NCDA&CS

2020 Annual Progress Report (Crop Year 2019) on the Tar-Pamlico Agricultural Rule (15A NCAC 02B .0732)

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


Tar-Pamlico River Basin
PERSON
VANCE
WARREN
GRANVILLE
HALIFAX
NORTHAMPTON
GATES
CURRITUCK
HERTFORD
CAMDEN
PASQUOTANK
PERQUIMANS
CHOWAN
BERTIE
FRANKLIN
ORANGE
DURHAM
NASH
EDGECOMBE
WASHINGTON
TYRRELL
MARTIN
WAKE
DARE
CHATHAM
WILSON
PITT
LEE
JOHNSTON
GREENE
BEAUFORT
HYDE
HARNETT
WAYNE
LENOIR
CRAVEN
JONES
DUPLIN
CARTERET
ONSLOW
PENDER
Legend
Water Bodies
Major Rivers
Tar-Pamlico River Basin
Roads
Municipalities
County Boundaries
N
W
E
S
0 5 10 20 30 40 50 60
Miles

Summary

The Tar-Pamlico Basin Oversight Committee (BOC) received and approved crop year[1] (CY) 2019 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 CY2019, agriculture collectively achieved an estimated 55% reduction in nitrogen loss compared to the 1991 baseline, continuing to exceed the rule-mandated 30% reduction. Thirteen of fourteen LAC's exceeded the 30% reduction goal established by the BOC, with Martin County reporting a 22% nitrogen loss reduction from baseline. Phosphorus tracking in the basin indicates less risk of phosphorus loss during CY2019 than in the baseline year for 6 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 2020, 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 did not meet the 30% goal. All LACs except one are currently exceeding the 30% 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). All fourteen LACs met as required in 2019, and based on their input the collective reduction of 55% exceeded the mandated 30% in CY2019.

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

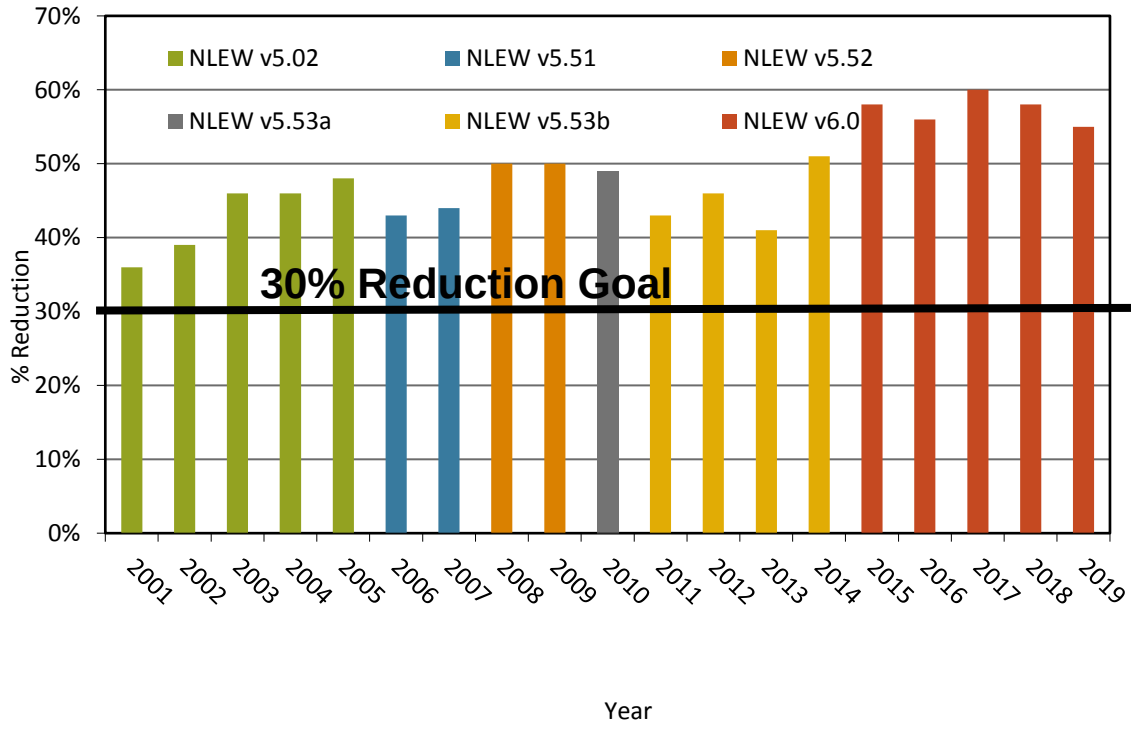
Scope of Report and Methodology

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 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 2019.

Figure 1: Collective Cropland Nitrogen Loss Reduction Percent 2001 to 2019, 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 CY2019

All fourteen LACs submitted their nineteenth annual report to the BOC in August 2020. For the entire basin, in CY2019 agriculture achieved a 55% reduction in nitrogen loss compared to the 1991 baseline. This year 13 LACs achieved the at-least 30% nitrogen loss reduction goal set by the BOC. 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) for CY2018 and CY2019, Tar-Pamlico River Basin**

County	Baseline N Loss (lb)*	CY2018 N Loss (lb)*	CY2018 N Reduction (%)	CY2019 N Loss (lb)*	CY2019 N Reduction (%)
Beaufort	9,178,262	4,416,924	52%	4,565,622	50%
Edgecombe	5,037,742	2,813,349	44%	2,979,040	41%
Franklin	2,183,680	415,705	81%	464,095	79%
Granville	890,371	129,478	85%	104,151	88%
Halifax	2,902,105	1,387,694	52%	1,520,008	48%
Hyde	5,501,161	2,033,956	63%	2,345,846	57%
Martin	782,152	532,175	32%	611,387	22%
Nash	4,693,868	1,382,451	71%	1,412,895	70%
Person	153,228	60,010	61%	45,291	70%
Pitt	6,229,921	2,676,430	57%	3,028,674	51%
Vance	419,485	76,637	82%	66,094	84%
Warren	535,517	226,197	58%	198,770	63%
Washington	939,912	446,782	52%	543,014	42%
Wilson	890,691	408,325	54%	411,741	54%
Total	40,338,095	17,006,114	58%	18,296,628	55%

**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 13,000 acres and overall soybean acres decreased by roughly 27,000 acres. The winter of 2018/19 was unseasonably wet, so overall

wheat acres fell by roughly 11,000 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.

Martin County is currently reporting a 22% nitrogen loss reduction from baseline. They are working to improve their reduction, which decreased this year primarily due to cropping shifts and a methodological adjustment of cumulative BMP acres (practices did not change - see "BMP Implementation" section). In Martin County, crop prices and rotations led to a significant shift to corn and cotton from other crops compared to CY2018. In particular, the county saw an increase of 223 acres of corn and 1,855 acres of cotton between CY2018 and CY2019. The most significant factors affecting nitrogen loss reductions in the basin are shifts to crops which require high nitrogen inputs from crops which require little or no nitrogen and improved fertilization management. 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	CY2016	CY2017	CY2018	CY2019
BMP implementation	14%	14%	15%	7%
Fertilization Management	17%	17%	15%	22%
Cropping shift	14%	17%	15%	13%
Cropland converted to grass/trees	5%	5%	5%	5%
Cropland lost to idle land	5%	6%	7%	7%
Cropland lost to development	1%	1%	1%	1%
TOTAL	56%	60%	58%	55%

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

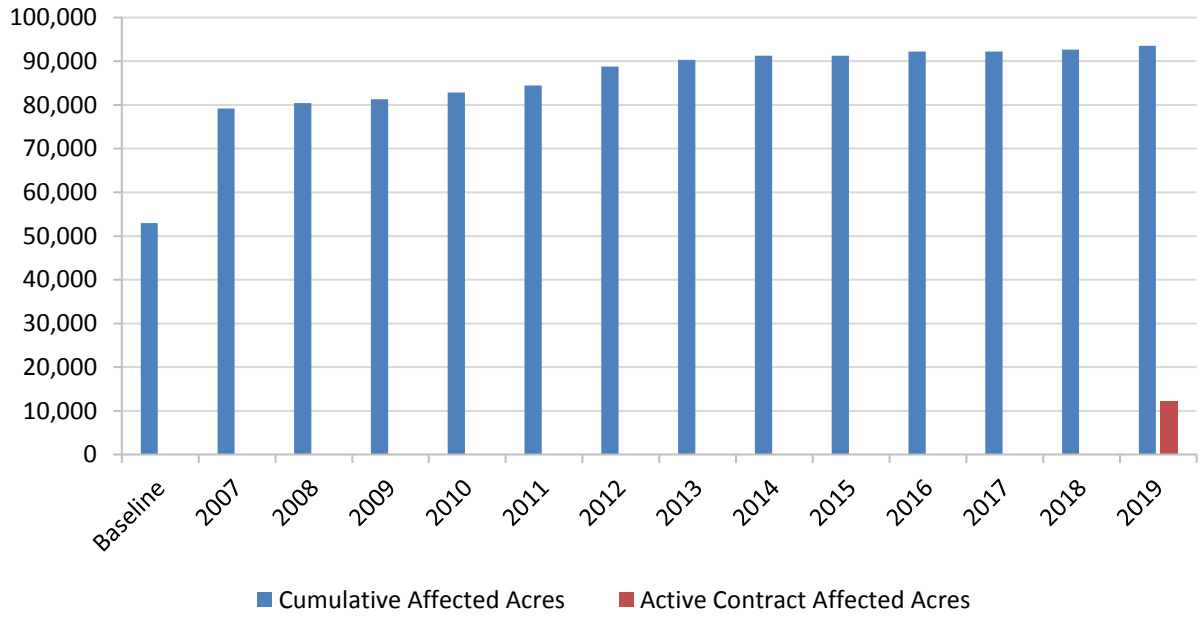
BMP Implementation

As illustrated in Figure 2, CY2019 yielded an increase of 4,405 acres of nutrient scavenger crops from CY2018 and a decrease of over 80,000 acres reported as affected by water control structures, while acres of 100' buffer increased by 21.

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 be under active contract. Coastal counties have reported that despite contract expirations, 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. 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 water control structures 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. Figure 2 shows the cumulative total of all acres affected by water control structures since baseline, as well as the adjusted total showing only active cost share contracts beginning in CY2019.

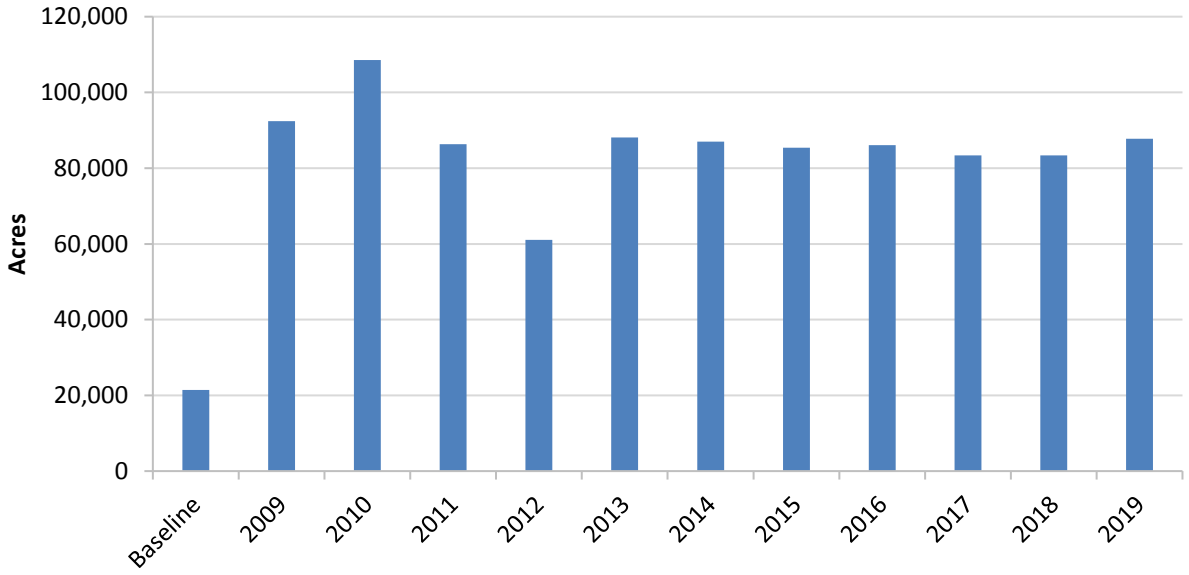
Figure 2: Acres Affected by Water Control Structures for Baseline (1991) and Installed from CY2009 to CY2019, Tar-Pamlico River Basin



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. Nutrient scavenger crop acres are documented on an annual basis because their implementation depends on crop rotations. Figure 3 shows the annual total of nutrient scavenger crop acres in the basin from baseline and CY2009 through CY2019.

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

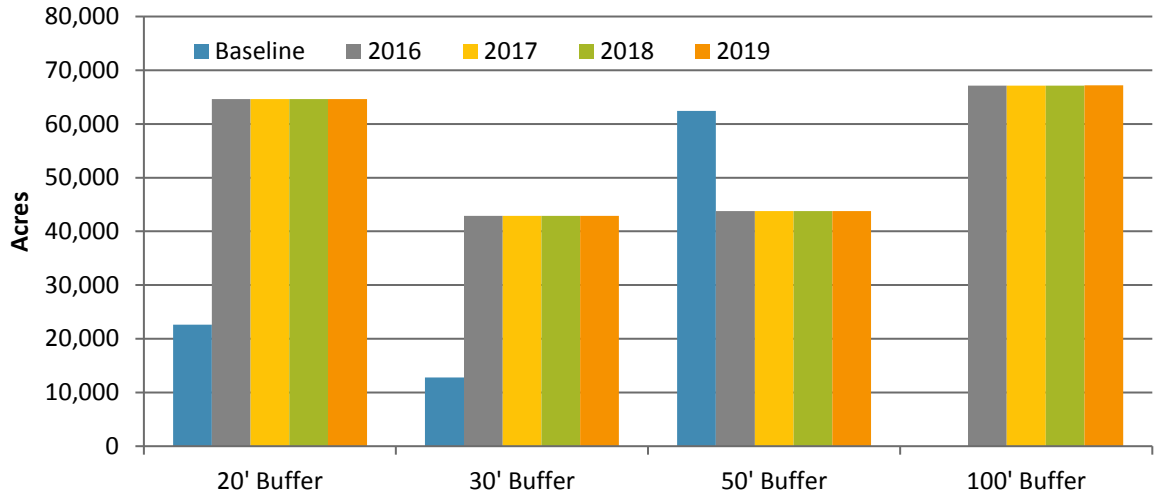


Overall, the total acres of implementation of BMPs have increased since the baseline. When actual acres of BMPs installed through federal, state and local cost share programs are compared to the total cropland (569,061 acres), over half of all reported cropland receives some kind of BMP treatment; this 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 treatment estimate is probably greater 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 4.[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 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'.

[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/**

*Figure 4: Buffer Acres Present on Agricultural Lands for Baseline (1991) and Installed from CY2016 through CY2019, 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.*[2]

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 CY2016.

Increased implementation numbers are evident in CY2019 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, 2016-2019, Tar-Pamlico River Basin**

BMP	Units	2016	2017	2018	2019
Diversion	Feet	440,614	441,962	441,962	441,962
Fencing (USDA Programs)	Feet	262,519	262,519	262,519	263,205
Field Border	Acres	1,303	1,306	1,308	1,309
Grassed Waterway	Acres	2,587	2,602	2,634	2,635
Livestock Exclusion	Feet	239,868	239,868	239,868	241,960
Sod Based Rotation	Acres	90,911	98,681	101,150	101,940
Tillage Management	Acres	62,151	67,899	69,504	69,504
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 5 indicates that nitrogen rates for the major crops in the basin have reduced from the baseline period.

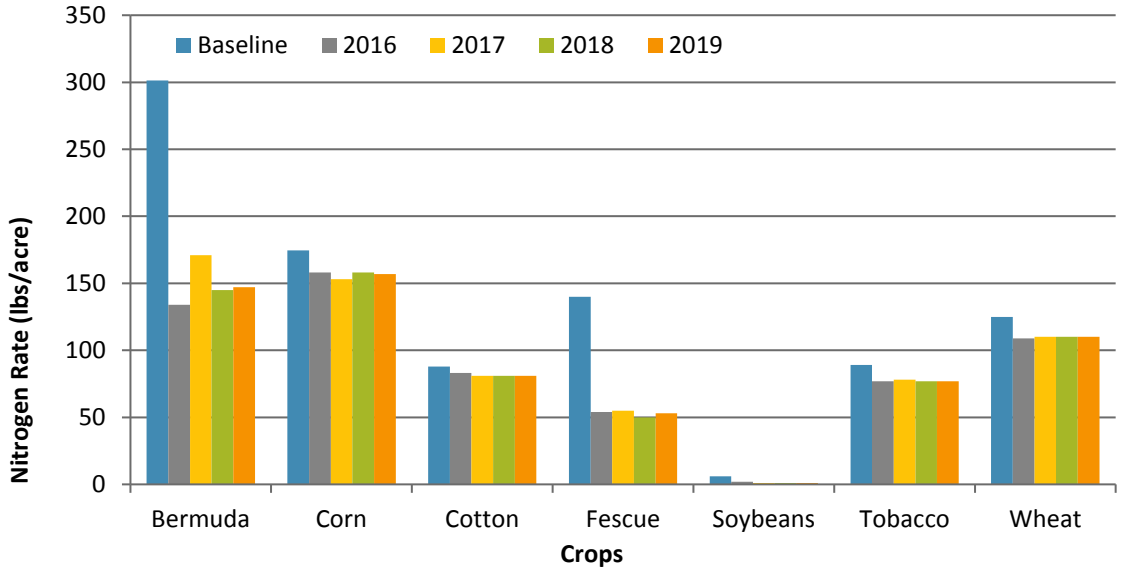
In CY2019 nitrogen rates increased by 2 lbs/acre on corn and 3 lbs/acre on fescue, and remained stable for bermuda, cotton, soybeans, tobacco, and wheat compared to CY2018. Most pastures are under-fertilized throughout the Tar-Pamlico basin. Pasture and hayland are typically not supplemented with inorganic 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 and 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.

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 (lb/ac) for the Major Agricultural Crops for the Baseline (1991) and 2016-2019, Tar-Pamlico River Basin

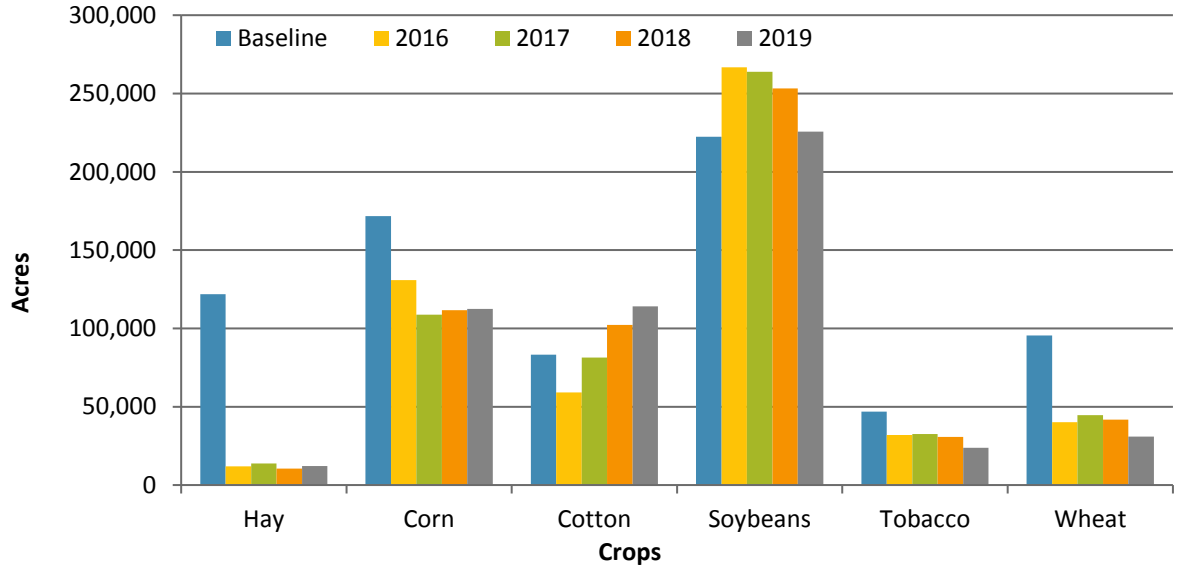


Cropping Shifts

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.

Figure 6 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. 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 13,000 acres and overall soybean acres decreased by roughly 27,000 acres. The winter of 2018/19 was unseasonably wet, so overall wheat acres fell by roughly 11,000 during those months because in many cases it was too wet for producers to access fields in time for planting. A host of factors from individual to global determine crop choices.

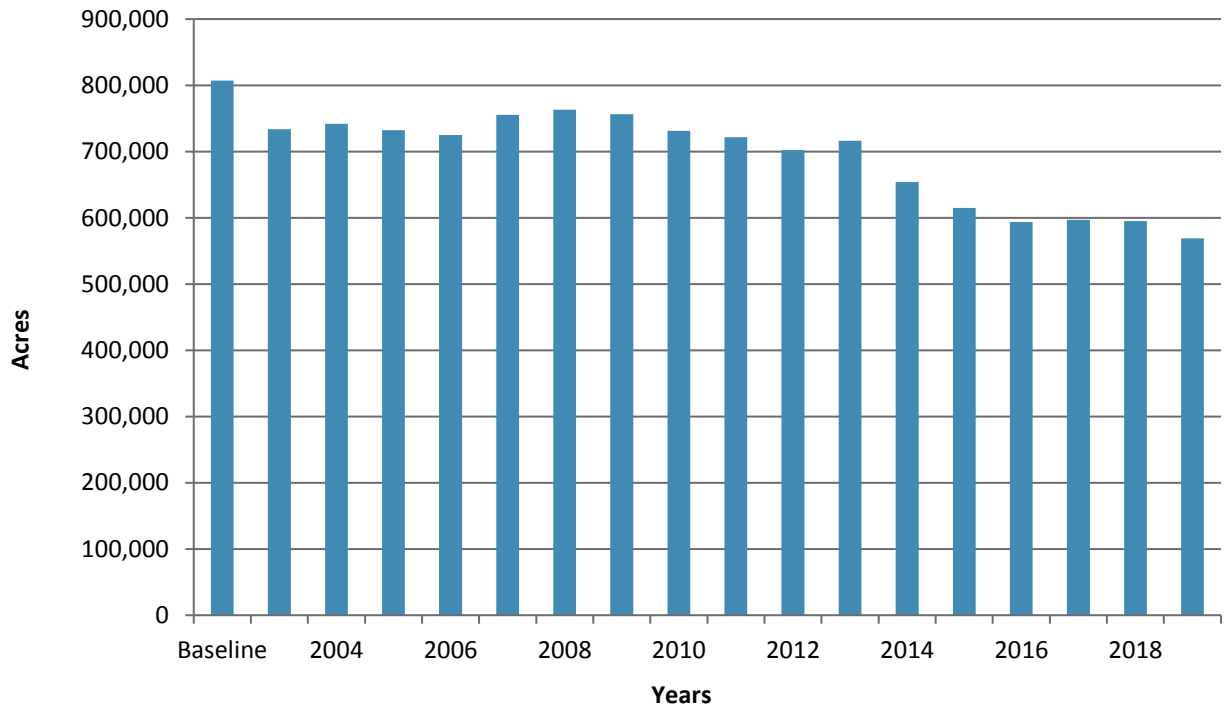
Figure 6: Acreage of Major Crops for the Baseline (1991) and 2016-2019, Tar-Pamlico River Basin



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 47,462 acres have been converted to grass or trees since the 1991 baseline. For CY2019 it is estimated that there are approximately 66,356 idle acres. There is a total of 569,061 NLEW-accountable acres of cropland (see Figure 7). In addition to these changes, LACs have noted that over 2,500 cropland acres have been converted to newly leased and constructed solar facilities. 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 7).

Figure 7. NLEW-Accounted Cropland Acres in the Tar-Pamlico River Basin, Baseline (1991) - 2019



**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 CY2019: 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 CY2016 through CY2019. 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. Water Control Structures will be reported as both cumulative and active contract acres, which makes determining a positive or negative risk change problematic. The BOC notes consistent and ongoing implementation of water control structure cost share contracts in coastal counties, and Soil & Water Conservation Districts will continue to do field verifications of older structures where possible.

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. 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	CY2016	CY2017	CY2018	CY2019	1991 – 2019 Change	CY2019 P Loss Risk +/-
Agricultural land	Acres	FSA	807,026	593,530	597,066	595,165**	569,061	-29%	-
Cropland conversion (to grass & trees)	Acres	USDA-NRCS & NCACSP	660	47,134	47,269	47,328	47,462	7,091%	-
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	62,151	67,899**	69,504**	69,504	68%	-
Vegetated buffers (cumulative)	Acres	USDA-NRCS & NCACSP	50,836	218,440	218,440	218,440	218,461	330%	-
Water control structures (cumulative)	Acres Affected	USDA-NRCS & NCACSP	52,984	92,208	92,208	92,668	(92,668)/ 11,320	-79%***	+/-***
Scavenger crop	Acres	LAC	13,272	86,109	83,312	83,382	87,787	561%	-
Animal waste P	lbs of P/ yr	NC Ag Statistics	13,597,734	14,805,403	14,855,289	14,654,365	14,969,462	10%	+
Soil test P median	P Index	NCDA&CS	83	84	85	93	93	12%	+

** 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 2017 Ag Census, conservation tillage (including no-till) was practiced on 451,018 crop acres in the Tar-Pamlico River Basin.[3]*

***This number was calculated incorrectly on last year's report due to a spreadsheet error.*

****Cumulative water control structure acres are reported along with acres currently under active contract. Due to the fact that an unknown portion of inactive acres are likely still affected by water control structures, the BOC believes the P loss risk in this category is difficult to describe as clearly positive or negative.*

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 DWR annually, and to bring any concerns raised by the results of this effort to DWR'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, 2017 Census of Agriculture, Census by Watershed (HUC 030201). Available at: www.agcensus.usda.gov/ Publications/2017/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 lasting reduction in nitrogen loss in the basin.

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.

Soil & Water Conservation District staffs have been informed about the updated methodology for reporting active water control structure contracts. All have expressed a willingness to reach out to producers who signed up for older contracts and who may be willing to re-contract for upgrades and repairs. LAC members will keep track of these developments in future years, and as producers are re-engaged with the contracting process their affected acres will be added back to the county's reporting total.

The BOC has noted and is monitoring a statewide increase in poultry production. According to Agricultural Statistics, there is a roughly 18% decrease in layer production and a roughly 25% decrease in broiler production in the counties of the Tar-Pamlico Basin since 1993/1994. While there are notable production increases in other parts of the state, there does not appear to be a significant upward trend of production in the Tar-Pamlico Basin. The BOC plans to monitor these changes in the future. The BOC will also monitor the ongoing increase in soil test phosphorus.

In CY2019 soil and water conservation districts spent almost $260,000 through the Agriculture Cost Share Program in the Tar-Pamlico River Basin, and the Natural Resources Conservation Service spent over $1,550,000 through the Environmental Quality Assistance Program in the

counties of the Tar-Pamlico River Basin. These programs have all helped fund erosion and nutrient reducing BMPs in the Tar-Pamlico 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.

Over 150 farmers, local staff, and agency personnel with other responsibilities serve on the Neuse and Tar-Pamlico 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.

Watershed technicians are no longer eligible for state and federal funding, so 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 original 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 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. 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.

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% nitrogen reduction and no net increase in phosphorus goals. However, the measurable effects of these BMPs on overall in-stream nutrient 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 and no net increase of phosphorus delivered to the Pamlico estuary.