Appendix Chapter 1 USDA Census of Agriculture

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USDA Census of Agriculture Data Overview

The US Department of Agriculture (USDA) conducts a nationwide Census of Agriculture (Census) every five years. The Census includes a count of all farms and ranches and the people that operate them. Any rural or urban farm/ranch that grows fruit, vegetables, or a food animal is counted if $1,000 or more of such products were raised and sold or normally would have been sold during a census year (USDA, 2019a). Agricultural summary statistics can be obtained at the national, state, and county level for many farm related commodities.

Information about the number and types of animal operations, farm crops, and treatments for 2007, 2012, 2017 and 2022 was obtained from the USDA's National Agricultural Statistics Service (NASS) Quick Stats for 15 counties located in Cape Fear River basin. Counties queried have greater than 45% land area in the Cape Fear River basin. These include Alamance, Bladen, Brunswick, Chatham, Cumberland, Duplin, Guilford, Harnett, Lee, Moore, New Hanover, Orange, Pender, Randolph, and Sampson counties. Per the 2022 USDA Census of Agriculture, a total of 9,362 farms operations are operating on a total of 1,593,062 acres (2,489 mi^2) in counties with more than 45% land area in the basin. While most of the land area in Hoke County is located in the Cape Fear River basin, it was not included in the query. Much of the county land area in Hoke County is occupied by Fort Liberty Military Reservation.

Animal Operations

USDA Census data was queried for the sector "animals and products" for poultry, cattle, and swine. "Inventory" was selected as the category for one query. Inventories are measured as of December 31st of the Census year. "Production" was selected for a second query. A production contract is defined by USDA as "an agreement between a producer or grower and a contractor (integrator) setting terms, conditions, and fees to be paid by the contractor to the operation for the production of crops, livestock, or poultry. Crops and livestock inventory, production, and value of sales are the total of all production, both independent and raised under production contract" (USDA, 2017). Production contract statistics for cattle were only available for replacement dairy cows and were not included in this analysis. It should also be noted that neither the inventory numbers nor the production numbers are representative of total head counts, and final contract numbers may not be the same as what is reported for the Census if a contract is not met, terminated, or later amended. Inventory and production contract farms and animal numbers are two distinct data items and should not be combined or added together. Farms that report a production contract must also report inventory. The USDA reports some county inventories for livestock, poultry, and crops as "(D)", indicating that numbers are "withheld to avoid disclosing data for individual farms". Therefore, exact head counts or crop acreage cannot be calculated. The tables and figures below show changes over time in animal inventory and production numbers. *Table 1* presents the Cape Fear River basin (15 counties) and statewide animal and farm totals for census years 2007, 2012, 2017 and 2022 for comparison.

Table 1: USDA Census of Agriculture Animal and Farm Operation Total for the 15 Counties in the Cape Fear River Basin and NC Statewide Totals for Census Years 2007, 2012, 2017 and 2022.

Animal Type[1]	2007	2012	2017	2022	Change from 2007 to 2022	Percent Change from 2007 to 2022	2022 Statewide USDA Animal Totals	2022 CFRB Percent of Statewide Totals
Chickens[4] Inventory[2]	53,361,938	47,429,276	54,286,271	75,983,865	+22,621,927	+ 42.39 %	**209,561,611**	36.26 %
Chickens[4] Inv. Operations	1,506	1,727	2,086	2,464	+958	+ 63.61 %	**10,195**	24.17 %
Chickens[5] Production[3]	243,683,545	226,125,275	242,082,775	332,177,146	+88,493,601	+ 36.31 %	**966,345,547**	34.37 %
Chickens[5] Prod. Operations	661	566	566	687	+26	+ 3.93 %	**2,124**	32.34 %
Turkey Inventory[2]	9,129,571	10,023,276	7,328,558	6,430,041	-2,699,530	- 29.57 %	**15,516,238**	41.44 %
Turkey Inv. Operations	326	310	249	284	-42	- 12.88 %	**791**	35.90 %
Turkey Production[3]	32,224,319	30,909,194	18,189,783	17,323,609	-14,900,710	- 46.24 %	**37,504,418**	46.19 %
Turkey Prod. Operations	302	239	152	132	-170	- 56.29 %	**298**	44.30 %
Swine[6] Inventory[2]	5,874,892	4,762,023	5,111,355	4,924,165	-950,727	- 16.18 %	**7,927,842**	62.11 %
Swine[6] Inv. Operations	1,185	817	910	885	-300	- 25.32 %	**2,492**	35.51 %
Swine[6] Production[3]	19,052,749	12,573,032	14,000,328	14,757,073	-4,295,676	- 22.55 %	**23,752,768**	62.13 %
Swine[6] Prod. Operations	848	527	578	549	-299	- 35.26 %	**910**	60.33 %
Cattle[7] Inventory[2]	208,810	208,128	183,993	174,225	-34,585	- 16.56 %	**718,631**	24.24 %
Cattle[7] Inv. Operations	4,074	4,097	3,906	3,316	-758	- 18.61 %	**14,980**	22.14 %

[1] Animal Type was queried for 15 counties with >45% land coverage in the Cape Fear River basin. Excludes Hoke County.

[2] USDA Inventory numbers represent a point in time (End of December) when the Census data was collected.

[3] USDA Production Contract numbers are "totals for the portion of agriculture production raised and delivered under production contract" (USDA, 2017). Production Contract and Inventory represent different data items and should not be combined. Like animal numbers reported under Production Contract and Inventory, the number of farms with Production Contracts and the number of farms with Inventory are different data items and cannot be combined.

[4] Chicken Inventory includes broilers, pullets, layers, and roosters.

[5] Chicken Production includes broilers, layers, and pullets for 2012 to 2022 and boilers and pullets for 2007.

[6] Swine includes Hogs, Inventory (Total). There are no new or expanding permitted swine (hog) operations in the basin. The numbers reported here are most likely associated with farms that are below the animal threshold defined under North Carolina's General Statute 143-215.10B and are deemed permitted.

[7] Cattle Inventory includes Catte, Including Calves (Total)

Poultry

In the Census of Agriculture, inventory statistics for poultry are listed separately for the different types of poultry: broilers, layers, pullets, roosters, and turkeys. To understand how chicken numbers have changed over time, broilers, layers, pullets, and roosters were queried through QuickStats.

Chicken Inventory

Total number of operations and inventory (broilers, layers, pullets, and roosters) by county and basin are represented in *Table 2* and *Figure 1*. *Figure 2* displays the 2022 geographic distribution for the chicken inventory in the basin. The total number of chickens (inventory) fluctuated but remained relatively constant between the 2007, 2012, and 2017 census years with a 1.7% increase in chicken inventory numbers between 2007 and 2017. However, there was about a 40% increase in chicken inventory numbers between 2017 and 2022 with a total of almost 76 million chickens in inventory in December 2022 (*Table 2*). The total number of chicken farm operations reporting inventory increased by 958 farms, increasing from 1,506 in 2007 to 2,464 farms in 2022 (*Table 1* and *Table 2*).

Turkey Inventory

Turkeys were queried separately. The total number of operations and inventory for turkeys by county and basin are represented in *Table 2* and *Figure 3* and the geographic distribution for 2022 is shown in *Figure 4*. The total number of turkeys (inventory) increased between 2007 and 2012 from 9.1 million to 10 million in 2012 and declined between 2012 and 2022 from 10 million to 6.4 million (*Table 1* and *Table 3*). The total number of operations also decreased from 326 operations in 2007 to 284 operations in 2022.

Chicken Production

The USDA Census of Agriculture was also queried for chicken production contract numbers. Total number of chicken production (broilers, layers, and pullets) by county and basin are represented in *Table 4* and *Figure 5*. Chicken production only included broilers and pullets for 2007 and broilers, pullets and layers for 2012 to 2022. *Figure 6* shows the geographic distribution of chicken production in 2022 in the basin.

The total number of chickens (production) produced under contracts also remained relatively constant between the 2007, 2012, and 2017 census years. However, the number of chicken produced under contracts increased by 36% to 332 million chickens in 2022. The number of farms with production contracts dropped by 95 farms between 2007 (661) and 2012 (566) but increased to 687 farms in 2022 (added 121 farms with production contracts) (*Table 1* and *Table 4*).

Turkey Production

The USDA Census of Agriculture was also queried for Turkey production contract numbers. Total number of turkey production by county and basin are represented in *Table 5* and *Figure 7*. *Figure 8* shows the geographic distribution of turkey production in 2022 in the basin.

The total number of turkey (production) produced under contracts also declined with each census year between the 2007 and 2022. The number of turkey's declined by 46% from 32.2 million in 2007, down to 17.3 million in 2022 (*Table 1* and *Table 5*). The number of farms with turkey production contracts dropped by 170 farm in that timeframe to a total of 132 farms in 2022.

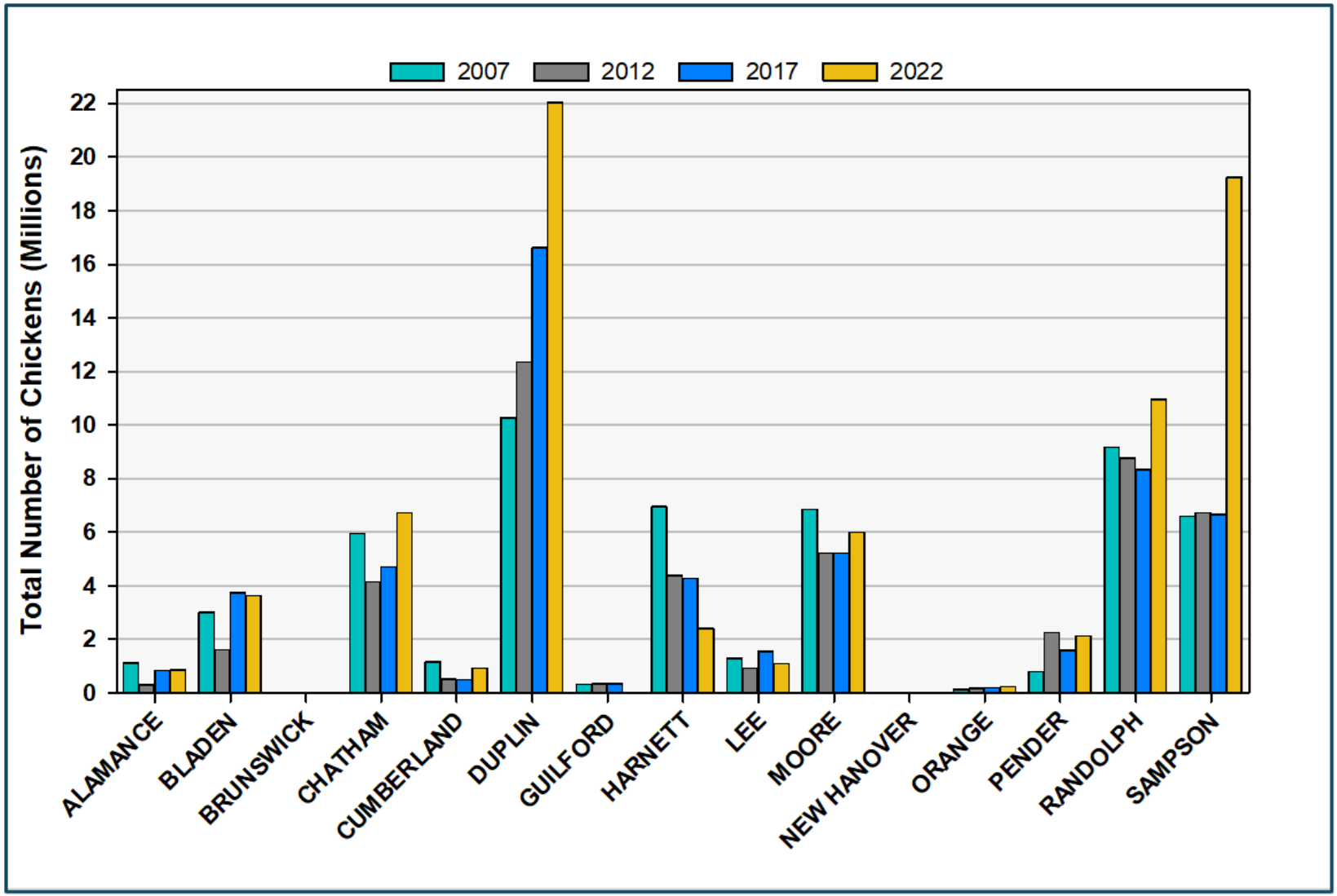
Table 2: Total Number of Chicken (Includes Broilers, Layers, Pullets, and Roosters) Operations and Inventory (USDA, 2022)*

COUNTY	Operations (2007)	Inventory* (2007)	Operations (2012)	Inventory* (2012)	Operations (2017)	Inventory* (2017)	Operations (2022)		Inventory* (2022)	
							Total	%	Total	%
ALAMANCE	91	1,104,268	134	286,395	118	828,163	143	5.80	847,256	1.12
BLADEN	61	2,980,133	63	1,583,952	84	3,715,557	83	3.37	3,610,003	4.75
BRUNSWICK	33	1,579	63	1,769	57	1,857	66	2.68	2,637	0.00
CHATHAM	209	5,939,978	213	4,120,641	264	4,671,172	315	12.78	6,694,386	8.81
CUMBERLAND	34	1,141,086	54	491,906	126	471,057	120	4.87	894,057	1.18
DUPLIN	135	10,257,442	136	12,325,690	135	16,592,763	195	7.91	22,008,081	28.96
GUILFORD	73	305,483	106	322,885	123	320,726	127	5.15	9,215	0.01
HARNETT	118	6,924,614	124	4,370,912	183	4,248,960	155	6.29	2,378,720	3.13
LEE	38	1,265,939	43	901,037	80	1,526,533	79	3.21	1,076,604	1.42
MOORE	171	6,829,982	144	5,190,516	167	5,206,683	273	11.08	5,976,909	7.87
NEW HANOVER	1	(D)	6	103	39	780	27	1.10	442	0.00
ORANGE	101	111,592	143	153,605	188	170,624	215	8.73	212,996	0.28
PENDER	49	782,097	98	2,240,861	86	1,572,756	119	4.83	2,108,056	2.77
RANDOLPH	294	9,152,283	289	8,748,721	324	8,316,289	361	14.65	10,938,392	14.40
SAMPSON	98	6,565,462	111	6,690,283	112	6,642,351	186	7.55	19,226,111	25.30
TOTAL CHICKENS	**1,506**	**53,361,938**	**1,727**	**47,429,276**	**2,086**	**54,286,271**	**2,464**		**75,983,865**	

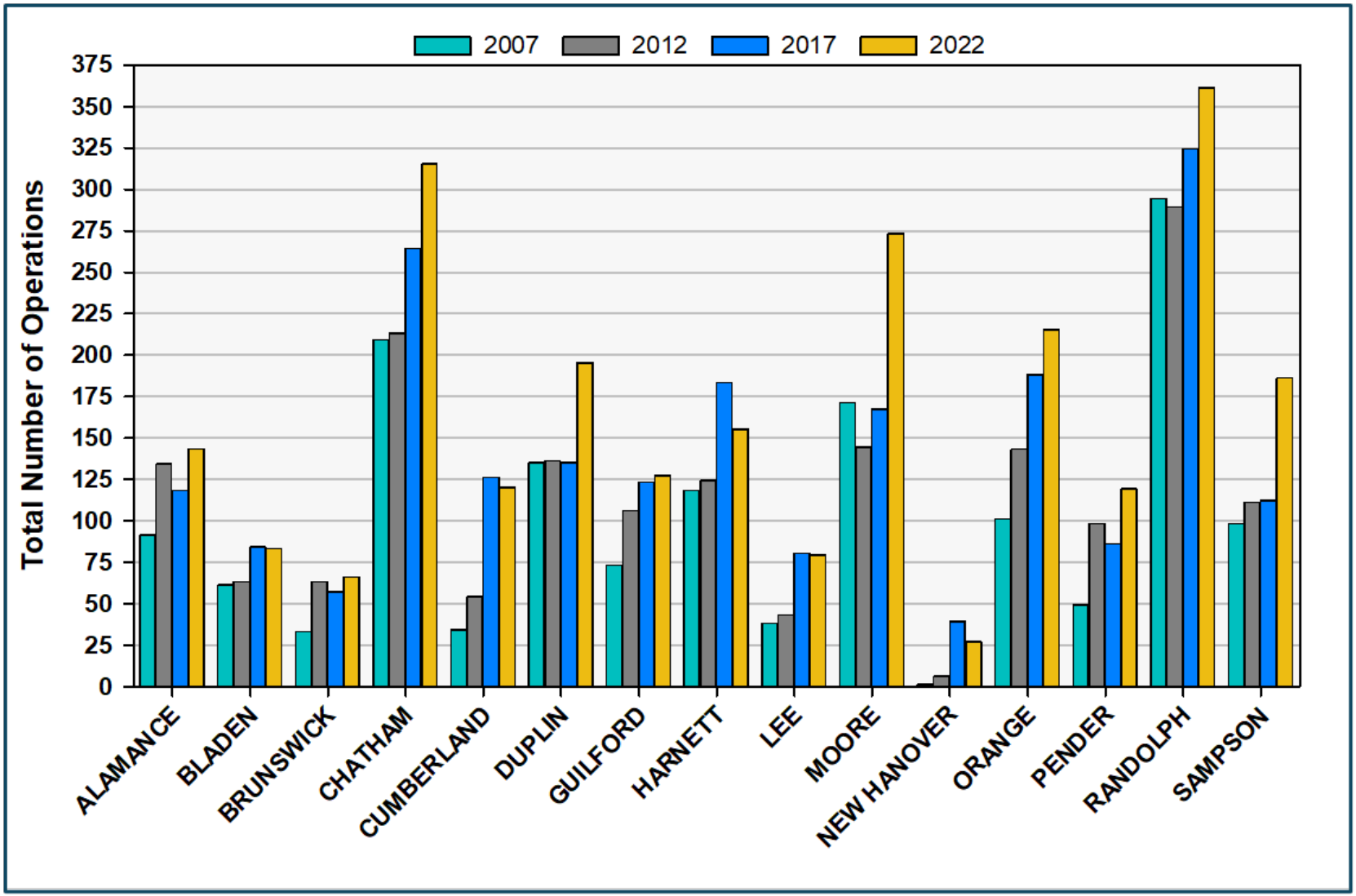
* Inventories are measured as of December 31st of the Census year. Numbers reported here include broilers, layers, pullets, and roosters.
(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.
NA - County information not provided by USDA NASS.

Figure 1: USDA Total Number of Chickens, Includes Broilers, Layers, Pullets, and Roosters (2007-2022):

A) Inventory By County



B) Operations By County



C) Cape Fear River Basin Total Chicken Inventory and Operations

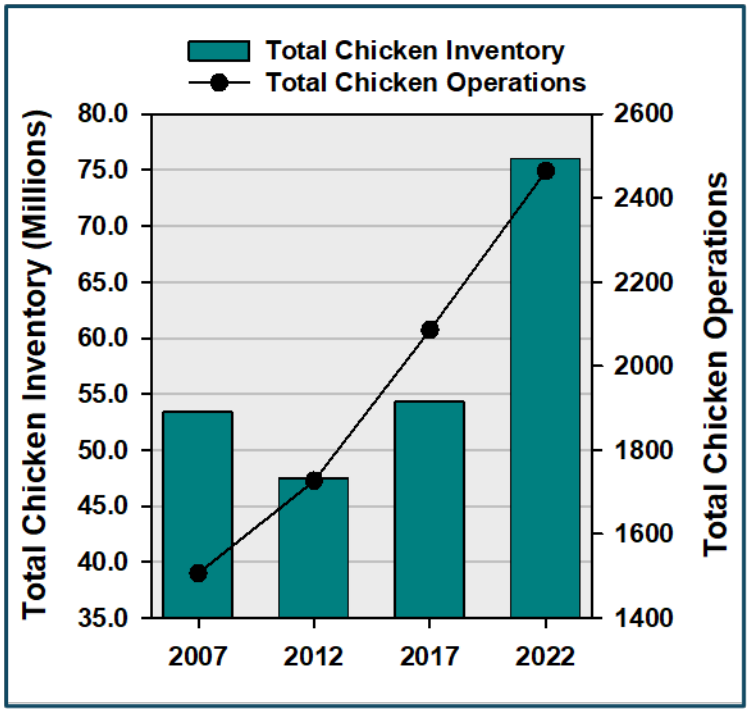


Figure 2:Total Chicken Numbers by County: Inventory 2022, includes broilers, layers, pullets, and roosters.

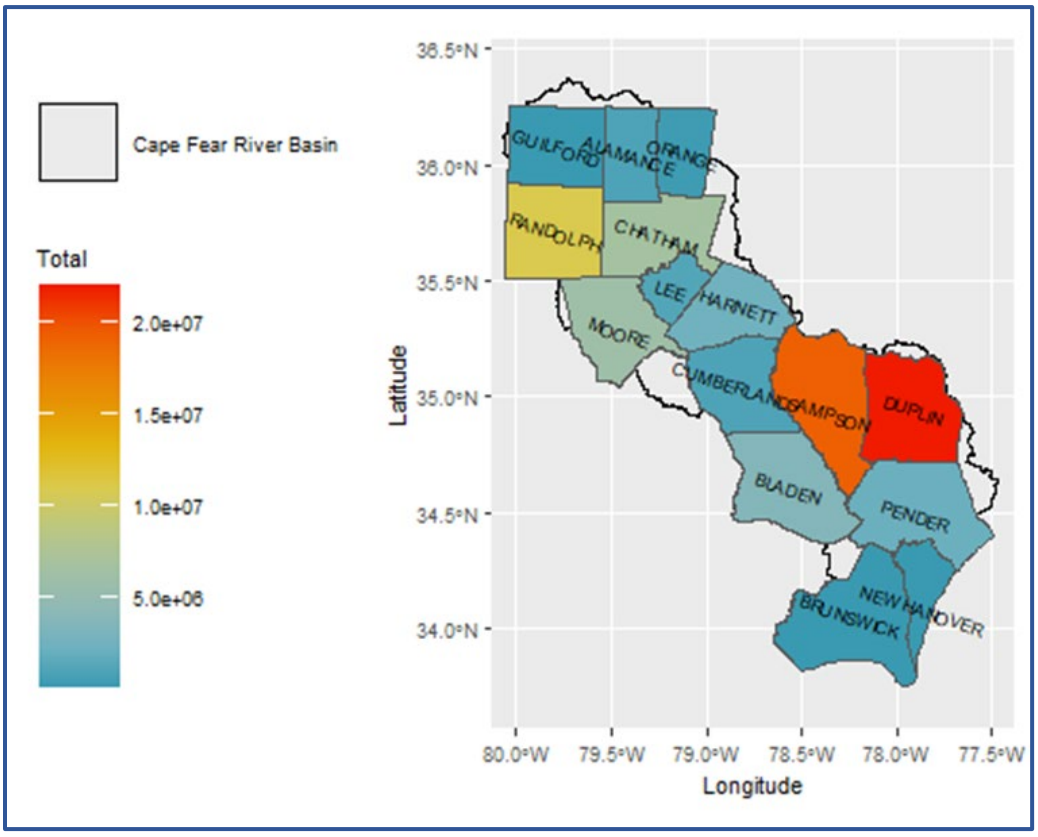


Table 3: Total Number of Turkey Operations and Inventory (USDA, 2022)

COUNTY	Operations (2007)	Inventory (2007)	Operations (2012)	Inventory (2012)	Operations (2017)	Inventory (2017)	Operations (2022)		Inventory (2022)	
							Total	%	Total	%
ALAMANCE	5	(D)	13	307	3	18	9	3.17	43	0.00
BLADEN	11	400,346	13	728,808	8	369,800	12	4.23	396,541	6.17
BRUNSWICK	3	27	2	(D)	3	90	3	1.06	67	0.00
CHATHAM	10	942	7	(D)	17	(D)	21	7.39	537	0.01
CUMBERLAND	11	282,972	10	192,546	25	242,686	17	5.99	503,772	7.83
DUPLIN	119	3,531,646	93	3,895,830	45	1,977,668	47	16.55	2,152,073	33.47
GUILFORD	3	10	9	41	8	48	4	1.41	8	0.00
HARNETT	1	NA	6	(D)	2	(D)	9	3.17	44	0.00
LEE	2	NA	2	(D)	2	(D)	14	4.93	170	0.00
MOORE	3	NA	6	32	4	16	24	8.45	(D)	
NEW HANOVER	NA	NA	3	(D)	6	6	NA		NA	
ORANGE	6	27	9	76	10	166	12	4.23	205	0.00
PENDER	14	342,551	27	430,755	8	143,166	10	3.52	86,051	1.34
RANDOLPH	8	46	7	37	25	117	23	8.10	180	0.00
SAMPSON	130	4,571,004	103	4,774,844	83	4,594,777	79	27.82	3,290,350	51.17
TOTAL TURKEYS	**326**	**9,129,571**	**310**	**10,023,276**	**249**	**7,328,558**	**284**		**6,430,041**	

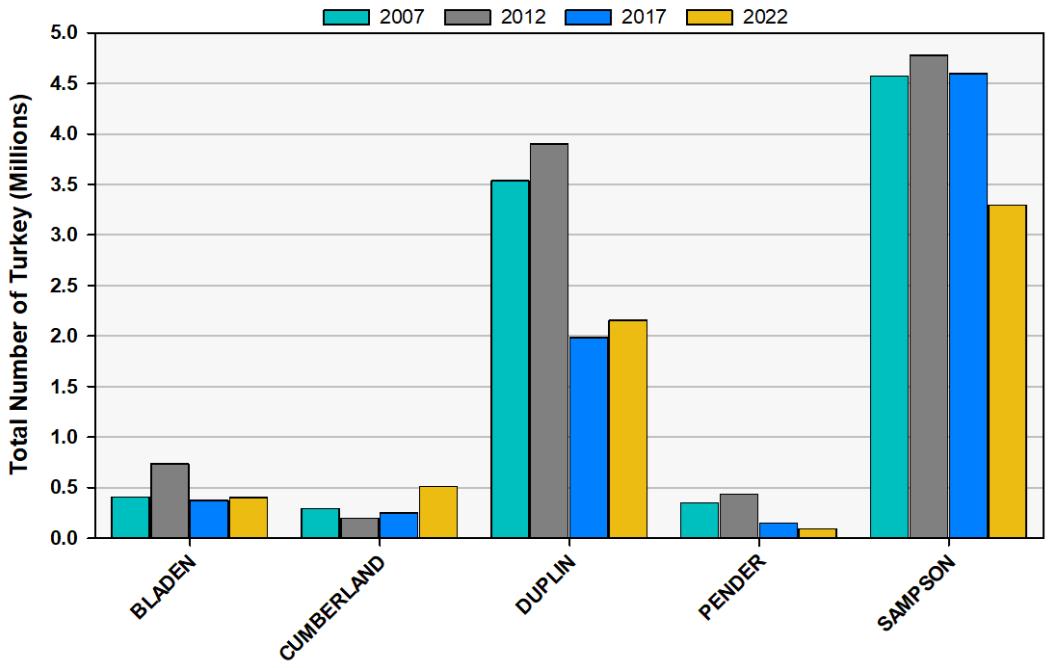
* Inventories are measured as of December 31st of the Census year.

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

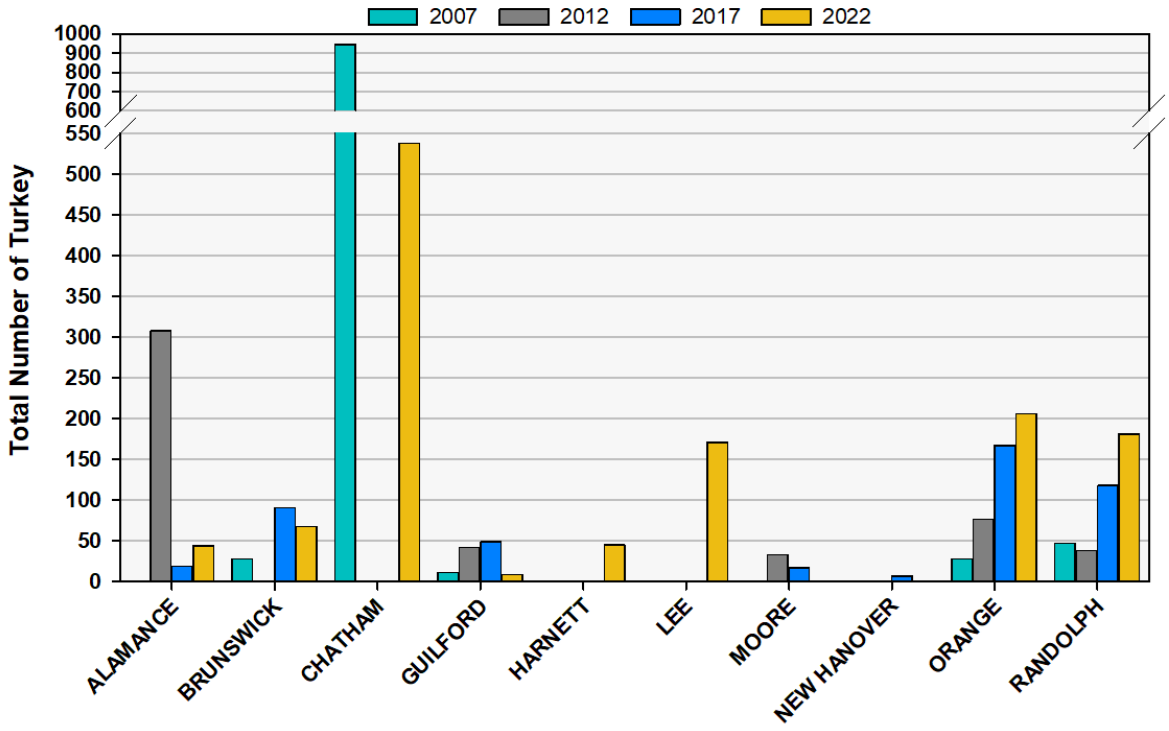
NA - County information not provided by USDA NASS.

Figure 3: Total Number of Turkeys by County: Inventory 2007-2022

A) Inventory of the Five Largest Counties



B) Inventory of the Ten Lowest Counties



C) Cape Fear River Basin Total Turkey Inventory and Operations

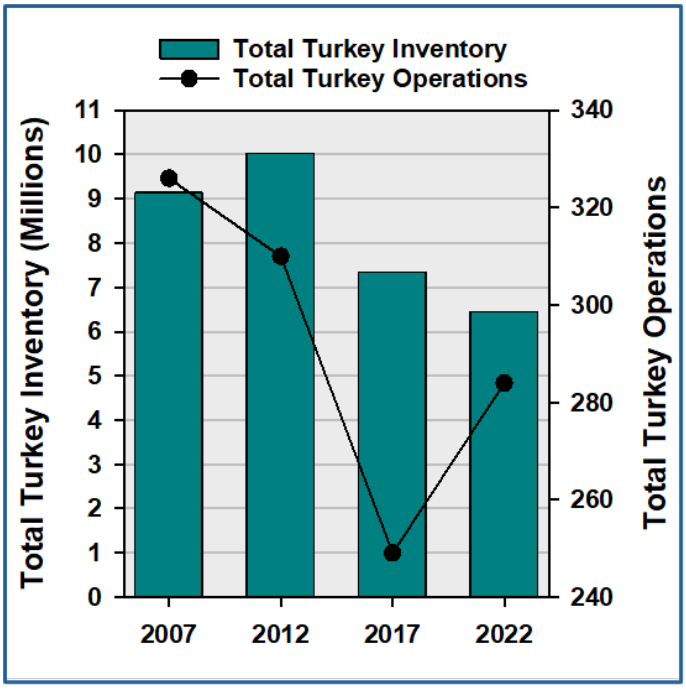


Figure 4: Geographic Distribution of Total Number of Turkeys by County: Inventory (USDA Census of Agriculture 2022)

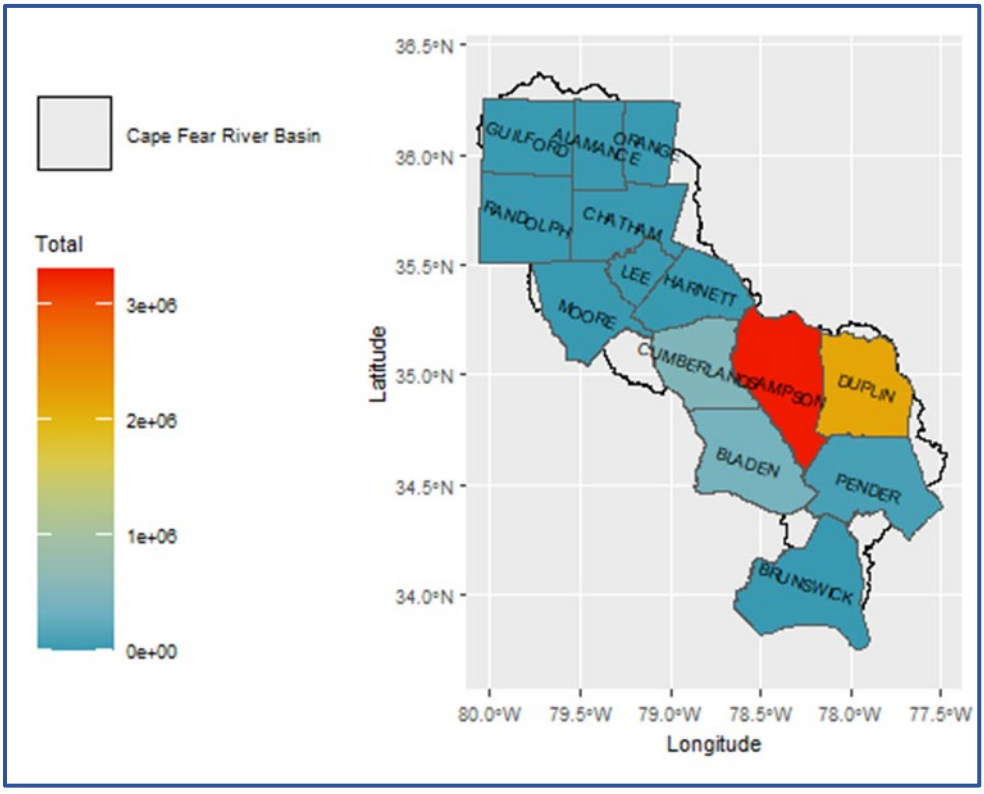


Table 4: Total Number of Operations and Chickens Under Production Contracts (Broilers, Pullets and Layers) (2007-2022)*

County	Operations (2007)	Production (2007)*	Operations (2012)	Production (2012)	Operations (2017)	Production (2017)	Operations (2022)		Production (2022)	
							Total	%	Total	%
ALAMANCE	10	2,899,000	14	708,300	21	2,045,444	18	2.62	2,146,800	0.65
BLADEN	19	14,686,500	15	11,061,500	21	21,605,729	32	4.66	24,926,534	7.50
BRUNSWICK	NA	NA	NA	NA	NA	NA	NA		NA	
CHATHAM	103	26,730,076	75	19,878,914	80	19,263,124	84	12.23	27,901,390	8.40
CUMBERLAND	10	5,972,000	5	2,123,702	6	2,019,600	6	0.87	4,259,600	1.28
DUPLIN	106	46,840,736	99	58,126,617	103	69,770,960	144	20.96	95,986,288	28.90
GUILFORD	7	958,800	5	114,000	8	293,000	5	0.73	(D)	
HARNETT	70	36,629,543	52	24,727,216	41	20,794,900	30	4.37	14,167,340	4.26
LEE	15	5,331,600	12	3,922,000	11	7,298,000	15	2.18	5,988,000	1.80
MOORE	110	33,434,200	68	26,084,385	65	26,859,000	62	9.02	27,312,400	
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA		NA	
ORANGE	NA	NA	3	99,430	4	122,462	3	0.44	98,000	0.03
PENDER	6	3,925,250	14	9,594,234	10	7,840,573	17	2.47	9,442,408	2.84
RANDOLPH	157	39,403,141	147	37,110,849	136	36,843,634	153	22.27	43,139,464	12.99
SAMPSON	48	26,872,699	57	32,574,128	60	27,326,349	118	17.18	76,808,922	23.12
TOTAL CHICKENS	**661**	**243,683,545**	**566**	**226,125,275**	**566**	**242,082,775**	**687**		**332,177,146**	

* Chicken Production includes broilers, layers, and pullets for 2012 to 2022 and boilers and pullets for 2007.

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

NA - County information not provided by USDA NASS.

Figure 5: Total Number of Chicken Production with Contracts:

A) By County and B) By River Basin with Total Operations with Production Contracts (2007-2022)
(Chickens production includes broilers, pullets and layers for 2012 to 2022 and only broilers and pullets for 2007.)

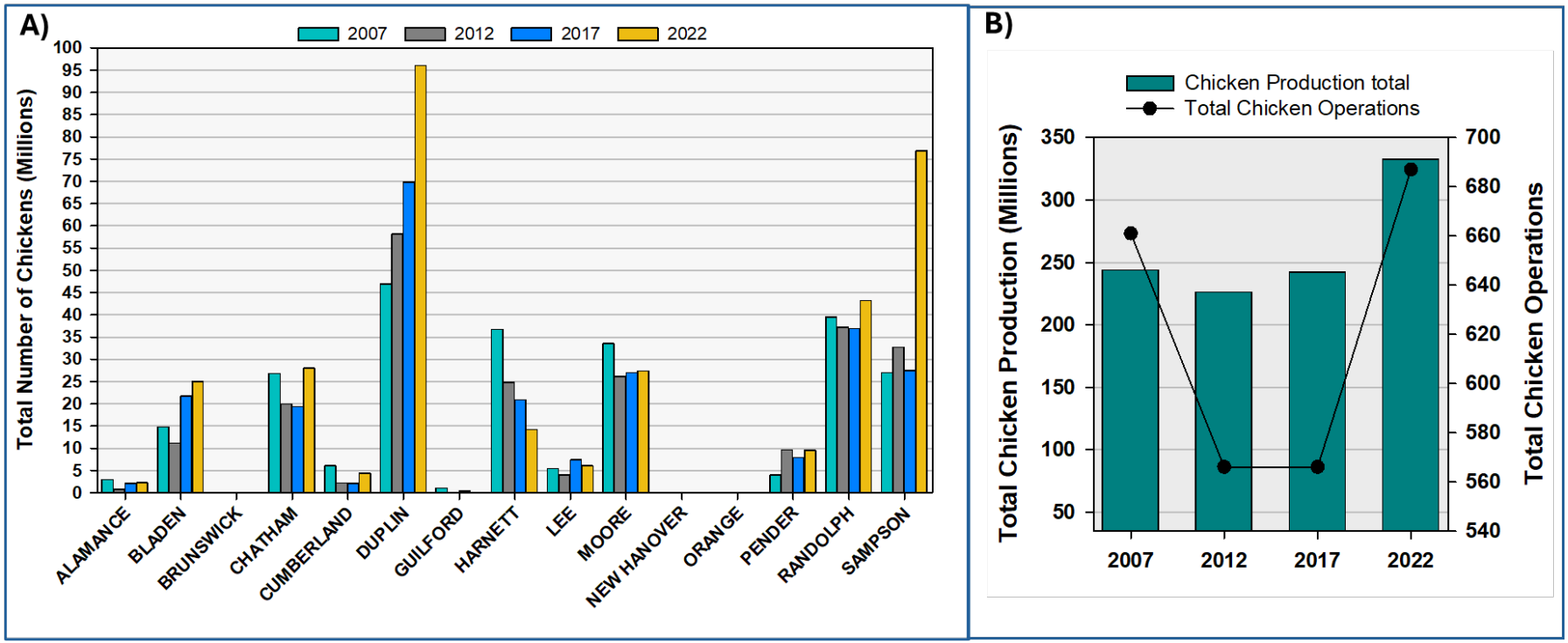


Figure 6: Geographic Distribution of Chicken Production Contract Numbers

(Chickens Include Broilers, Pullets and Layers) (USDA Census of Agriculture 2022)

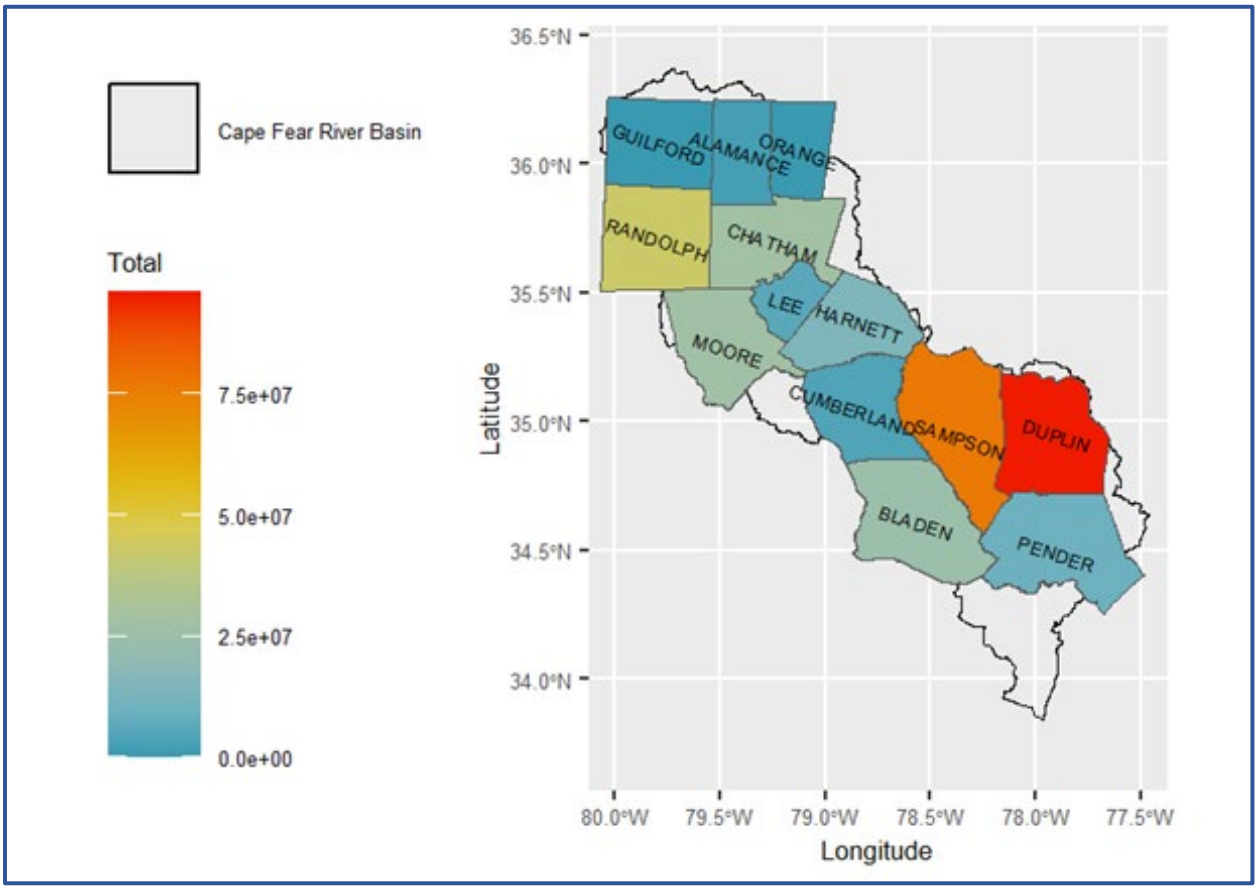


Table 5: Total Number of Operations and Turkeys Under Production Contracts (2007-2022)

County	Operations (2007)	Production (2007)	Operations (2012)	Production (2012)	Operations (2017)	Production (2017)	Operations (2022)		Production (2022)	
							Total	%	Total	%
ALAMANCE	NA	NA	NA	NA	NA	NA	NA		NA	
BLADEN	10	1,387,390	14	2,640,561	12	2,179,587	10	7.58	1,785,400	10.31
BRUNSWICK	NA	NA	NA	NA	NA	NA	NA		NA	
CHATHAM	1	(D)	NA	NA	NA	NA	NA		NA	
CUMBERLAND	10	971,656	7	817,705	6	1,028,497	8	6.06	1,427,666	8.24
DUPLIN	128	12,252,821	93	10,896,583	45	4,687,372	45	34.09	4,744,403	27.39
GUILFORD	NA	NA	NA	NA	NA	NA	NA		NA	
HARNETT	2	(D)	2	(D)	2	(D)	3	2.27	207,500	1.20
LEE	NA	NA	NA	NA	NA	NA	NA		NA	
MOORE	1	(D)	NA	NA	NA	NA	1	0.76	(D)	
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA		NA	
ORANGE	NA	NA	NA	NA	NA	NA	NA		NA	
PENDER	13	1,373,745	13	1,163,000	3	298,000	2	1.52	(D)	
RANDOLPH	NA	NA	NA	NA	NA	NA	NA		NA	
SAMPSON	137	16,238,707	110	15,391,345	84	9,996,327	63	47.73	9,158,640	52.87
TOTAL TURKEYS	**302**	**32,224,319**	**239**	**30,909,194**	**152**	**18,189,783**	**132**		**17,323,609**	

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.
NA - County information not provided by USDA NASS.

Figure 7: Total Number of Turkey Production: A) By County and B) By River Basin with Total Operations with Production Contracts

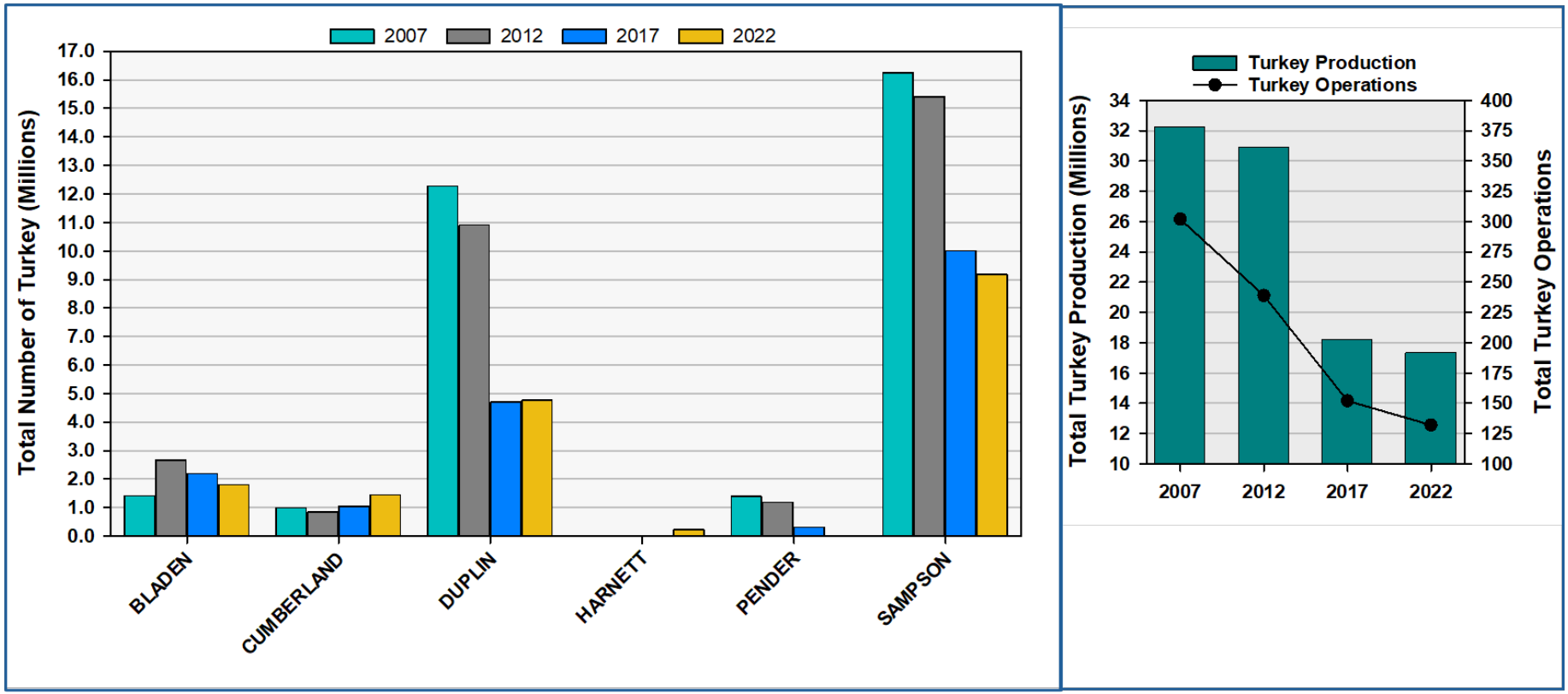
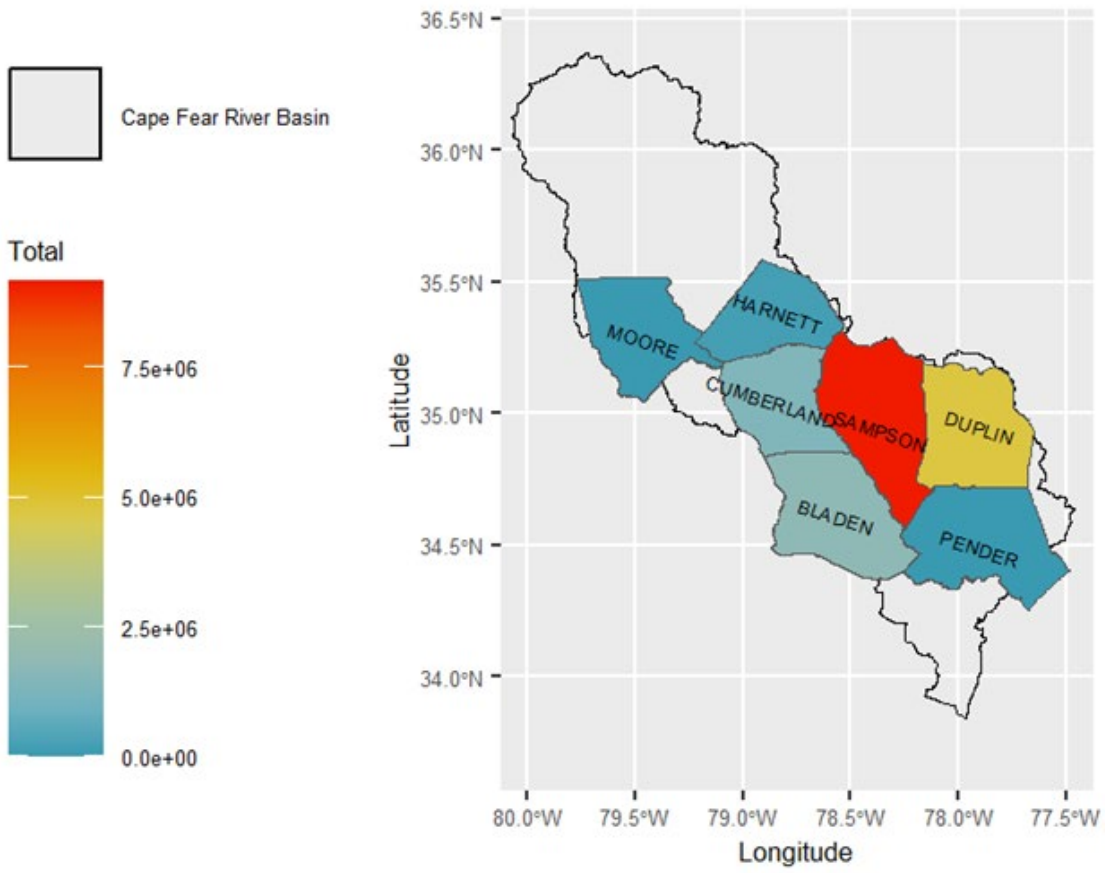


Figure 8: Geographic Distribution of Total Number of Turkeys by County: Production (USDA Census of Agriculture 2022)



USDA Census of Agriculture County Poultry Summary

In 2022, Duplin and Sampson counties combined have the highest total number of chickens and turkeys in the basin. Combined, they house 54.27% of the Cape Fear River basins total chicken inventory (41,234,192; *Table 2*) and 41.88% of the total chickens produced under a contract (139,125,752; *Table 4*). As far as the number of chicken operations reporting their overall chicken inventory to the USDA Census of Agriculture, Duplin and Sampson counties only accounts for 15.46% (381) of the overall operations in the Cape Fear River basin. This indicates that the number of birds per operation are much larger in these two counties than those is the rest of the basin. In contrast, the top two counties with the highest number of operations (Inventory) are Robeson County with 14.65% of the operations (361) and Chatham County with 12.78% (315), which accounts for only 14.40% and 8.81% of the overall chicken inventory respectively in the basin (Table 2). The counties with the highest number of operations reporting chicken production under contracts are Randolph (153), Duplin (144) and Sampon (118) counties (*Table 4)*.

The overall turkey inventory and production has declined in the Cape Fear River basin. The majority of those produced in the basin take place in Duplin and Sampson counties, with Sampson County being the largest. Combined, both counties accounted for 84.64% (5,442,423; *Table 3*) of the total turkey inventory and 80.25% of the total turkeys produced under a contract (13,903,043; *Table 5*).

North Carolina Department of Agriculture & Consumer Services' (NCDA&CS) Agricultural Statistic Division Poultry Summary

Every census is a survey, but not every survey is a census.[1] The North Carolina Department of Agriculture & Consumer Services' (NCDA&CS) Agricultural Statistic Division brings together current and historic data regarding North Carolina's agriculture. NCDA&CS has been working in cooperation with NASS since 1919. Information is collected through a cooperative program with NCDA&CS, USDA, and by the National Association of State Departments of Agriculture (NASDA) enumerators. Statistical data is collected from both personal on-farm visits and telephone surveys. The success of these cooperative relations can be attributed to the response of farmers and agribusinesses to the surveys. The information collected by individual operations is held strictly confidential and is published at state and county level for use by farmers, economists, the public, and other government agencies.

To better understand how poultry numbers are changing annually, DWR queried NASS survey information for broilers, production between 2005 and 2021. Understanding the changes annually could potentially be used to estimate the amount of dry litter and plant available nitrogen (PAN) being generated. These numbers can then help producers develop waste utilization plans (WUP) and nutrient management plans (NMP) and help water quality professionals understand how much animal waste is being generated and potentially land applied as fertilizer. Over the last 15 years, the total number of broilers in production in the 15 counties queried has steadily increased from 211.8 million in 2005 to 297.2 million in 2021 (*Figure 9*). The top five counties producing broilers under production contracts over the last five years (2017 to 2021) are Bladen, Duplin, Moore, Randolph, and Sampson with Duplin producing more than double the number of broilers when compared to the other four counties (*Figure 10*).

[1] https://www.usda.gov/media/blog/2022/11/01/census-vs-survey-whats-difference#:~:text=When%20NASS%20conducts%20a%20census,a%20sample%20representing%20the%20population (accessed 4/8/2023)

Figure 9: Total Number of Chickens (Broilers): Production (2005-2021)

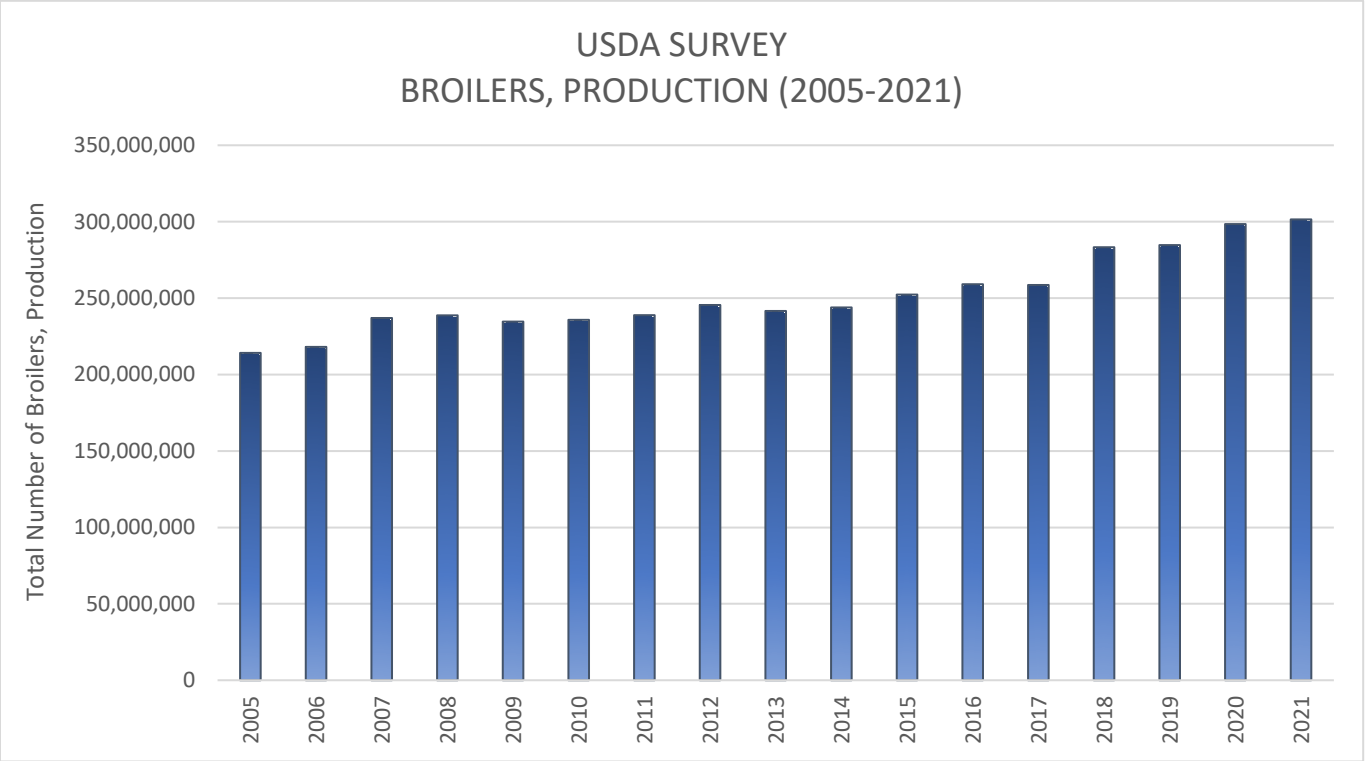
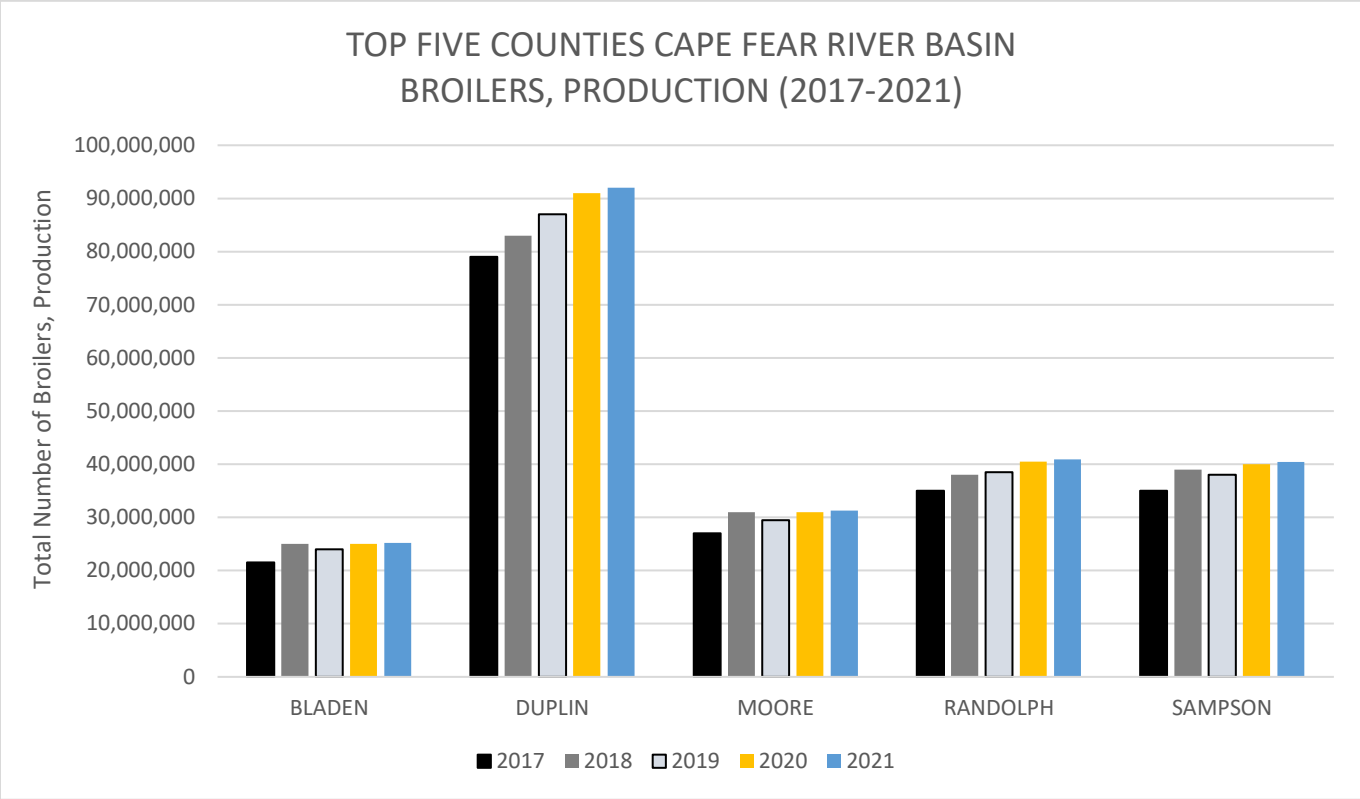


Figure 10: Top Five Counties Cape Fear River Basin, Boilers, Production (2017-2021)



The amount of dry litter and plant available nitrogen (PAN) generated by poultry depends on the type of bird and management measures being utilized on the farm. The amount of dry litter (tons/year) and PAN (lbs/year) generally correspond to the number of birds found in the county. For broilers, the following assumptions are made:

- Tons of litter produced = total production divided by 5 (5 flocks or cycles/year)
- Accumulated whole house manure/litter cleanout per year = 7.2 tons of manure/year per 1,000 birds
- Manure nutrient weights = 57.8 lbs of total nitrogen (TN)
- Assumption: 50% of TN available for plant uptake

- Formula: Litter Produced = (Total Broilers Produced Annually/5) * (7.2/1000)
  - Example: Duplin County 2020 = 91,000,000 birds
  - Tons of litter generated = (91,000,000/5) * (7.2/1,000)
  - Tons of litter generated = 131,040 tons/year

- Formula: PAN = Litter produced * 57.8/2
  - Example Duplin County 2020 = 91,000,000 with total of 131,040 tons of litter generated/year
  - PAN = 131,040 * (57.8/2)
  - PAN = 3,787,056 lbs/year

Figure 11 and *Figure 12* and *Table 6* to *Table 8* show the total amount of litter generated and PAN for broilers produced in the counties with more than 45% land area in the Cape Fear River basin based on the NASS query. Over the last 10 years, the total amount of dry litter and PAN have either remained steady or increased across the basin.

Figure 11: Litter Generated (Tons/Year) from Broilers, Production 2005-2021

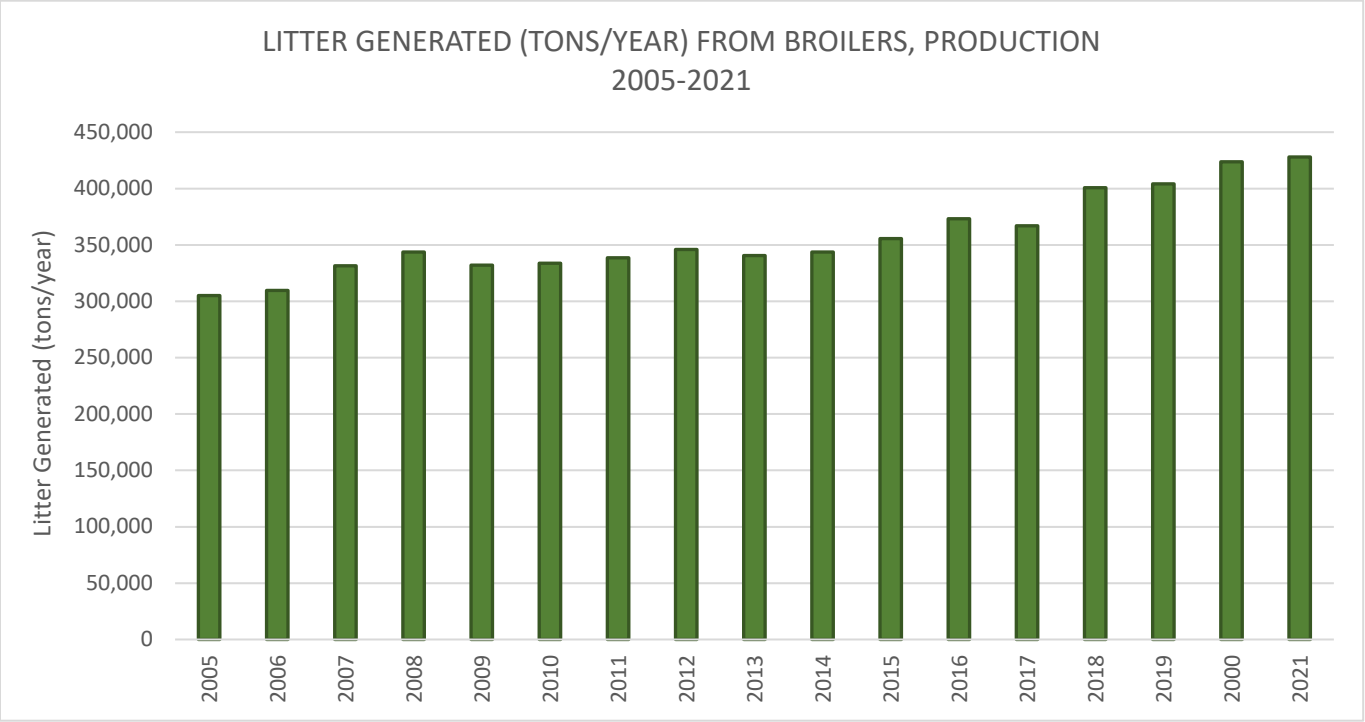


Figure 12: Pan Generated (Lbs/Year) from Broilers, Production 2005-2021

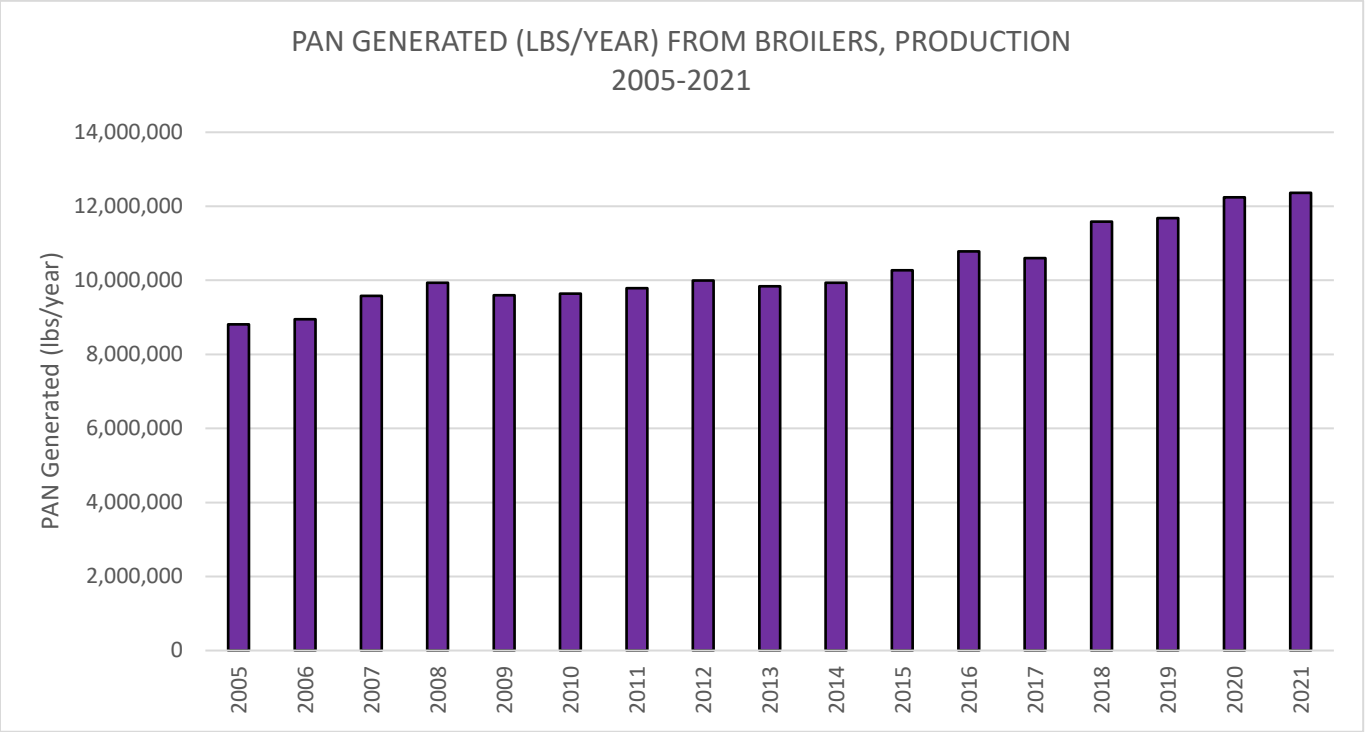


Table 6: USDA NASS Survey Results 2005-2021 by County for Broilers, Production in the Cape Fear River Basin

County	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Alamance	2,800,000	2,700,000	2,550,000	2,650,000	2,000,000	2,100,000	1,700,000	650,000	640,000	645,000	670,000	900,000	1,200,000	1,300,000	1,400,000	1,450,000	1,450,000
Bladen	9,300,000	10,000,000	16,600,000	17,100,000	16,300,000	14,800,000	16,300,000	11,000,000	10,900,000	11,000,000	11,300,000	18,000,000	21,500,000	25,000,000	24,000,000	25,000,000	25,200,000
Brunswick																	
Chatham	32,200,000	32,400,000	26,200,000	23,000,000	25,000,000	26,800,000	22,100,000	19,500,000	19,100,000	19,300,000	20,000,000	19,000,000	18,500,000	19,500,000	20,500,000	21,500,000	21,600,000
Cumberland	3,300,000	3,400,000	4,000,000	3,000,000	1,800,000	1,600,000	1,850,000	2,100,000	2,100,000	2,100,000	2,200,000	2,150,000	2,000,000	3,500,000	2,200,000	2,300,000	2,350,000
Duplin	31,000,000	31,000,000	47,200,000	55,000,000	60,000,000	62,000,000	78,200,000	67,200,000	66,100,000	66,800,000	69,000,000	74,000,000	79,000,000	83,000,000	87,000,000	91,000,000	92,000,000
Guilford			955,000	985,000	1,250,000	1,000,000	360,000	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Harnett	26,000,000	27,800,000	30,000,000	31,000,000	25,500,000	24,600,000	21,600,000	24,700,000	24,300,000	24,500,000	25,400,000	23,000,000	21,000,000	23,000,000	23,000,000	24,000,000	24,300,000
Lee	6,200,000	7,100,000	5,300,000	3,000,000	4,000,000	4,500,000	4,250,000	3,900,000	3,850,000	3,900,000	4,000,000	5,300,000	6,600,000	5,500,000	8,000,000	8,400,000	8,500,000
Moore	36,000,000	36,000,000	33,200,000	34,300,000	30,700,000	30,500,000	30,400,000	26,000,000	25,600,000	25,800,000	26,700,000	26,600,000	27,000,000	31,000,000	29,500,000	31,000,000	31,300,000
New Hanover								(D)	(D)	(D)		(D)					
Orange			3,200	3,300				15,000	14,000	14,000	14,400	4,000,000	4,000	4,500	4,600	4,800	4,900
Pender	1,000,000	2,500,000	3,900,000	6,000,000	6,400,000	5,300,000	5,600,000	9,450,000	9,300,000	9,400,000	9,700,000	8,650,000	8,000,000	9,500,000	8,500,000	9,000,000	9,150,000
Randolph	46,000,000	47,000,000	38,200,000	40,000,000	40,100,000	38,100,000	30,600,000	35,700,000	35,200,000	35,500,000	36,800,000	35,000,000	35,000,000	38,000,000	38,500,000	40,500,000	40,900,000
Sampson	17,970,000	15,200,000	22,000,000	22,700,000	17,500,000	20,400,000	22,200,000	40,000,000	39,300,000	39,700,000	41,100,000	38,000,000	35,000,000	39,000,000	38,000,000	40,000,000	40,400,000
Total	**211,770,000**	**215,100,000**	**230,108,200**	**238,738,300**	**230,550,000**	**231,700,000**	**235,160,000**	**240,215,000**	**236,404,000**	**238,659,000**	**246,884,400**	**259,100,000**	**254,804,000**	**278,304,500**	**280,604,600**	**294,154,800**	**297,154,900**

*Table 7: Estimated Amount of Litter Generated (Tons/Year) Broilers, Production**

County	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2000	2021
Alamance	4,032	3,888	3,672	3,816	2,880	3,024	2,448	936	922	929	965	1,296	1,728	1,872	2,016	2,088	2,088
Bladen	13,392	14,400	23,904	24,624	23,472	21,312	23,472	15,840	15,696	15,840	16,272	25,920	30,960	36,000	34,560	36,000	36,288
Brunswick																	
Chatham	46,368	46,656	37,728	33,120	36,000	38,592	31,824	28,080	27,504	27,792	28,800	27,360	26,640	28,080	29,520	30,960	31,104
Cumberland	4,752	4,896	5,760	4,320	2,592	2,304	2,664	3,024	3,024	3,024	3,168	3,096	2,880	5,040	3,168	3,312	3,384
Duplin	44,640	44,640	67,968	79,200	86,400	89,280	112,608	96,768	95,184	96,192	99,360	106,560	113,760	119,520	125,280	131,040	132,480
Guilford			1,375	1,418	1,800	1,440	518										
Harnett	37,440	40,032	43,200	44,640	36,720	35,424	31,104	35,568	34,992	35,280	36,576	33,120	30,240	33,120	33,120	34,560	34,992
Lee	8,928	10,224	7,632	4,320	5,760	6,480	6,120	5,616	5,544	5,616	5,760	7,632	9,504	7,920	11,520	12,096	12,240
Moore	51,840	51,840	47,808	49,392	44,208	43,920	43,776	37,440	36,864	37,152	38,448	38,304	38,880	44,640	42,480	44,640	45,072
New Hanover																	
Orange			5	5				22	20	20	21	5,760	6	6	7	7	7
Pender	1,440	3,600	5,616	8,640	9,216	7,632	8,064	13,608	13,392	13,536	13,968	12,456	11,520	13,680	12,240	12,960	13,176
Randolph	66,240	67,680	55,008	57,600	57,744	54,864	44,064	51,408	50,688	51,120	52,992	50,400	50,400	54,720	55,440	58,320	58,896
Sampson	25,877	21,888	31,680	32,688	25,200	29,376	31,968	57,600	56,592	57,168	59,184	54,720	50,400	56,160	54,720	57,600	58,176
Total	**304,949**	**309,744**	**331,356**	**343,783**	**331,992**	**333,648**	**338,630**	**345,910**	**340,422**	**343,669**	**355,514**	**373,104**	**366,918**	**400,758**	**404,071**	**423,583**	**427,903**

**Estimated with the assumption that there are 5 flocks per year and 7.2 tons litter generated per every 1,000 birds. Example calculation for Sampson 2021: (40,400,000/5)*(7.2/1,000) = 58,176 tons of litter generated per year.

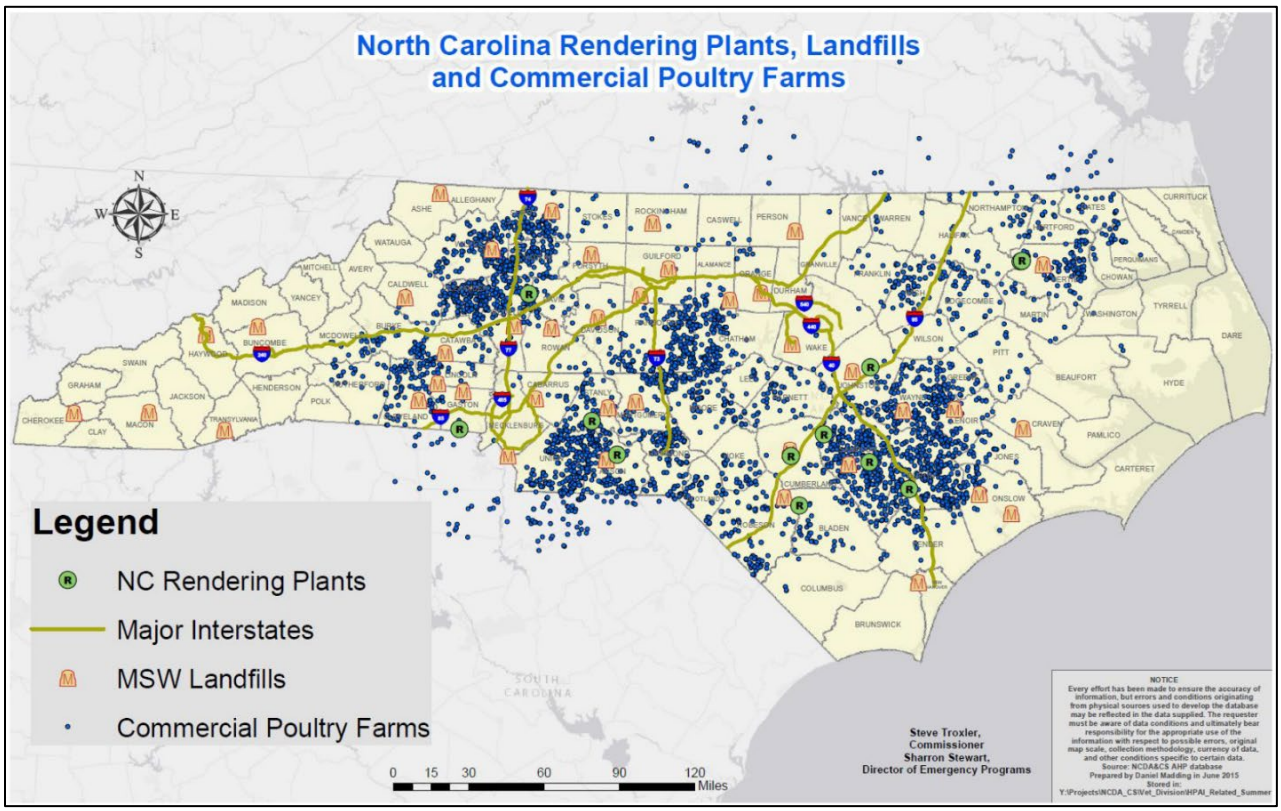
*Table 8: Estimated Amount of PAN Generated (LBS/Year) Broilers, Production**

County	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Alamance	116,525	112,363	106,121	110,282	83,232	87,394	70,747	27,050	26,634	26,842	27,883	37,454	49,939	54,101	58,262	60,343	60,343
Bladen	387,029	416,160	690,826	711,634	678,341	615,917	678,341	457,776	453,614	457,776	470,261	749,088	894,744	1,040,400	998,784	1,040,400	1,048,723
Brunswick																	
Chatham	1,340,035	1,348,358	1,090,339	957,168	1,040,400	1,115,309	919,714	811,512	794,866	803,189	832,320	790,704	769,896	811,512	853,128	894,744	898,906
Cumberland	137,333	141,494	166,464	124,848	74,909	66,586	76,990	87,394	87,394	87,394	91,555	89,474	83,232	145,656	91,555	95,717	97,798
Duplin	1,290,096	1,290,096	1,964,275	2,288,880	2,496,960	2,580,192	3,254,371	2,796,595	2,750,818	2,779,949	2,871,504	3,079,584	3,287,664	3,454,128	3,620,592	3,787,056	3,828,672
Guilford			39,743	40,992	52,020	41,616	14,982										
Harnett	1,082,016	1,156,925	1,248,480	1,290,096	1,061,208	1,023,754	898,906	1,027,915	1,011,269	1,019,592	1,057,046	957,168	873,936	957,168	957,168	998,784	1,011,269
												187,272					
Lee	258,019	295,474	220,565	124,848	166,464	187,272	176,868	162,302	160,222	162,302	166,464	220,565	274,666	228,888	332,928	349,574	353,736
Moore	1,498,176	1,498,176	1,381,651	1,427,429	1,277,611	1,269,288	1,265,126	1,082,016	1,065,370	1,073,693	1,111,147	1,106,986	1,123,632	1,290,096	1,227,672	1,290,096	1,302,581
New Hanover																	
Orange			133	137				624	583	583	599	166,464	166	187	191	200	204
Pender	41,616	104,040	162,302	249,696	266,342	220,565	233,050	393,271	387,029	391,190	403,675	359,978	332,928	395,352	353,736	374,544	380,786
Randolph	1,914,336	1,955,952	1,589,731	1,664,640	1,668,802	1,585,570	1,273,450	1,485,691	1,464,883	1,477,368	1,531,469	1,456,560	1,456,560	1,581,408	1,602,216	1,685,448	1,702,094
Sampson	747,840	632,563	915,552	944,683	728,280	848,966	923,875	1,664,640	1,635,509	1,652,155	1,710,418	1,581,408	1,456,560	1,623,024	1,581,408	1,664,640	1,681,286
Total	**8,813,020**	**8,951,602**	**9,576,183**	**9,935,333**	**9,594,569**	**9,642,427**	**9,786,419**	**9,996,787**	**9,838,189**	**9,932,033**	**10,274,341**	**10,782,706**	**10,603,923**	**11,581,920**	**11,677,641**	**12,241,546**	**12,366,398**

***** Formula used to calculate the amount of PAN generated: lbs PAN/year = litter produced*(57.8/2). Assumptions: 57.8 lbs TN/ton of litter and 50% availability. Example calculation for Duplin 2021: 132,480*(57.8/2) = 3,828,672 lbs/year PAN.

The NCDA&CS produced *Figure 13* in preparation for management of potential avian influenza outbreak in 2015. The map (*Figure 13*) shows approximate locations of individual poultry farms. The densities and distribution of the farms in the Cape Fear River basin are consistent with the spatial distribution of the agricultural census derived poultry data. *Figure 13* was included in a report titled "A Comparison of PAN and P_2O_5 produced by Poultry, Swine and Cattle Operations in North Carolina." The report was published by DEQ in 2017.

Figure 13: North Carolina Rendering Plants, Landfills and Commercial Poultry Farms



Most poultry operations in North Carolina use a dry waste management system, and are therefore considered deemed permitted under current regulations (15A NCAC 02T .1303 and General Statute 143-215.10C). Operations that are deemed permitted have fewer animals than what the state requires to obtain a permit or they have a waste management system that does not require a state or federal permit. Under North Carolina Administrative Code (NCAC) 15A NCAC 02T .1303, "deemed permitted" is defined as "a facility that is considered to have a needed permit and to be in compliance with the permitting requirements of General Statute 143-215.1(a) even though it has not received an individual permit for its construction or operation." Because information about the location, number of animals, amount of waste produced or fields on which the dry litter or manure is applied is unknown, determining the extent of potential impacts from poultry waste or manure from deemed permitted operations to water quality is difficult to assess. In addition, information about agricultural operations is often restricted due to federal rules and regulations under the USDA.

Cattle and Cows

Table 9, *Figure 14* and *Figure 15* represent the numbers associated with cattle and dairy cows with inventory for each census year in counties with more than 45% land area in the Cape Fear River basin. The majority of operations in the basin fall below the animal threshold defined under North Carolina's General Statute 143-215.10B. Therefore, they are deemed permitted and not required to obtain a permit from DEQ.

The overall inventory for beef cattle and cows in the Cape Fear River basin has declined from 208,810 in 2007 to 174,225 in 2022 (*Table 9* and *Figure 15*). The 2022 Cattle inventory totals represents 24% of the NC statewide cattle inventory totals (718,631; *Table 1*). The total number of operations has also declined from 4,074 in 2007 to 3,316 in 2022. Randolph and Chatham counties had the highest number for all years with 43,848 in Randolph County and 30,497 in Chatham County in 2022 (42.67% of the basin total) (*Table 9*). For this report, the data item Cattle, including Calves was queried. *Figure 16* shows the geographic distribution of cattle and cows in the basin. The distribution is comparable to the distribution of permitted cattle operation shown in Chapter 1.

Table 9: USDA Beef Cattle and Dairy Cow (Including Calves) Inventory and Farm Operations 2007, 2012, 2017 and 2022

County	Operations (2007)	Inventory* (2007)	Operations (2012)	Inventory* (2012)	Operations (2017)	Inventory* (2017)	Operations (2022)		Inventory* (2022)	
							Total	%	Total	%
ALAMANCE	390	19,869	383	17,733	351	15,347	313	9.44	11,760	6.75
BLADEN	106	5,704	98	3,123	113	4,034	92	2.77	4,358	2.50
BRUNSWICK	61	2,254	68	1,851	71	1,370	56	1.69	1,676	0.96
CHATHAM	602	31,691	629	38,420	622	32,403	555	16.74	30,497	17.50
CUMBERLAND	91	3,805	100	2,912	92	3,004	85	2.56	2,818	1.62
DUPLIN	388	28,839	283	22,066	277	20,160	288	8.69	21,940	12.59
GUILFORD	347	13,160	378	14,861	332	10,535	248	7.48	9,980	5.73
HARNETT	204	7,088	235	6,997	239	6,497	185	5.58	4,822	2.77
LEE	108	3,452	101	3,842	114	3,244	88	2.65	2,166	1.24
MOORE	306	7,859	297	11,489	301	10,902	288	8.69	12,032	6.91
NEW HANOVER	NA	NA	2	(D)	1	(D)	1		(D)	
ORANGE	216	13,189	250	10,108	225	10,530	195	5.88	6,271	3.60
PENDER	70	1,970	85	2,214	75	2,866	66	1.99	3,047	1.75
RANDOLPH	822	40,563	875	45,481	803	41,671	650	19.60	43,848	25.17
SAMPSON	363	29,367	313	27,031	290	21,430	207	6.24	19,010	10.91
TOTAL CATTLE	**4,074**	**208,810**	**4,097**	**208,128**	**3,906**	**183,993**	**3,316**		**174,225**	

* Inventories are measured as of December 31st of the Census year.

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

NA - County information not provided by USDA NASS.

Figure 14: Total Number of Cattle and Dairy Farms and Inventory Reported in the Census of Agriculture 2007, 2012 2017 and 2022

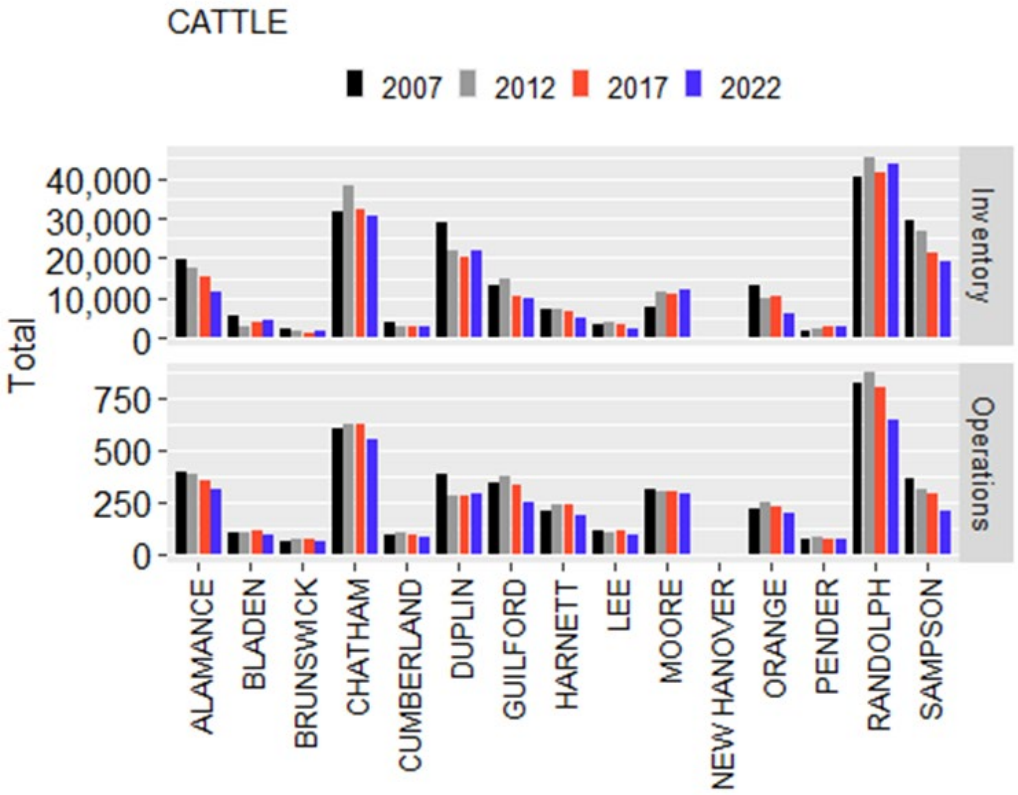


Figure 15: USDA Beef Cattle and Dairy Cows (Including Calves) Inventory and Farm Operations 2007, 2012, 2017 and 2022

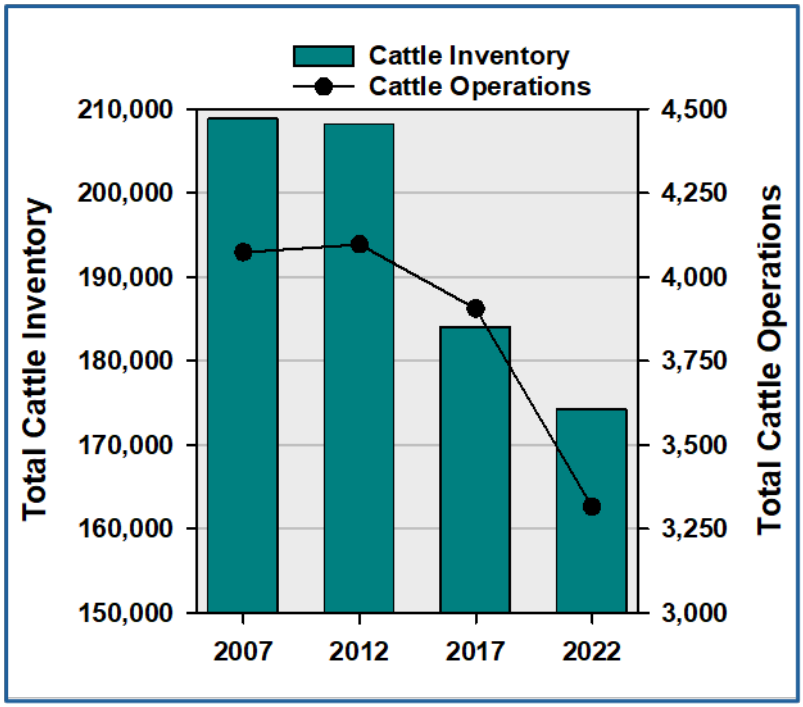
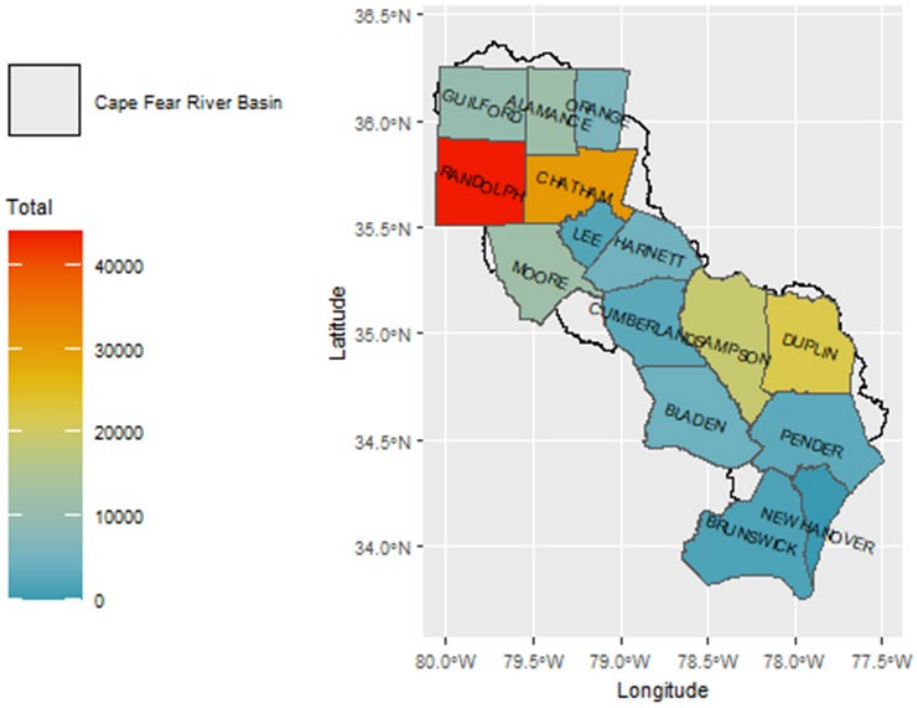


Figure 16: Geographic Distribution of Cattle and Cow Inventory in the Cape Fear River Basin (2022)



Swine/Hogs

Table 10 and *Figure 17* represent inventory numbers associated with swine operations in counties with more than 45% land area in the Cape Fear River basin. There are no new or expanding permitted swine (hog) operations in the basin. The changes in inventory and the numbers of farms reported are likely associated with farms that are below the animal threshold defined under North Carolina's General Statute 143-215.10B and are deemed permitted and farms that do not have inventory on their farm on December 31 of the reporting census year.

Swine Inventory

According to the USDA Census of Agriculture, the overall inventory for swine and the number of operations reporting swine in the Cape Fear River basin has fluctuated between 2007, 2012, 2017 and 2022, with 4.9 million total swine reported in inventory on December 31, 2022 (*Table 10* and *Figure 17*). The total swine inventory reported in 2022 represents 62% of the NC statewide total of 7.9 million head (*Table 1*). The total number of operations reporting inventory decrease from 1,185 farms in 2007 to 885 farms in 2022. Duplin and Sampson counties had the highest number for all years with a combined total of 3.7 million head in 2022, 76% of the total inventory reported in the Cape Fear River basin (*Table 10*) and 47% of the NC statewide inventory totals (*Table 1*). *Figure 18* shows the geographic distribution of hogs in the basin for 2022 inventory. The distribution is comparable to the distribution of Hog/Swine Operation permits and live weights shown in Chapter 1.

Swine Production

The overall swine production numbers and the number of operations under contract in the Cape Fear River basin dropped from the 2007 levels (19 million) but have remained fairly consistent, especially between 2017 (14.0 million) and 2022 (14.8 million) (*Table 11* and *Figure 19*). The total swine production numbers reported in 2022 of 14.8 million head represents 62% of the statewide total of 23.8 million head (*Table 11* and *Table 1*). Duplin and Sampson county production totals (11.7 million) account for 79% of the basinwide and 49% of the statewide production totals. The number of operations reporting swine contracts dropped from 848 in 2007 to 549 in 2022 (*Table 11* and *Figure 19*). *Figure 20* shows the geographic distribution of swine in the basin for 2022 production under contracts.

Table 10: Number of Swine (Hogs) Operations and Inventory Reported in the USDA Census of Agriculture 2007, 2012, 2017 and 2022

County	Operations (2007)	Inventory* (2007)	Operations (2012)	Inventory* (2012)	Operations (2017)	Inventory* (2017)	Operations (2022)		Inventory* (2022)	
							Total	%	Total	%
ALAMANCE	18	3,568	16	95	22	166	24	2.71	170	0.00
BLADEN	96	811,876	66	650,749	69	713,011	57	6.44	688,866	13.99
BRUNSWICK	42	78,491	15	75,150	23	76,368	17	1.92	55,316	1.12
CHATHAM	35	15,221	20	8,988	19	(D)	28	3.16	935	0.02
CUMBERLAND	36	118,867	21	119,242	42	103,041	19	2.15	86,251	1.75
DUPLIN	455	2,285,224	280	1,733,026	268	1,957,364	295	33.33	1,884,573	38.27
GUILFORD	19	9,266	29	14,502	10	4,198	5	0.56	3,027	0.06
HARNETT	24	66,492	30	73,979	56	82,592	40	4.52	83,539	1.70
LEE	13	4,244	4	(D)	8	(D)	17	1.92	430	0.01
MOORE	10	45,599	24	(D)	18	(D)	42	4.75	(D)	
NEW HANOVER	NA	NA	2	(D)	NA	NA	NA		NA	
ORANGE	26	(D)	24	5,126	35	(D)	32	3.62	439	0.01
PENDER	61	254,180	43	203,873	52	269,727	59	6.67	254,535	5.17
RANDOLPH	30	25,610	25	18,492	22	20,303	38	4.29	11,882	0.24
SAMPSON	320	2,156,254	218	1,858,801	266	1,884,585	212	23.95	1,854,202	37.66
TOTAL SWINE	**1,185**	**5,874,892**	**817**	**4,762,023**	**910**	**5,111,355**	**885**		**4,924,165**	

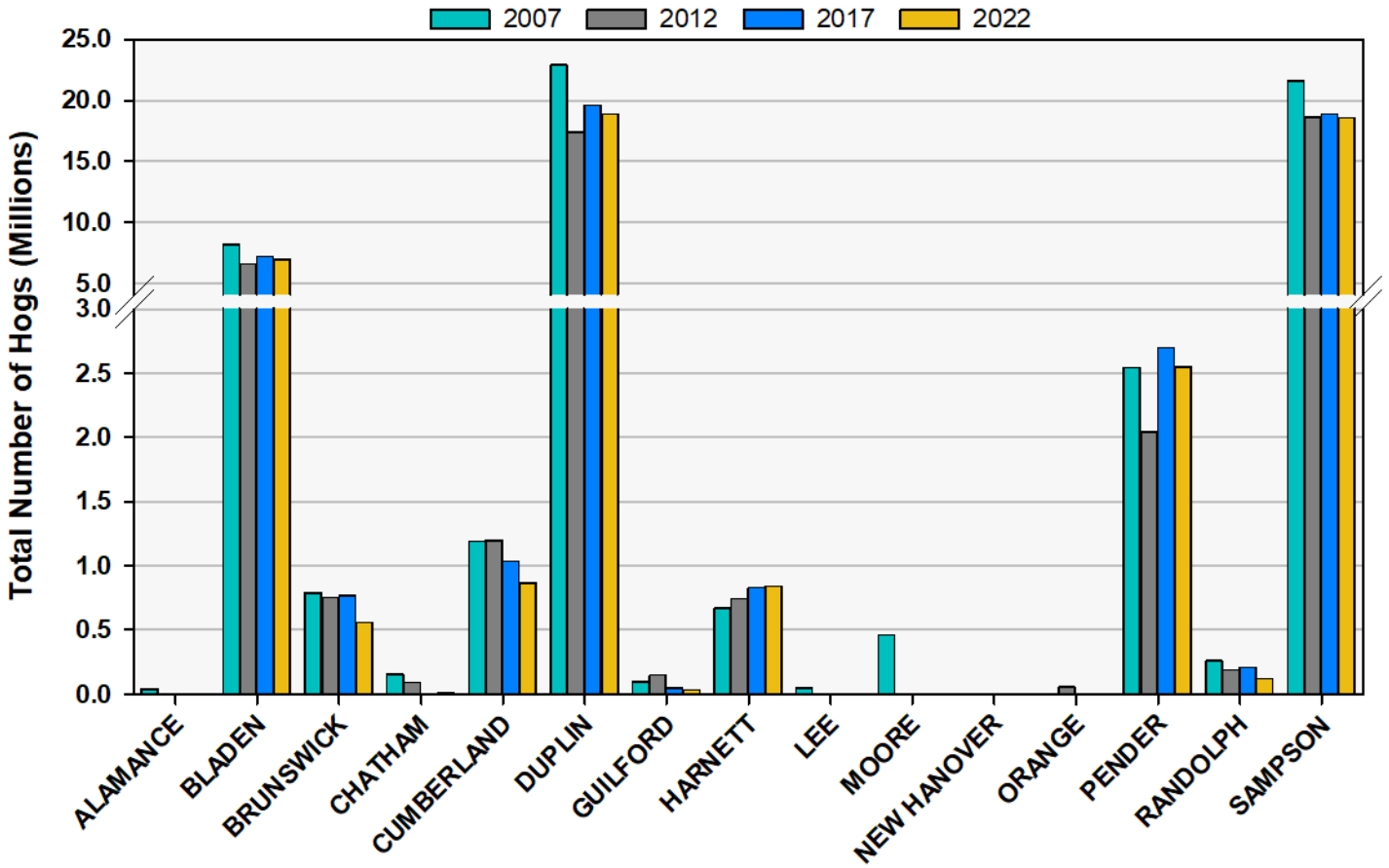
* Inventories are measured as of December 31st of the Census year.

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

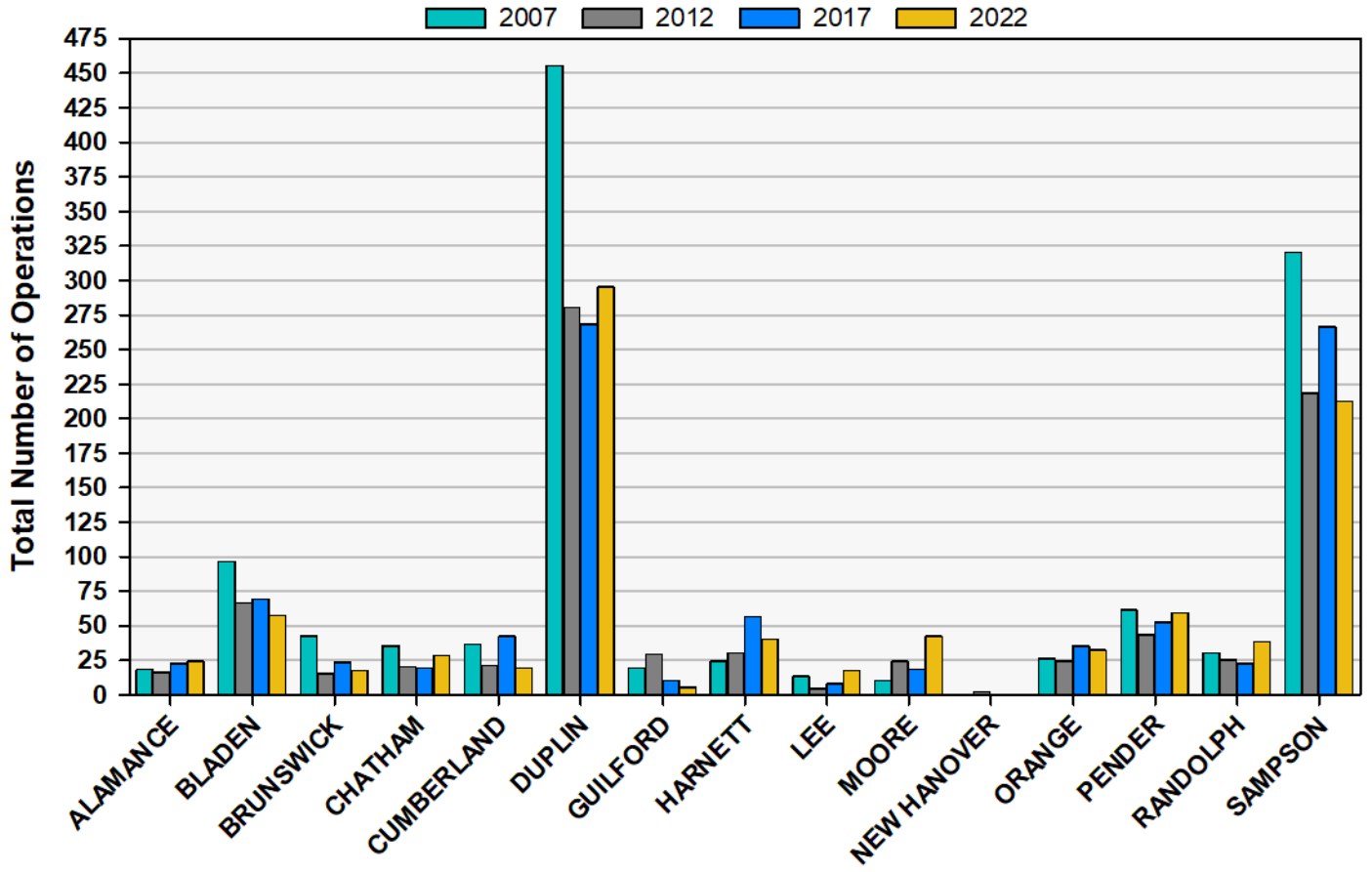
NA - County information not provided by USDA NASS.

Figure 17: USDA Total Number of Swine (Hogs) Inventory and Operations (2007-2022)

A) Inventory By County



B) Operation By County



C) Cape Fear River Basin – Total Hog/Swine Inventory and Operations Reported

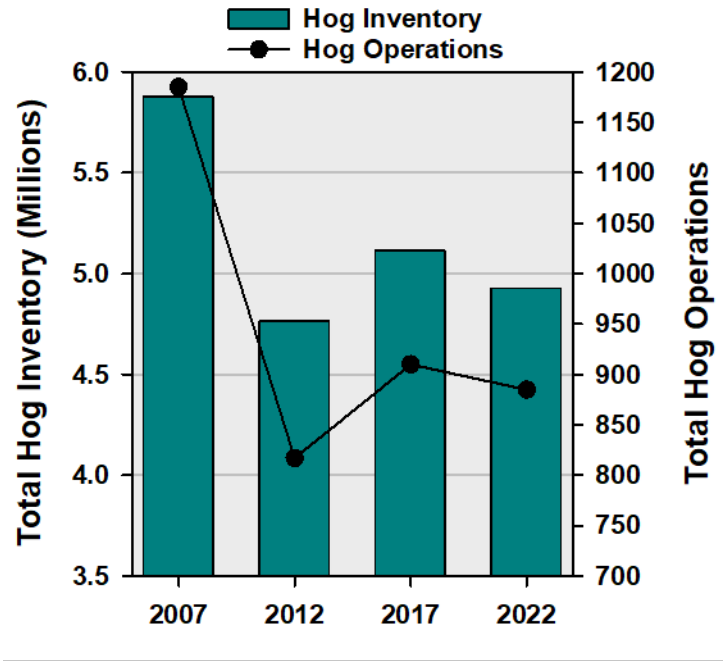


Figure 18: Geographic Distribution of Swine Inventory in the Cape Fear River Basin (USDA Census of Agriculture 2022)

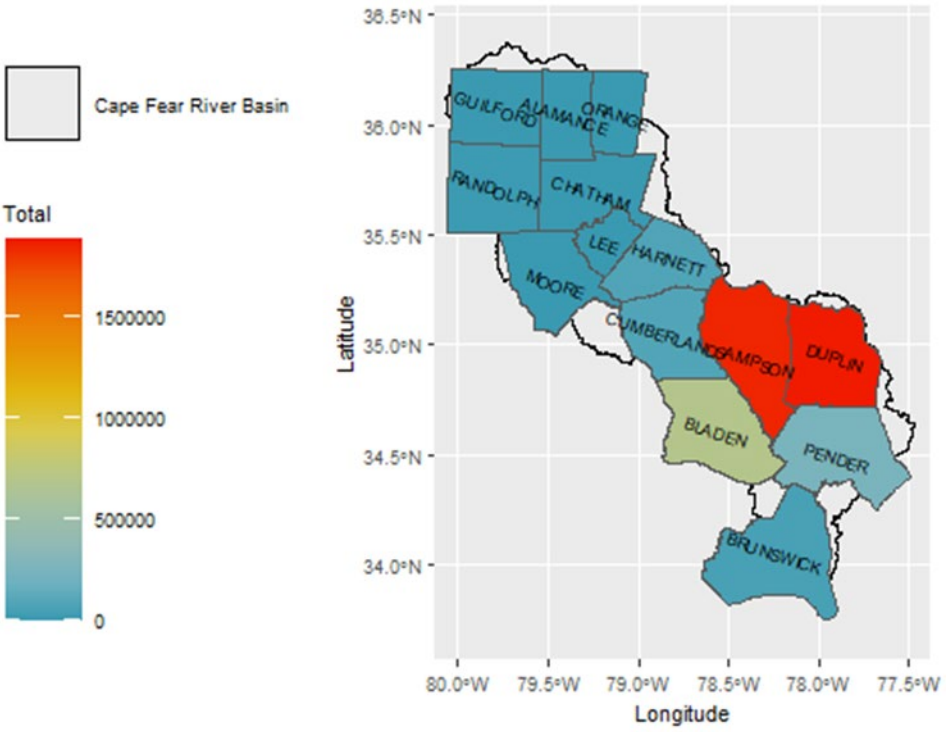


Table 11: Total Number of Swine (Hog) and Operations Under Production Contract Reported in the USDA Census of Agriculture 2007, 2012, 2017 and 2022

County	Operations (2007)	Production (2007)	Operations (2012)	Production (2012)	Operations (2017)	Production (2017)	Operations (2022)		Production (2022)	
							Total	%	Total	%
ALAMANCE	6	5,526	NA	NA	NA	NA	NA		NA	
BLADEN	68	2,331,559	44	1,611,542	51	1,948,480	49	8.93	1,616,584	10.95
BRUNSWICK	12	367,516	8	264,020	12	201,520	6	1.09	80,650	0.55
CHATHAM	1	(D)	2	(D)	(D)	(D)	2	0.36	(D)	
CUMBERLAND	29	546,410	14	485,672	9	415,068	10	1.82	396,260	2.69
DUPLIN	398	7,337,237	233	4,986,039	241	5,380,492	254	46.27	6,477,337	43.89
GUILFORD	3	27,620	8	38,970	2	(D)	1	0.18	(D)	
HARNETT	7	156,563	3	71,760	3	86,760	5	0.91	147,400	1.00
LEE	1	(D)	1	(D)	1	(D)	NA		NA	
MOORE	3	(D)	2	(D)	1	(D)	NA		NA	
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA		NA	
ORANGE	1	(D)	1	(D)	1	(D)	NA		NA	
PENDER	37	1,043,516	20	578,214	30	1,220,283	25	4.55	796,200	5.40
RANDOLPH	6	59,237	12	69,300	7	44,540	5	0.91	22,510	0.15
SAMPSON	276	7,177,565	179	4,467,515	220	4,703,185	192	34.97	5,220,132	35.37
TOTAL SWINE	**848**	**19,052,749**	**527**	**12,573,032**	**578**	**14,000,328**	**549**		**14,757,073**	

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

NA - County information not provided by USDA NASS.

Figure 19: Total Number of Swine/Hog Production: A) By County and B) By River Basin with Total Operations with Production Contracts

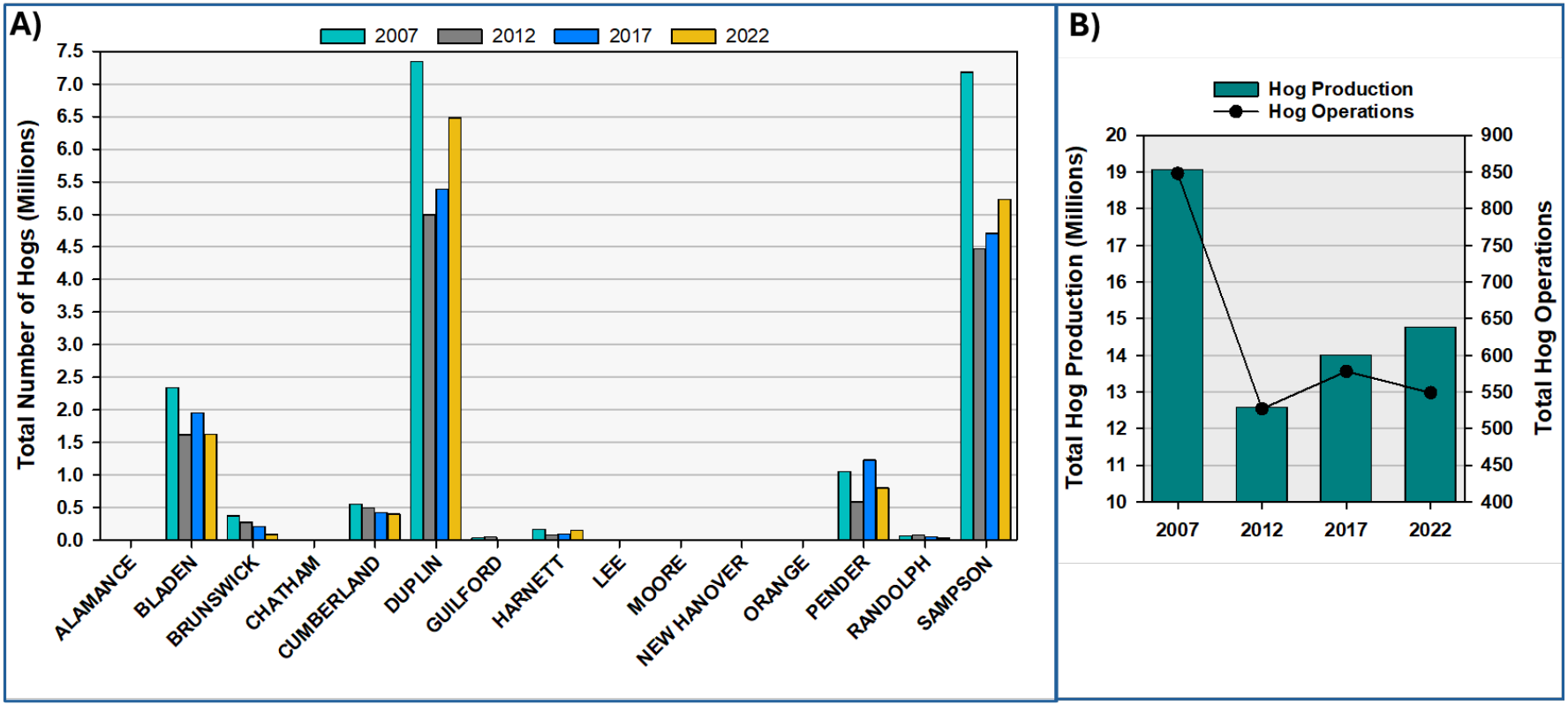
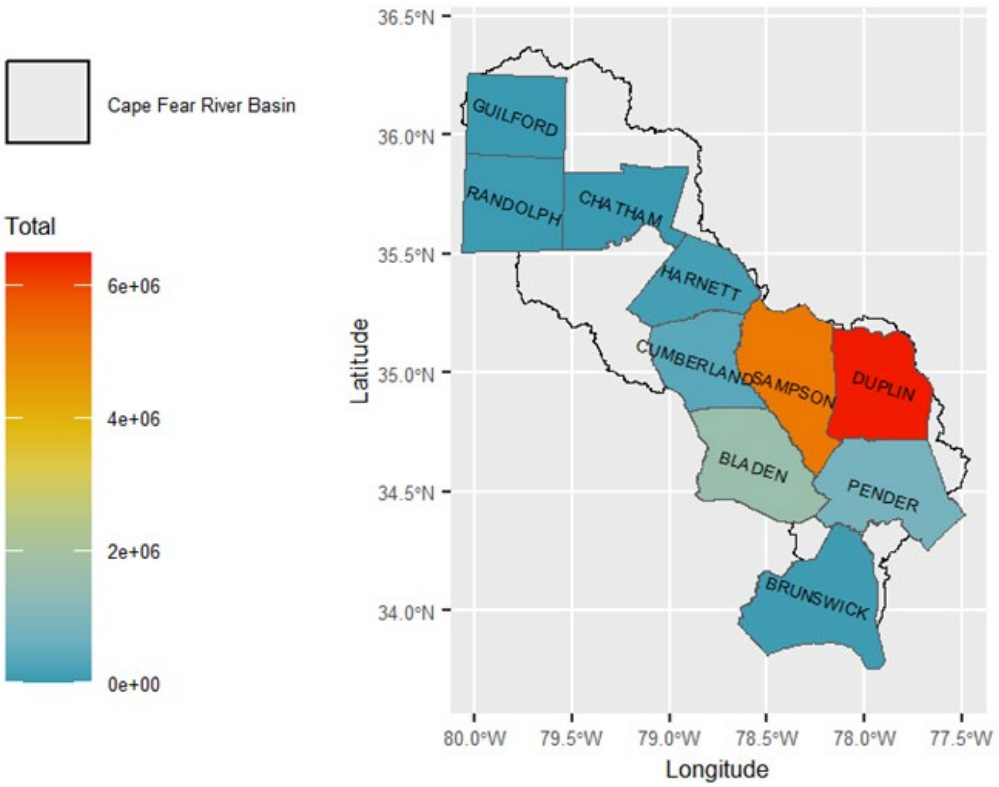


Figure 20: Geographic Distribution of the Total Number of Swine by County: Production (USDA Census of Agriculture 2022)



Crops and Treatments

In addition to animal operations, the Census of Agriculture was also queried for additional information related to the total number of farms, total number of acres farmed, crops grown, and treated (manure or chemical) acres. The information can be used to compare changes over time and help basin planners understand what types of agriculture operations exist in each of the counties located partially or entirely in the basin. *Table 13* and *Table 14* were queried using the filters shown in *Table 12*.

Table 12: USDA Query Filters for Farms, Farmed Acres, Crops Grown, and Acres Treated

SECTOR	GROUP	COMMODITY	CATEGORY/DATA ITEM
Demographics	Farms, Land & Assets	Ag Land	Area
Demographics	Farms, Land & Assets	Farm Operations	Farm Operations-Number Farm Operations-Acre
Crops	Field Crops	NA	NA
Environmental	Farms, Land & Assets	Ag Land	Treated

The total acreages farmed, and number of farming operations has declined since 2007. From 2007 to 2022, there was a 13% decline in farm operations and a 1.6% decline in total farmed acres (*Table 13* and *Figure 22*). There was a 0.5% decline between 2007 and 2017 which was fairly consistent with the 0.7% loss of agriculture land cover calculated for the 2001 to 2019 time period (Chapter 1). Sampson County, followed by Duplin County, have the highest acres of farmland, 292,205 acres and 254,164 acres, respectively. *Figure 23* shows the geographic distribution of the total farm acres in the basin.

Between 2007 and 2022, USDA NASS statistics showed that farm acreage declined in seven counties (Alamance, Cumberland, Lee, New Hanover, Orange, Randolph and Sampson); stayed roughly the same with less than 5% change in four counties (Brunswick, Duplin, Guilford and Harnett); and increased in four counties (Bladen, Chatham, Moore and Pender) (*Table 14*). Acreage wise, Alamance, Cumberland, and Sampson counties declined the most (by more than 19,000 acres) between 2007 to 2022. New Hanover County, which had the least farmed acreage in 2007 (4,416 acres), had the greatest percent decrease in the number of acres farmed (57%) to 1,898 acres in 2022. Moore County reported the largest increase in farm acreage (26,183) with an increase of 32.7%.

Crops, including corn, cotton, hay & haylage, soybeans, tobacco, and wheat, are summarized in *Table 13* and listed by county in *Table 14*. Of these crops, soybeans had the greatest acreage, 242,647 acres, and had increased through 2017 (*Figure 21*), while the other crops have fluctuated. *Figure 23* to *Figure 29* shows the geographic distribution of these six crops in the basin.

The USDA statistical data indicates that farm acres treated with fertilizer in counties with greater than 45% land area in the basin decreased by 20% between 2007 to 2022. Farm acres treated with manure decreased by 14% (*Table 13*, *Table 14* and *Figure 22*). Manure is treated as a separate fertilizer type because application rates of manure are often based on crop nitrogen needs. Consistent manure application at agronomic rates based on plant available nitrogen needs can often result in a buildup of phosphorus in soils over time since a greater portion of plant available phosphorus can be found in animal

waste compared to plant available nitrogen[2]. *Figure 30* and *Figure 31* shows the geographic distribution of the farm acres that utilized fertilizer and specifically manure fertilizer in the basin.

Table 13: Total number of farms, crops and treatments for counties with more than 45% land cover in the Cape Fear River basin

DATA ITEM	Number of Operations				Number of Acres			
	2007	2012	2017	2022	2007	2012	2017	2022
TOTAL FARM OPERATIONS	10,769	10,251	9,624	9,362	1,619,081	1,567,174	1,611,622	1,593,062
ANIMALS	**Number of Operations**				**Inventory**			
TOTAL CATTLE	4,074	4,097	3,906	3,316	208,810	208,128	183,993	174,225
TOTAL HOGS/SWINE	1,185	817	910	885	5,874,892	4,762,023	5,111,355	4,924,165
TOTAL TURKEYS	326	310	249	284	9,129,571	10,023,276	7,328,558	6,430,041
TOTAL CHICKENS[1]	1,506	1,727	2,086	2,464	53,361,938	47,429,276	54,286,271	75,983,865
CROP/COMMODITY	**Number of Operations**				**Number of Acres**			
TOTAL CORN	1,790	1,309	1,125	1,089	205,925	141,780	157,949	162,438
TOTAL COTTON	148	197	94	108	47,410	65,766	27,660	35,190
TOTAL HAY & HAYLAGE	3,855	3,830	3,658	3,236	161,363	144,670	143,715	139,216
TOTAL SOYBEANS	1,515	1,510	1,364	1,088	206,525	223,484	258,144	242,647
TOTAL TOBACCO	508	338	287	181	37,538	32,801	35,422	23,958
TOTAL WHEAT	594	886	458	430	69,293	119,416	55,168	65,414
FERTILIZER TREATMENT	**Number of Operations**				**Number of Acres**			
TOTAL FERTILIZER: (TOTAL)	5,781	4,762	4,657	4,053	648,453	559,268	573,522	516,050
TOTAL FERTILIZER: (MANURE)	2,303	1,823	1,940	1,758	141,868	127,374	115,665	121,551

[1] Poultry Inventory includes broilers, pullets, layers, and roosters.

[2] North Carolina Department of Agriculture & Consumer Services (NCDA&CS), Division of Soil and Water Conservation (DSWC), Allie Dinwiddie, NPS Planning Coordinator, Public Comments, received via email March 21, 2022.

Figure 21: Total crop acres for counties with more than 45% land cover in the Cape Fear River basin

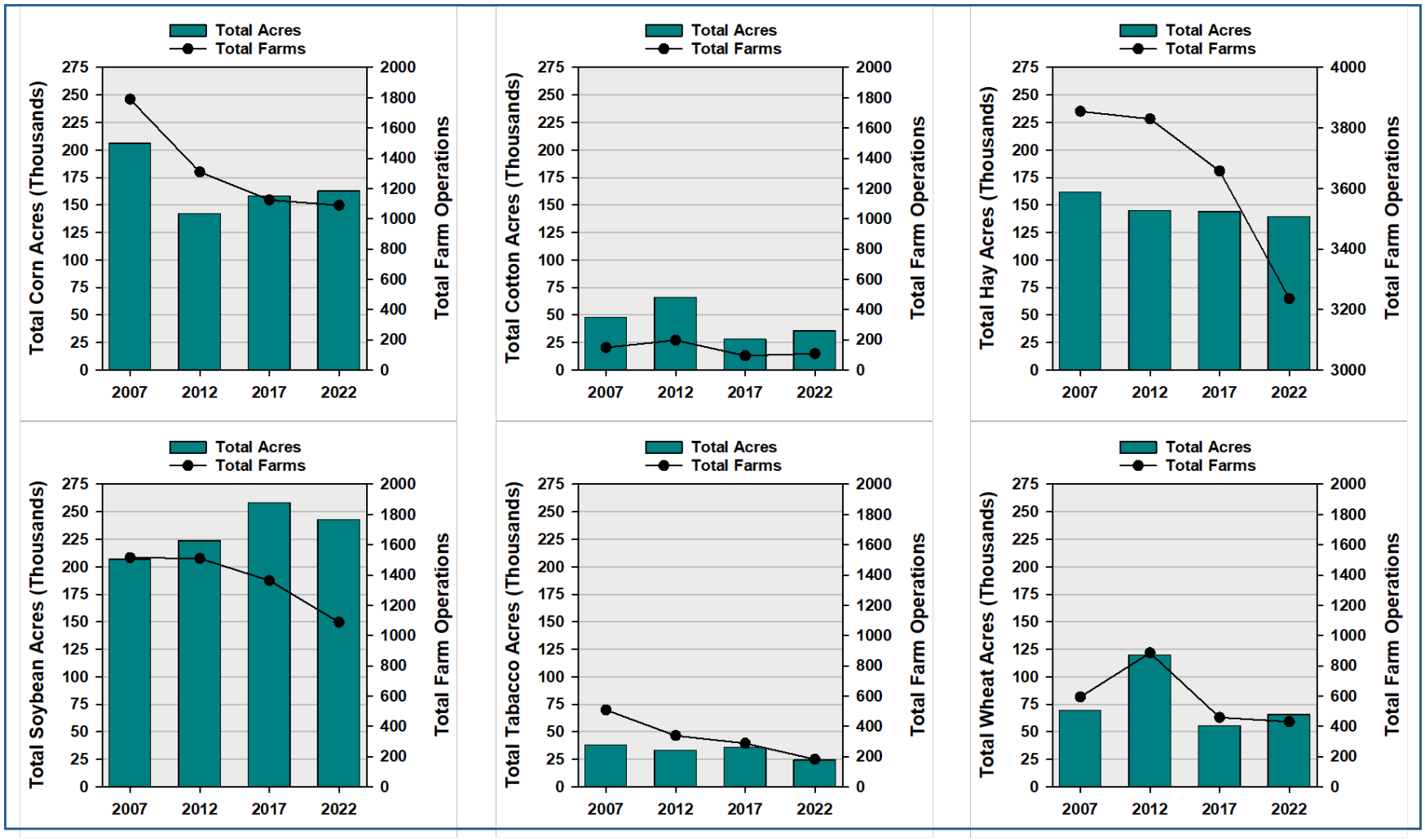


Figure 22: Total Farm and Total Fertilizer Acres for Counties with More than 45% Land Cover in the Cape Fear River Basin

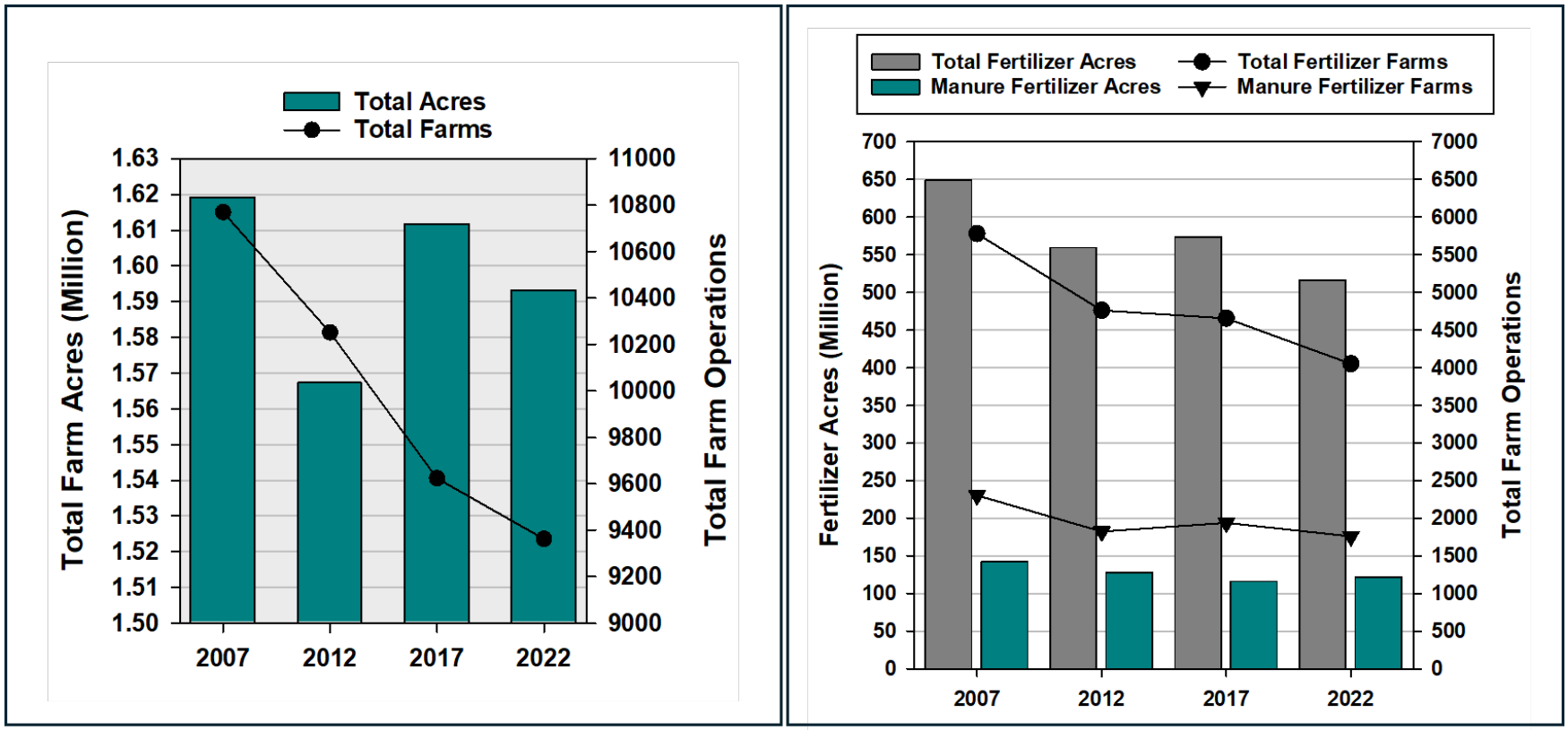


Table 14: Number of Farms, Crops and Treatment by County as Reported in the 2022 USDA Census of Agriculture. Includes Change in the Number of Acres and Percent Change in Acres Between the 2007 and 2022 Census.

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
TOTAL FARM OPERATIONS										
ALAMANCE	753	87,888	732	83,551	720	80,042	724	68,769	-19,119	-21.75
BLADEN	500	127,171	492	117,323	512	180,340	423	146,195	19,024	14.96
BRUNSWICK	264	44,084	254	45,442	231	44,693	238	45,150	1,066	2.42
CHATHAM	1,089	104,171	1,138	111,778	1,116	105,995	1,076	114,051	9,880	9.48
CUMBERLAND	500	88,353	389	82,317	336	65,995	327	65,919	-22,434	-25.39
DUPLIN	1,159	248,026	940	230,925	820	243,098	949	254,164	6,138	2.47
GUILFORD	963	96,519	962	90,750	854	76,352	775	94,798	-1,721	-1.78
HARNETT	727	111,770	797	119,775	643	106,262	563	109,179	-2,591	-2.32
LEE	272	36,210	246	39,081	250	35,170	264	31,204	-5,006	-13.82
MOORE	804	80,075	718	82,462	733	89,375	802	106,258	26,183	32.70
NEW HANOVER	73	4,416	50	2,881	59	879	60	1,898	-2,518	-57.02
ORANGE	604	60,057	645	56,666	686	69,908	687	53,068	-6,989	-11.64
PENDER	357	61,571	335	55,775	336	64,484	354	78,903	17,332	28.15
RANDOLPH	1,501	147,316	1,486	156,813	1,368	147,781	1,238	131,301	-16,015	-10.87
SAMPSON	1,203	321,454	1,067	291,635	960	301,248	882	292,205	-29,249	-9.10
TOTAL FARM OPERATIONS	**10,769**	**1,619,081**	**10,251**	**1,567,174**	**9,624**	**1,611,622**	**9,362**	**1,593,062**	**-26,019**	**-1.61**
CORN										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	72	4,932	52	3,743	50	4,280	30	1,856	-3,076	-62.37
BLADEN	167	25,831	107	17,132	116	20,725	84	18,477	-7,354	-28.47
BRUNSWICK	79	9,121	57	8,725	56	8,505	29	9,166	45	0.49
CHATHAM	35	2,447	40	2,518	24	2,258	31	3,228	781	31.92
CUMBERLAND	91	8,792	51	8,935	42	6,721	40	7,285	-1,507	-17.14

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
DUPLIN	404	61,555	279	36,864	235	39,246	241	44,205	-17,350	-28.19
GUILFORD	95	5,617	91	5,722	74	3,806	63	4,712	-905	-16.11
HARNETT	122	7,910	58	4,671	30	3,578	56	7,768	-142	-1.80
LEE	39	1,653	20	1,044	14	1,106	25	2,103	450	27.22
MOORE	61	1,736	41	1,176	45	1,803	60	3,157	1,421	81.85
NEW HANOVER	8	1,281	4	342	NA	NA	4	529	-752	-58.70
ORANGE	38	3,640	33	2,689	40	4,304	27	2,887	-753	-20.69
PENDER	72	12,785	74	8,538	54	11,638	61	10,910	-1,875	-14.67
RANDOLPH	138	10,117	157	10,306	126	13,200	120	13,362	3,245	32.07
SAMPSON	369	48,508	245	29,375	219	36,779	218	32,793	-15,715	-32.40
TOTAL CORN	**1,790**	**205,925**	**1,309**	**141,780**	**1,125**	**157,949**	**1,089**	**162,438**	**-43,487**	**-21.12**
COTTON										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	NA	NA	NA	NA	NA	NA	NA	NA		
BLADEN	7	2,282	11	2,458	7	900	1	(D)		
BRUNSWICK	NA	NA	3	750	1	(D)	1	(D		
CHATHAM	NA	NA	NA	NA	NA	NA	2	(D)		
CUMBERLAND	14	4,978	13	5,949	8	3,314	7	3,499	-1,479	-29.71
DUPLIN	17	4,467	29	12,777	13	5,683	18	3,370	-1,097	-24.56
GUILFORD	NA	NA	5	115	NA	NA	NA	NA		
HARNETT	28	12,896	55	20,905	25	6,602	29	9,989		
LEE	3	345	4	1,240	NA	NA	3	(D)		
MOORE	NA	NA	NA	NA	2	(D)	NA	NA		
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA	NA		
ORANGE	NA	NA	NA	NA	NA	NA	NA	NA		
PENDER	2	(D)	1	(D)	1	(D)	4	4,100		
RANDOLPH	NA	NA	NA	NA	1	(D)	NA	NA		

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
SAMPSON	77	22,442	76	21,572	36	11,161	43	14,232	-8,210	-36.58
TOTAL COTTON	**148**	**47,410**	**197**	**65,766**	**94**	**27,660**	**108**	**35,190**	**-12,220**	**-25.78**
HAY & HAYLAGE										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	347	15,841	376	14,751	337	14,594	293	12,181	-3,660	-23.10
BLADEN	104	5,246	83	3,897	100	4,130	111	4,583	-663	-12.64
BRUNSWICK	54	2,152	43	1,405	55	1,701	48	2,350	198	9.20
CHATHAM	461	17,169	452	15,332	500	19,035	449	18,288	1,119	6.52
CUMBERLAND	113	4,303	97	3,956	77	3,622	65	2,969	-1,334	-31.00
DUPLIN	375	22,044	287	18,284	248	17,307	294	21,454	-590	-2.68
GUILFORD	447	14,775	471	12,977	434	12,740	355	12,603	-2,172	-14.70
HARNETT	213	6,534	206	5,539	177	4,620	176	4,715	-1,819	-27.84
LEE	72	2,922	64	2,317	97	2,862	74	2,131	-791	-27.07
MOORE	281	6,195	285	7,379	230	6,706	231	7,930	1,735	28.01
NEW HANOVER	2	(D)	NA	NA	NA	NA	NA	NA		
ORANGE	276	11,611	314	10,993	337	12,097	252	8,330	-3,281	-28.26
PENDER	45	1,735	62	1,889	40	3,209	34	1,349	-386	-22.25
RANDOLPH	696	21,846	781	25,614	715	22,682	601	21,630	-216	-0.99
SAMPSON	369	28,990	309	20,337	311	18,410	253	18,703	-10,287	-35.48
TOTAL HAY & HAYLAGE	**3,855**	**161,363**	**3,830**	**144,670**	**3,658**	**143,715**	**3,236**	**139,216**	**-22,147**	**-13.72**
SOYBEANS										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	47	2,944	41	4,547	37	3,527	33	4,308	1,364	46.33
BLADEN	104	15,020	101	10,831	96	18,396	72	11,599	-3,421	-22.78

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
BRUNSWICK	49	10,997	47	10,610	52	9,225	35	10,757	-240	-2.18
CHATHAM	17	1,307	21	1,717	16	3,208	19	4,127	2,820	215.76
CUMBERLAND	97	12,255	84	15,449	55	13,438	53	12,712	457	3.73
DUPLIN	342	42,435	316	53,337	315	60,042	280	60,290	17,855	42.08
GUILFORD	77	9,031	96	10,189	71	9,806	70	8,446	-585	-6.48
HARNETT	157	26,296	146	24,700	141	28,475	89	25,421	-875	-3.33
LEE	44	6,308	27	4,755	21	7,125	14	4,151	-2,157	-34.19
MOORE	34	4,741	24	2,582	30	4,917	20	4,844	103	2.17
NEW HANOVER	5	967	5	346	NA	NA	4	166	-801	-82.83
ORANGE	19	2,566	24	2,144	36	4,844	16	3,266	700	27.28
PENDER	52	11,615	52	11,378	49	13,520	45	17,634	6,019	51.82
RANDOLPH	66	8,321	127	12,385	127	14,242	77	10,156	1,835	22.05
SAMPSON	405	51,722	399	58,514	318	67,379	261	64,770	13,048	25.23
TOTAL SOYBEANS	**1,515**	**206,525**	**1,510**	**223,484**	**1,364**	**258,144**	**1,088**	**242,647**	**36,122**	**17.49**
TOBACCO										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	37	1,605	23	1,001	20	1,525	6	511	-1,094	-68.16
BLADEN	14	1,070	8	361	2	(D)	6	207	-863	-80.65
BRUNSWICK	13	862	4	250	2	(D)	NA	NA		
CHATHAM	3	378	2	NA	5	690	3	792	414	109.52
CUMBERLAND	24	3,071	15	2,670	11	2,123	7	643	-2,428	-79.06
DUPLIN	78	6,082	38	3,604	22	2,562	15	1,457	-4,625	-76.04
GUILFORD	44	2,072	42	2,007	41	2,367	19	1,181	-891	-43.00
HARNETT	66	6,175	67	7,129	51	8,821	43	7,368	1,193	19.32
LEE	33	2,012	20	2,489	17	3,007	7	1,755	-257	-12.77
MOORE	31	1,433	17	1,229	21	2,036	14	1,542	109	7.61

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA	NA		
ORANGE	18	373	14	422	24	1,101	10	184	-189	-50.67
PENDER	9	631	3	157	2	(D)	1	(D)		
RANDOLPH	21	911	12	811	6	745	6	275	-636	-69.81
SAMPSON	117	10,863	73	10,671	63	10,445	44	8,043	-2,820	-25.96
TOTAL TOBACCO	**508**	**37,538**	**338**	**32,801**	**287**	**35,422**	**181**	**23,958**	**-13,580**	**-36.18**
WHEAT										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	49	2,427	42	3,789	27	1,060	39	1,692	-735	-30.28
BLADEN	32	4,327	42	5,074	18	2,753	24	3,310	-1,017	-23.50
BRUNSWICK	3	(D)	22	4,686	10	190	3	960		
CHATHAM	16	1,043	10	982	13	1,290	10	1,188	145	13.90
CUMBERLAND	27	2,307	37	6,838	20	3,552	19	3,923	1,616	70.05
DUPLIN	103	17,502	181	32,611	86	12,234	85	15,453	-2,049	-11.71
GUILFORD	65	5,603	104	5,256	44	4,544	50	4,657	-946	-16.88
HARNETT	46	5,951	69	8,625	31	5,262	34	6,944	993	16.69
LEE	7	1,025	10	1,622	5	817	4	1,300	275	26.83
MOORE	12	1,088	15	1,559	11	1,047	14	2,203	1,115	102.48
NEW HANOVER	NA	NA	NA	NA	NA	NA	NA	NA		
ORANGE	19	2,396	26	1,762	23	2,198	19	560	-1,836	-76.63
PENDER	19	3,185	27	4,328	14	2,673	13	4,493	1,308	41.07
RANDOLPH	40	2,376	78	7,381	51	3,492	50	4,769	2,393	100.72
SAMPSON	156	20,063	223	34,903	105	14,056	66	13,962	-6,101	-30.41
TOTAL WHEAT	**594**	**69,293**	**886**	**119,416**	**458**	**55,168**	**430**	**65,414**	**-3,879**	**-5.60**

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
FERTILIZER: MANURE										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	118	5,250	105	4,462	126	5,258	97	3,299	-1,951	-37.16
BLADEN	40	5,566	46	2,178	40	3,412	57	7,126	1,560	28.03
BRUNSWICK	20	1,030	24	1,120	36	1,119	17	459	-571	-55.44
CHATHAM	283	15,222	200	11,024	253	11,769	231	13,786	-1,436	-9.43
CUMBERLAND	50	3,047	46	4,030	58	2,930	42	1,721	-1,326	-43.52
DUPLIN	295	26,102	231	30,156	207	17,171	225	24,921	-1,181	-4.52
GUILFORD	139	3,304	145	3,932	97	2,701	120	5,465	2,161	65.41
HARNETT	145	9,280	117	7,201	97	7,400	55	5,353	-3,927	-42.32
LEE	80	2,623	42	2,405	58	2,547	37	1,081	-1,542	-58.79
MOORE	219	9,597	178	9,781	215	11,530	201	9,699	102	1.06
NEW HANOVER	4	56	7	292	11	138	12	313	257	458.93
ORANGE	119	2,602	104	2,316	167	4,886	106	1,529	-1,073	-41.24
PENDER	68	3,113	37	1,959	38	2,750	39	5,752	2,639	84.77
RANDOLPH	419	22,262	331	20,677	303	23,810	362	23,507	1,245	5.59
SAMPSON	304	32,814	210	25,841	234	18,244	157	17,540	-15,274	-46.55
TOTAL FERTILIZER: (MANURE)	**2,303**	**141,868**	**1,823**	**127,374**	**1,940**	**115,665**	**1,758**	**121,551**	**-20,317**	**-14.32**
FERTILIZER: TOTAL										
County	**Operations (2007)**	**Acres (2007)**	**Operations (2012)**	**Acres (2012)**	**Operations (2017)**	**Acres (2017)**	**Operations (2022)**	**Acres (2022)**	**Change in Acres 2007 to 2022**	**% Change in Acres 2007 to 2022**
ALAMANCE	449	28,926	376	26,077	349	22,581	327	16,461	-12,465	-43.09
BLADEN	280	52,681	272	39,724	282	51,497	203	37,452	-15,229	-28.91
BRUNSWICK	166	22,519	128	21,664	120	19,247	99	19,581	-2,938	-13.05
CHATHAM	465	23,483	429	21,784	498	26,411	359	26,327	2,844	12.11

County	Operations (2007)	Acres (2007)	Operations (2012)	Acres (2012)	Operations (2017)	Acres (2017)	Operations (2022)	Acres (2022)	Change in Acres 2007 to 2022	% Change in Acres 2007 to 2022
CUMBERLAND	248	36,481	169	34,356	139	25,590	146	24,797	-11,684	-32.03
DUPLIN	626	122,359	465	104,518	391	91,929	429	90,857	-31,502	-25.75
GUILFORD	599	35,761	500	30,581	500	30,485	418	26,535	-9,226	-25.80
HARNETT	428	55,448	355	57,759	280	45,529	284	48,555	-6,893	-12.43
LEE	149	15,080	120	9,499	116	11,429	101	8,524	-6,556	-43.47
MOORE	369	14,748	297	12,105	314	16,453	338	20,307	5,559	37.69
NEW HANOVER	36	1,900	25	735	20	160	23	813	-1,087	-57.21
ORANGE	340	19,643	305	14,867	354	22,291	310	11,006	-8,637	-43.97
PENDER	176	26,109	155	17,846	132	24,301	132	30,069	3,960	15.17
RANDOLPH	741	40,379	590	36,196	647	44,770	470	35,750	-4,629	-11.46
SAMPSON	709	152,936	576	131,557	515	140,849	414	119,016	-33,920	-22.18
TOTAL FERTILIZER (TOTAL)	**5,781**	**648,453**	**4,762**	**559,268**	**4,657**	**573,522**	**4,053**	**516,050**	**-132,403**	**-20.42**

* Inventories are measured as of December 31st of the Census year. Numbers reported here include broilers, layers, pullets, and roosters.

(D) – Indicates that numbers are withheld to avoid disclosing data for individual farms.

NA - County information not provided by USDA NASS.

Figure 23: Geographic Distribution of Total Farm Acres in the Cape Fear River Basin (USDA Census of Agriculture 2022)

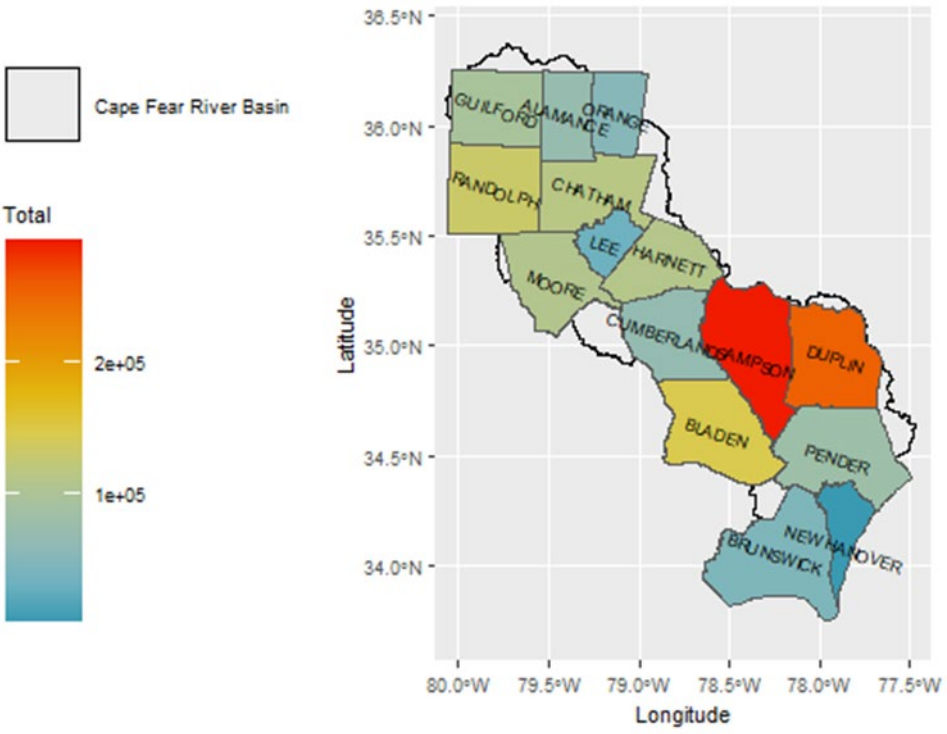


Figure 24: Geographic Distribution of Acres of Corn in the Cape Fear River Basin (USDA Census of Agriculture 2022)

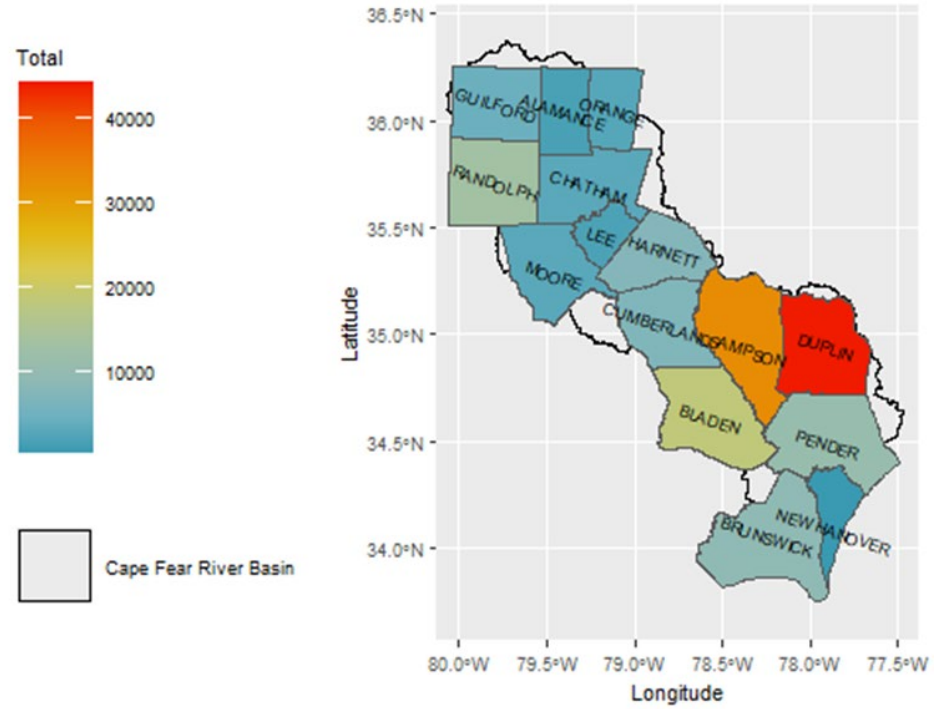


Figure 25: Geographic Distribution of Acres of Cotton in the Cape Fear River Basin (USDA Census of Agriculture 2022)

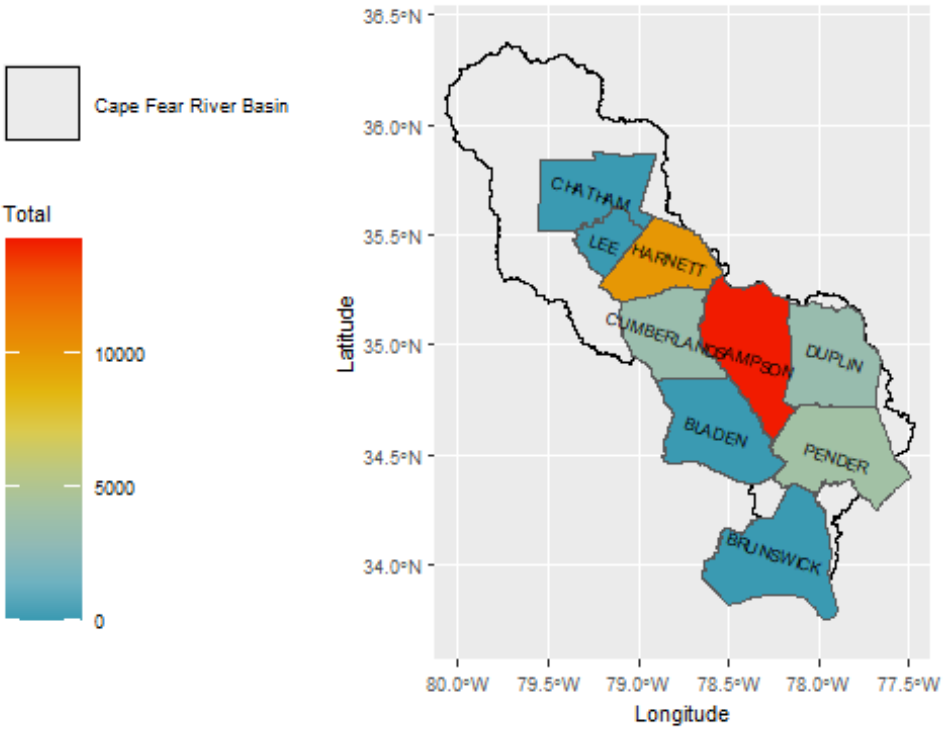


Figure 26: Geographic Distribution of Hay & Haylage in the Cape Fear River Basin (USDA Census of Agriculture 2022)

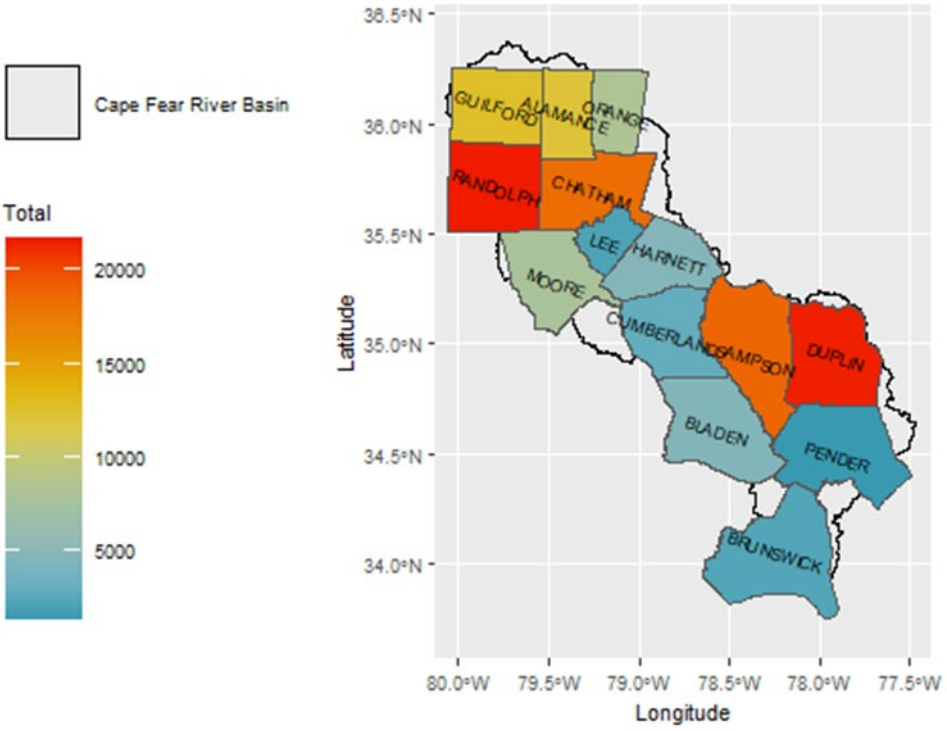


Figure 27: Geographic Distribution of Acres of Soybeans in the Cape Fear River Basin (USDA Census of Agriculture 2022)

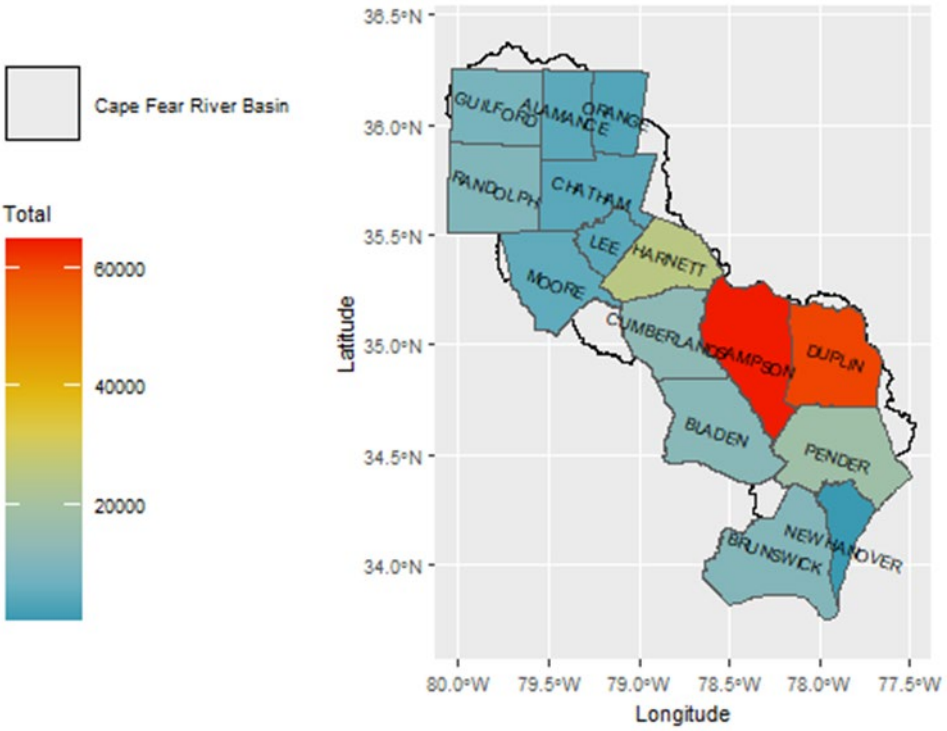


Figure 28: Geographic Distribution of Acres of Tobacco in the Cape Fear River Basin (USDA Census of Agriculture 2022)

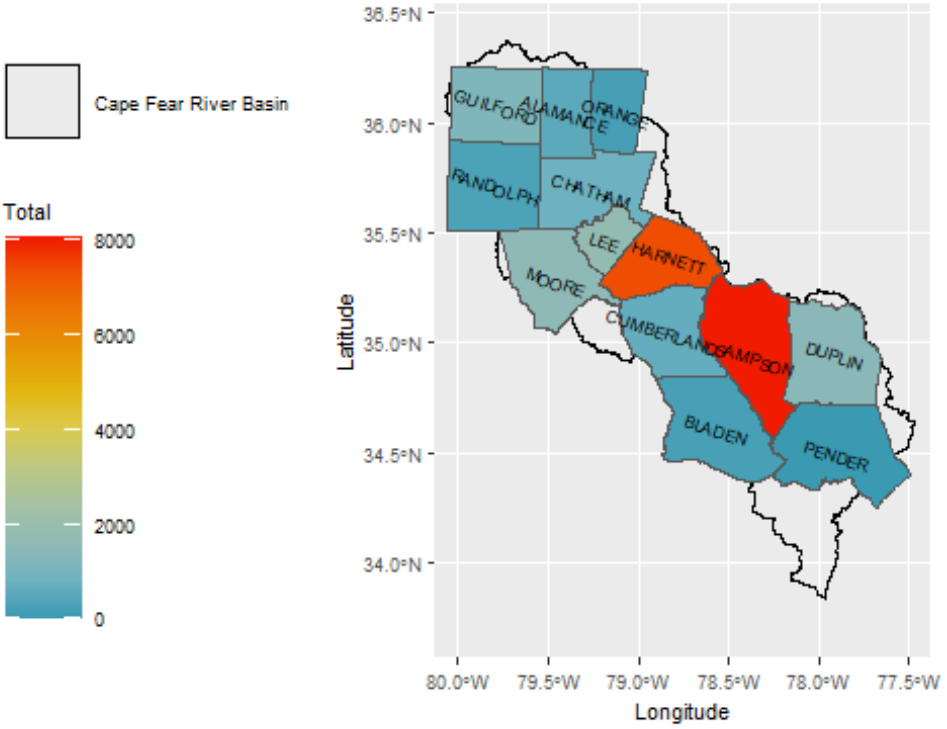


Figure 29: Geographic Distribution of Acres of Wheat in the Cape Fear River Basin (USDA Census of Agriculture 2022)

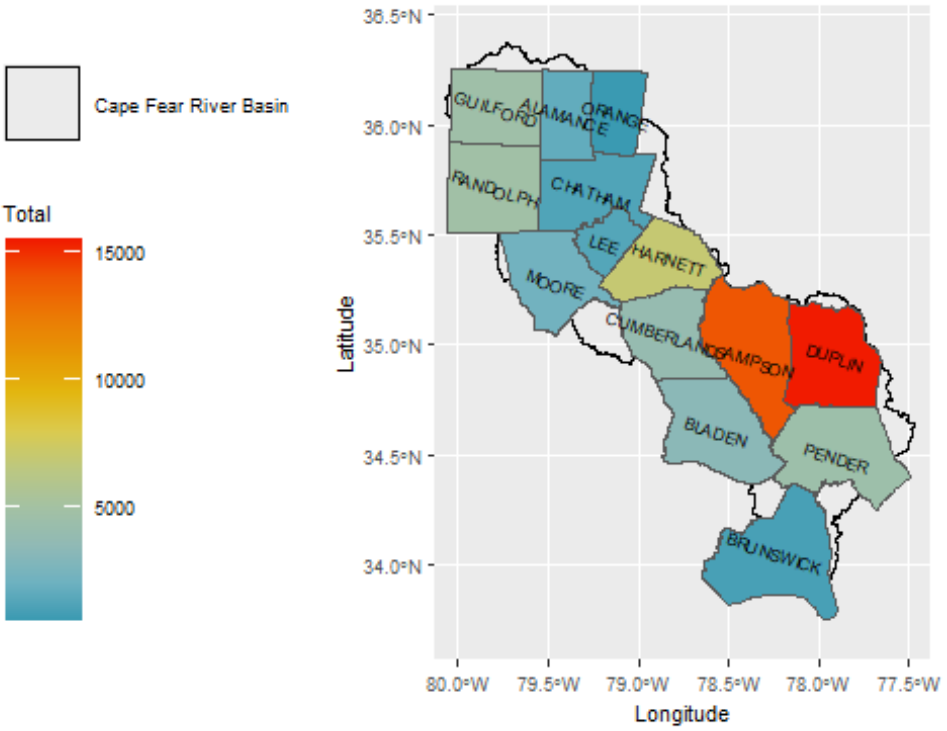


Figure 30: Geographic Distribution of Acres of Fertilizer-Manure in the Cape Fear River Basin (USDA Census of Agriculture 2022)

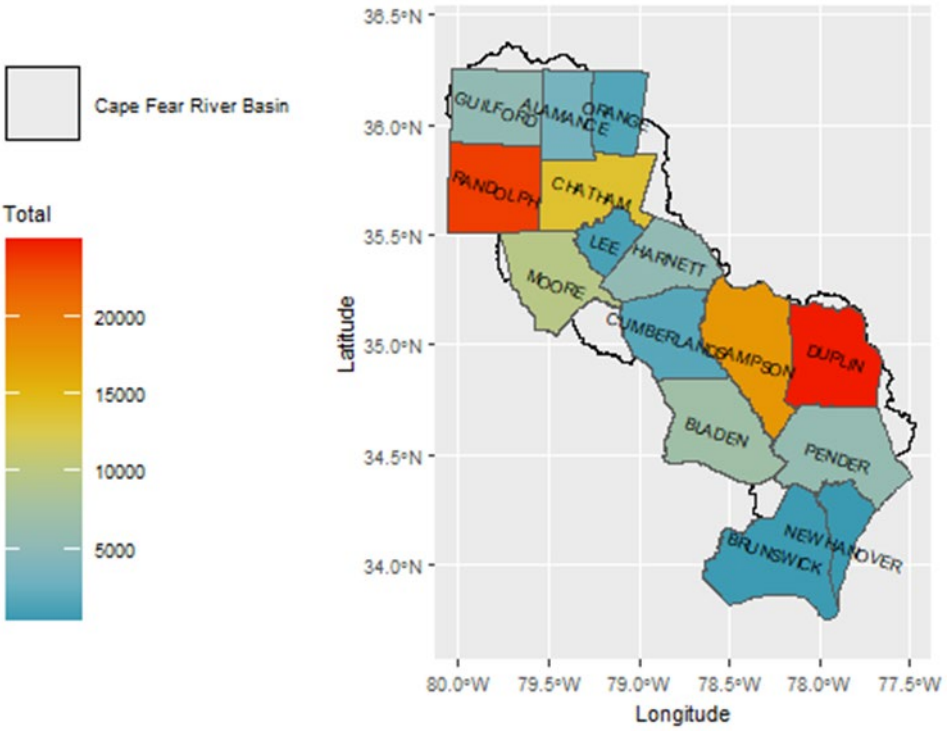


Figure 31: Geographic Distribution of Acres of Total Fertilizer in the Cape Fear River Basin (USDA Census of Agriculture 2022)