline year.

Phosphorous Technical Assistance Committee (PTAC)

The PTAC's overall purpose was to establish a phosphorus accounting method for agriculture in the basin. It determined that a defensible, aggregated, county-scale accounting method for estimating phosphorus losses from agricultural lands is not currently 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". 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.

Contributing to the reduced risk of phosphorus loss is the increase of nutrient reducing BMPs in the basin. As indicated in Table 5, the acres affected in the basin by water control structures have steadily increased over the past three years. It should also be noted that 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 5 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 only includes samples submitted for cropland. It 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 river basin area.

Table 5. Relative Changes in Land Use and Management Parameters and their Relative Effect on Phosphorus Loss Risk in the Tar-Pamlico

Parameter	Units	Source	1991 Baseline	CY2013	CY2014	CY2015	CY2016	1991 - 2016 Change	CY2016 P Loss Risk +/-
Agricultural land	Acres	FSA	807,026	716,289	653,954	614,715	593,530	-26%	-
Cropland conversion (to grass & trees)	Acres	USDA-NRCS & NCACSP	660	46,647	46,837	47,007	47,134	7042%	-
CRP / WRP (cumulative)	Acres	USDA-NRCS	19,241	41,833	41,833	41,833	41,833	117%	-
Conservation Tillage * (cumulative)	Acres	USDA-NRCS & NCACSP	41,415	52,185	52,428	55,878	62,151	50%	-
Vegetated buffers (cumulative)	Acres	USDA-NRCS & NCACSP	50,836	218,236	218,419	218,440	218,440	330%	-
Water control structures (cumulative)	Acres Affected	USDA-NRCS & NCACSP	52,984	90,356	91,240	91,308	92,208	74%	-
Scavenger crop	Acres	LAC	13,272	88,069	87,033	85,380	86,109	549%	-
Animal waste P	lbs of P/ yr	NC Ag Statistics	13,597,734	16,880,526	14,530,827	15,011,136	14,805,403	9%	+
Soil test P median	P Index	NCDA&CS	83	85	81	79	84	1%	+

** Conservation tillage is being practiced on additional acres but this number only reflects active cost share contract acres, not acres where contracts have expired or where farmers have implemented conservation tillage without cost share assistance. According to the 2012 Ag Census, conservation tillage (including no-till) was practiced on 420,550 crop acres in the Tar-Pamlico River Basin.*[3]

Based on the these findings, the BOC recommends that no additional management actions be required of agricultural operations in the basin at this time to comply with the "no net increase above the 1991 levels" phosphorus goal of the agriculture rule. The BOC will continue to track and report the identified set of qualitative phosphorus indicators to the EMC annually, and to bring any concerns raised by the results of this effort to the EMC's attention as they arise, along with recommendations for any appropriate action. The BOC expects that BMP implementation will continue to increase throughout the basin in future years, and notes that BMPs installed for nitrogen, pathogen and sediment control often provide significant phosphorus benefits as well.

[3] USDA NASS, 2012 Census of Agriculture, Census by Watershed (HUC 030201). Available at: www.agcensus.usda.gov/ Publications/2012/Online_Resources/Watersheds/sag03.pdf

Looking Forward

The Tar-Pamlico 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 nutrient losses.

Because cropping shifts are susceptible to various pressures, the BOC is working with LACs in all counties to continue BMP implementation that provides for a lasting reduction in nitrogen loss in the basin while monitoring cropping changes. Due to improved weather during the fall growing season in late 2016, the BOC expects reported wheat acre totals in CY2017 to increase significantly.

Basin Oversight Committee recognizes the dynamic nature of agricultural business.

- Changes in the 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 sustainability)
- 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. The Division of Soil and Water Conservation, funded through an EPA 319(h) grant, expends approximately $50,000 on agricultural reporting staff support annually.

In CY2016 soil and water conservation districts spent over $555,000 through the Agriculture Cost Share Program in the Tar-Pamlico River Basin, and the Natural Resources Conservation Service spent over $3,676,754 through the Environmental Quality Assistance Program in the counties of the Neuse and Tar-Pamlico River Basins. The EPA 319(h) grant program, which is administered by the Department of Environmental Quality, has approximately $1.2 million in competitive grant funds available 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. These programs have all helped fund erosion and nutrient reducing best management practices in the Tar-Pamlico basin. Participation by so many members of the local agricultural community demonstrates a commitment toward achieving the nutrient strategy's long-term goals.

Over 150 farmers, local staff, and agency personnel with other responsibilities serve on the Neuse and Tar-Pamlico LACs in a voluntary capacity. Without funding for technicians, the annual local progress reports fall on the LACs without local technical assistance to compile the data for the annual reports. 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.

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. The LACs will be trained to handle the new workload to the best of their ability. Because district staff has neither the time nor financial resources to synthesize county level data, this centralized approach will come at the expense of local knowledge. Annual agricultural reporting is required by the rules; therefore continued funding for the Division's remaining Nonpoint Source Planning Coordinator position is essential for compliance.

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 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.

The BOC will consider data from relevant studies as they are completed and become available and will consider the results as they relate to nutrient loadings from land based sources and uses. 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. The BOC supports new funding for research and implementation to further improve reductions and enhance agricultural nutrient reporting, including identification of additional sources. 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 Pamlico estuary.