

Chapter 9

Agriculture and Water Quality

9.1 Animal Operations

Over the years, key legislative bills were introduced and approved to regulate concentrated animal feeding operations (CAFOs) in the State of North Carolina. In May 2006, the Environmental Management Commission (EMC) adopted Title 15A Subchapter 02T. The rules reflect current policy and provide routine consideration of an applicant's compliance status. Section .1300 of Subchapter 02T applies to all persons proposing to construct, modify, expand or operate an animal waste management system. Animal waste is defined as livestock or poultry excreta or mixture of excreta with feed, litter, bedding or other material generated at a feedlot. Animal waste management systems are defined as a combination of structural and nonstructural practices that collect, treat, store or apply animal waste to the land. An animal waste management plan is defined as a plan to properly collect, store, treat or apply animal waste to the land in an environmentally safe manner developed in accordance with the General Statute §143-215.10C (www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_143/GS_143-215.10C.html).

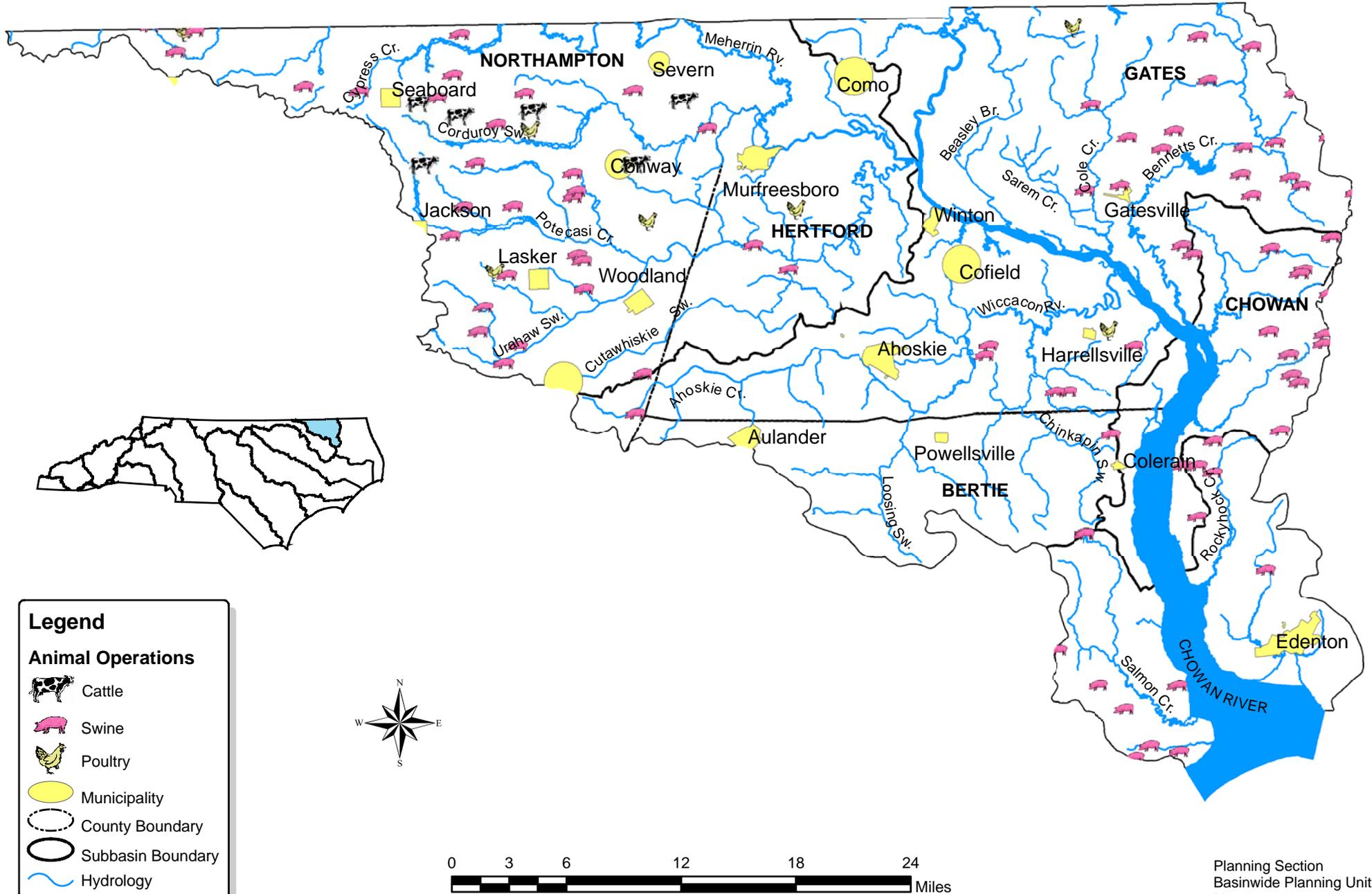
Table 20 summarizes the number of permitted livestock operations, total number of animals, number of facilities, and total steady state live weight. These numbers reflect only operations required by law to be permitted, and therefore, do not represent the total number of animals in each subbasin. The Chowan River basin contains approximately 101 animal operations, including both permitted and nonpermitted cattle, poultry and hog farms, as shown in Figure 7.

Table 20 Permitted Animal Operations.

Subbasin	Swine		
	No. of Facilities	No. of Animals	Total Steady State Live Weight*
03-01-01	11	23,952	4,904,760
03-01-02	21	47,314	16,603,330
03-01-03	3	2,080	253,500
03-01-04	2	7,216	974,160
Totals	37	80,562	227,357,50

* Steady State Live Weight (SSLW) is in pounds, after a conversion factor has been applied to the number of swine, cattle or poultry on a farm. Conversion factors come from the US Department of Agriculture, Natural Resource Conservation Service (NRCS) guidelines. Since the amount of waste produced varies by hog size, this is the best way to compare the sizes of the farms.

Figure 7 Animal Operations in the Chowan River Basin



9.2 Agricultural Best Management Practices and Funding Opportunities

9.2.1 NC Agriculture Cost Share Program

The NC Agricultural Cost Share Program (NCACSP) was established in 1984 to help reduce agricultural nonpoint runoff into the state's waters. The program helps owners and renters of established agricultural operations improve their on-farm management by using best management practices (BMPs). These BMPs include vegetative, structural or management systems that can improve the efficiency of farming operations while reducing the potential for surface and groundwater pollution. The NCACSP is implemented by the Division of Soil and Water (DSWC), which divides the approved BMPs into five main purposes or categories:

- *Erosion Reduction/Nutrient Loss Reduction in Fields*
Erosion/nutrient management measures include planned systems for reducing soil erosion and nutrient runoff from cropland into streams. Practices include: critical area planting, cropland conversion, water diversion, long-term no-till, pastureland conversion, sod-based rotation, stripcropping, terraces, and Christmas tree conservation cover.
- *Sediment/Nutrient Delivery Reduction from Fields*
Sediment/nutrient management measures include planned systems that prevent sediment and nutrient runoff from fields into streams. Practices include: field borders, filter strips, grassed waterways, nutrient management strategies, riparian buffers, water control structures, streambank stabilization, and road repair/stabilization.
- *Stream Protection from Animals*
Stream protection management measures are planned systems for protecting streams and streambanks. Such measures eliminate livestock access to streams by providing an alternate watering source away from the stream itself. Other benefits include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances. Practices include: heavy use area protection, livestock exclusion (i.e., fencing), spring development, stream crossings, trough or watering tanks, wells, and livestock feeding areas.
- *Proper Animal Waste Management*
A waste management system is a planned system in which all necessary components are installed for managed liquid and solid waste to prevent or minimize degradation of soil and water resources. Practices include: animal waste lagoon closures, constructed wetlands, controlled livestock lounging area, dry manure stacks, heavy use area protection, insect and odor control, stormwater management, waste storage ponds/lagoons, compost, and waste application system.
- *Agricultural Chemical (Agrichemical) Pollution Prevention*
Agrichemical pollution prevention measures involve a planned system to prevent chemical runoff to streams for water quality improvement. Practices include: agrichemical handling facilities and fertigation/chemigation back flow prevention systems.

The NCACSP is a voluntary program that reimburses farmers up to 75 percent of the cost of installing an approved BMP. The cost share funds are paid to the farmer once the planned BMP

is completed, inspected and certified according to NRCS standards and specifications and Soil and Water Conservation Commission (SWCC) policies. The annual statewide budget for BMP cost sharing is approximately \$8 million. [Note: the annual statewide budget for ACSP cost sharing is \$5.6 million; the additional \$2.4 million is the annual statewide budget for technical assistance.] During the period from 2000 to 2005, \$2,427,390 was provided for projects in the Chowan River basin. Table 21 summarizes the cost and total BMPs implemented (i.e., acres, units, linear feet) throughout the Chowan River basin.

Table 21 Summary of NCACSP projects in the Chowan River Basin (2000 to 2005)

Purpose of BMP	Subbasin 03-01-01		Subbasin 03-01-02		Subbasin 03-01-03		Subbasin 03-01-04	
	Total Implemented	Cost	Total Implemented	Cost	Total Implemented	Cost	Total Implemented	Cost
Erosion Reduction/Nutrient Loss Reduction in Fields	11,873.2 ac	\$285,672	5,110.8 ac	\$240,041	1,534.5 ac	\$212,604	5,009.5 ac	\$575,787
Sediment/Nutrient Delivery Reduction from Fields	1,240.0 l. ft.		20,853.2 l. ft.					
Stream Protection from Animals	3,968.5 ac	\$276,227	2,484.2 ac	\$370,525	937.7 ac	\$28,606	2,934.1 ac	\$139,833
Proper Animal Waste Management	4 units		11 units		1 unit		37 units	
	1 unit	\$4,750	1 unit	\$3,021				
	3,375.0 l. ft.							
	6 units	\$43,893	3 units	\$22,691	6 units	\$70,344	15 units	\$153,396
	1 ton						64 tons 1 gallon	
Total Costs		\$610,542		\$636,278		\$311,554		\$869,016

Benefits	Subbasin 03-01-01	Subbasin 03-01-02	Subbasin 03-01-03	Subbasin 03-01-04
Total Soil Saved (tons)	29,953	44,596	5,499	8,930
Total Nitrogen (N) Saved (lb.)	318,878	210,649	270,690	117,710
Total Phosphorus (P) Saved (lb.)	78,178	42,325	20,645	14,466
Total Waste-N Saved (lb.)	169,884	33,020	32,276	162,967
Total Waste-P Saved (lb.)	154,949	73,450	35,644	77,536

* The North Carolina Agricultural Nutrient Assessment Tool (NCANAT) contains two field-scale assessment tools: the Nitrogen Loss Estimation Worksheet (NLEW) and the Phosphorus Loss Assessment Tool (PLAT). NCANAT is a product of the cooperative effort between the NC State University, NC Department of Agriculture & Consumer Services, USDA-NRCS and the DENR. The tool consists of a function that allows comparisons to be made before and after BMPs are installed. Gains and losses of nitrogen, phosphorus and sediment due to BMP implementation can be computed. The DSWC has adopted this program to calculate these losses for the NCACSP reporting requirements.

County Soil and Water Conservation District (SWCD) contacts for the Chowan River basin are included in Appendix IV. BMP definitions and SWCD contact information can be found online at www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html.

9.2.2 USDA – NRCS Environmental Quality Improvement Program (EQIP)

The USDA – Environmental Quality Improvement Program (EQIP) provides technical, educational and financial assistance to eligible farmers to address soil, water and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers in complying with Federal and State environmental laws and encourages environmental enhancement. The purposes of the program are achieved through the implementation of a conservation plan that includes structural, vegetative and land management practices on eligible land. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, composters, filter strips, livestock exclusion, and permanent wildlife habitat. Incentive payments can also be made to implement one or more land management practices, such as nutrient management, pest management, grazing land management and long-term conservation tillage. The program is carried out at the county level with base funding levels made available to each county.

During this assessment period in Northampton County, over 265 acres were managed for nutrients and pesticides, 28,400 ft. were reserved as wildlife borders, and on 1,607 acres long-term no-till cultivation was implemented. Five lagoon closures occurred and five litter storage facilities were constructed. Future efforts using EQIP resources in Northampton County will include additional no-till, wildlife and field border acreage, closure of lagoons, construction of fencing, waterers, and wells, and establishing waste storage facilities.

NRCS district contacts for the Chowan River basin are provided in Appendix IV, or information can also be found on NRCS website at <http://www.nc.nrcs.usda.gov/programs/EQIP/index.html>.

9.2.3 Conservation Reserve Enhancement Program (CREP)

The Conservation Reserve Enhancement Program (CREP) is a joint effort of the DSWC, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program (EEP), and the USDA Farm Service Agency to address water quality problems in Chowan River basin. CREP is a voluntary program that seeks to protect land along watercourses that is currently in agricultural production. The objectives of the program include: installing forested riparian buffers, grassed filter strips and wetlands; reducing the impacts of sediment and nutrients within the targeted area; and providing substantial ecological benefits for many wildlife species that are declining in part as a result of habitat loss. Program funding will combine the Federal Conservation Reserve Program (CRP) funding with State funding from the Clean Water Management Trust Fund, Agriculture Cost Share Program, and North Carolina Wetlands Restoration Program.

Landowners of existing agricultural land within the Chowan River basin are eligible to participate in CREP. Under CREP, landowners can voluntarily enroll eligible land in 10-year, 15-year, 30-year, and permanent contracts. The state will pay additional bonuses to landowners that enroll land in 30-year and permanent agreements. Cost sharing will be available for installation of forested riparian buffers, grassed filter strips, wetlands restoration practices, water control structures, livestock exclusion, and remote livestock watering in order to increase the efficiency of enrolled practices. Interested landowners should contact their local Soil and Water Conservation District or Farm Service Agency office. The number of acres enrolled in CREP in

the Chowan River basin are listed below in Table 22. More information about CREP can be found on the SWCD website: <http://www.enr.state.nc.us/DSWC/pages/crep.html>.

Table 22 CREP Acres

County	Total Enrollments (acres)	30 Year Easements (acres)	Permanent Easements (acres)
Bertie	543	30	0
Chowan	379	212	0
Gates	1,646	1,141	414
Hertford	1,771	1,478	64
Northampton	2,188	1,618	30

9.3 SWCD Water Quality Strategy Plan

Agricultural land use and increasing development continue to alter natural hydrology with the need to improve drainage. Currently, most of the swamps and wetlands have been circumvented, routing stormwater through these areas in man-made channels. The water that once flowed through the floodplain is now channeled through man-made ditches directly to the creeks and rivers and is no longer filtered by swamps. In the Chowan River basin, redesigning and reconstructing drainage systems may improve water quality. Drainage redesign involves evaluating the entire watershed to determine where in-stream improvements can compliment farm fields and subdivision improvements such as no-till, land grading to reduce nitrogen, water control, riparian buffers and establishing wetlands.

Better tools to predict water flow are now available and research at NC State University provides examples that demonstrate how drainage systems can be redesigned. Reestablishing degraded swamps can be achieved by improving drainage, while forcing stormwater flow to reassociate with the floodplain. Old floodplains can be restored by establishing in-stream wetlands and building new wetlands where needed directly in the drainage system to reduce the total volume of water flow from these drainage systems.

SWCDs are encouraging the counties to develop Special Use Water Management Districts. Each district is to develop a list of priorities to address stormwater issues and drainage. Plans for each watershed will address the following:

- Volume of stormwater retained and discharged during stormwater events,
- Channel modification to re-associate storm flow with the biology of the flood plain to remove sediment and nutrients,
- Establishment of instream wetlands where needed,
- Drainage improvements required to sustain conservation enhancement and to provide drainage for urban and agricultural areas,
- Clearing and snagging required on five-year intervals to maintain the integrity of the drainage system and
- Demonstration projects illustrating innovative techniques for addressing the water quality issues associated with drainage.