Chapter 16
Agriculture and Water Quality

16.1 Animal Operations

In 1992, the Environmental Management Commission (EMC) adopted a rule modification (15A NCAC 2H.0217) establishing procedures for managing and reusing animal wastes from intensive livestock operations. The rule applies to new, expanding or existing feedlots with animal waste management systems designed to serve animal populations of at least the following size: 100 head of cattle, 75 horses, 250 swine, 1,000 sheep or 30,000 birds (chickens and turkeys) with a liquid waste system.

Key Animal Operation Legislation (1995-2003)

1995 Senate Bill 974 requires owners of swine facilities with 250 or more animals to hire a certified operator. Operators are required to attend a six-hour training course and pass an examination for certification. Senate Bill 1080 established buffer requirements for swine houses, lagoons and land application areas for farms sited after October 1, 1995.

1996 Senate Bill 1217 required all facilities (above threshold populations) to obtain coverage under a general permit, beginning in January 1997, for all new and expanding facilities. DWQ was directed to conduct annual inspections of all animal waste management facilities. Poultry facilities with 30,000+ birds and a liquid waste management system were required to hire a certified operator by January 1997 and facilities with dry litter animal waste management systems were required to develop an animal waste management plan by January 1998. The plan must address three specific items: 1) periodic testing of soils where waste is applied; 2) development of waste utilization plans; and 3) completion and maintenance of records on-site for three years. Additionally, anyone wishing to construct a new or expand an existing swine farm must notify all adjoining property owners.

1997 House Bill 515 placed a moratorium on new or existing swine farm operations and allows counties to adopt zoning ordinances for swine farms with a design capacity of 600,000 pounds (SSLW) or more. In addition, owners of potential new and expanding operations are required to notify the county (manager or chair of commission) and local health department, as well as adjoining landowners. NCDENR was required to develop and adopt economically feasible odor control standards by March 1, 1999.

1998 House Bill 1480 extended the moratorium on construction or expansion of swine farms. The bill also requires owners of swine operations to register with DWQ any contractual relationship with an integrator.

1999 House Bill 1160 extended (again) the moratorium on new construction or expansion of swine farms, required NCDENR to develop an inventory of inactive lagoons. The Bill requires owners/operators of an animal waste treatment system to notify the public in the event of a discharge to surface waters of the state of 1,000 gallons or more of untreated wastewater.

2000 Attorney General Easley reached a landmark agreement with Smithfield Foods, Inc. to phase out hog lagoons and implement new technologies that will substantially reduce pollutants from hog farms. The agreement commits Smithfield to phase out all anaerobic lagoon systems on 276 company-owned farms. Legislation will be required to phase out the remaining systems statewide within a 5-year period (State of Environment Report 2000).

2001 House Bill 1216 extended (again) the moratorium on new construction or expansion of swine farms.

Table 16 and Figure 23 summarize, by subbasin, the number of registered livestock operations, total number of animals, number of facilities, and total steady state live weight (SSLW) as of January 2005. These numbers reflect only operations required by law to be registered, and therefore, do not represent the total number of animals in each subbasin.

Table 16 - Registered Animal Operations in the Roanoke River Basin (as of 01/28/05)

Subbasin	Cattle			Poultry			Swine		
	No. of Facilities	No. of Animals	Total Steady State Live Weight*	No. of Facilities	No. of Animals	Total Steady State Live Weight*	No. of Facilities	No. of Animals	Total Steady State Live Weight*
03-02-01	2	365	511,000	0	0	0	1	800	417,600
03-02-02	0	0	0	0	0	0	1	1,205	521,765
03-02-03	0	0	0	0	0	0	1	1,800	243,000
03-02-04	2	400	560,000	0	0	0	0	0	0
03-02-05	1	200	280,000	0	0	0	4	500	708,500
03-02-06	0	0	0	0	0	0	2	2,506	1,940,810
03-02-07	3	700	980,000	0	0	0	4	5,750	2,349,250
03-02-08	4	1,205	1,192,000	1	60,000	240,000	11	31,575	6,692,065
03-02-09	0	0	0	0	0	0	6	14,488	2,252,480
03-02-10	0	0	0	0	0	0	3	6,360	2,426,080
Totals	**12**	**2,870**	**3,523,000**	**1**	**60,000**	**240,000**	**33**	**64,984**	**17,551,550**

* 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 guidelines. Since the amount of waste produced varies by hog size, this is the best way to compare the sizes of the farms.

16.2 Impacted Streams in Agricultural Areas

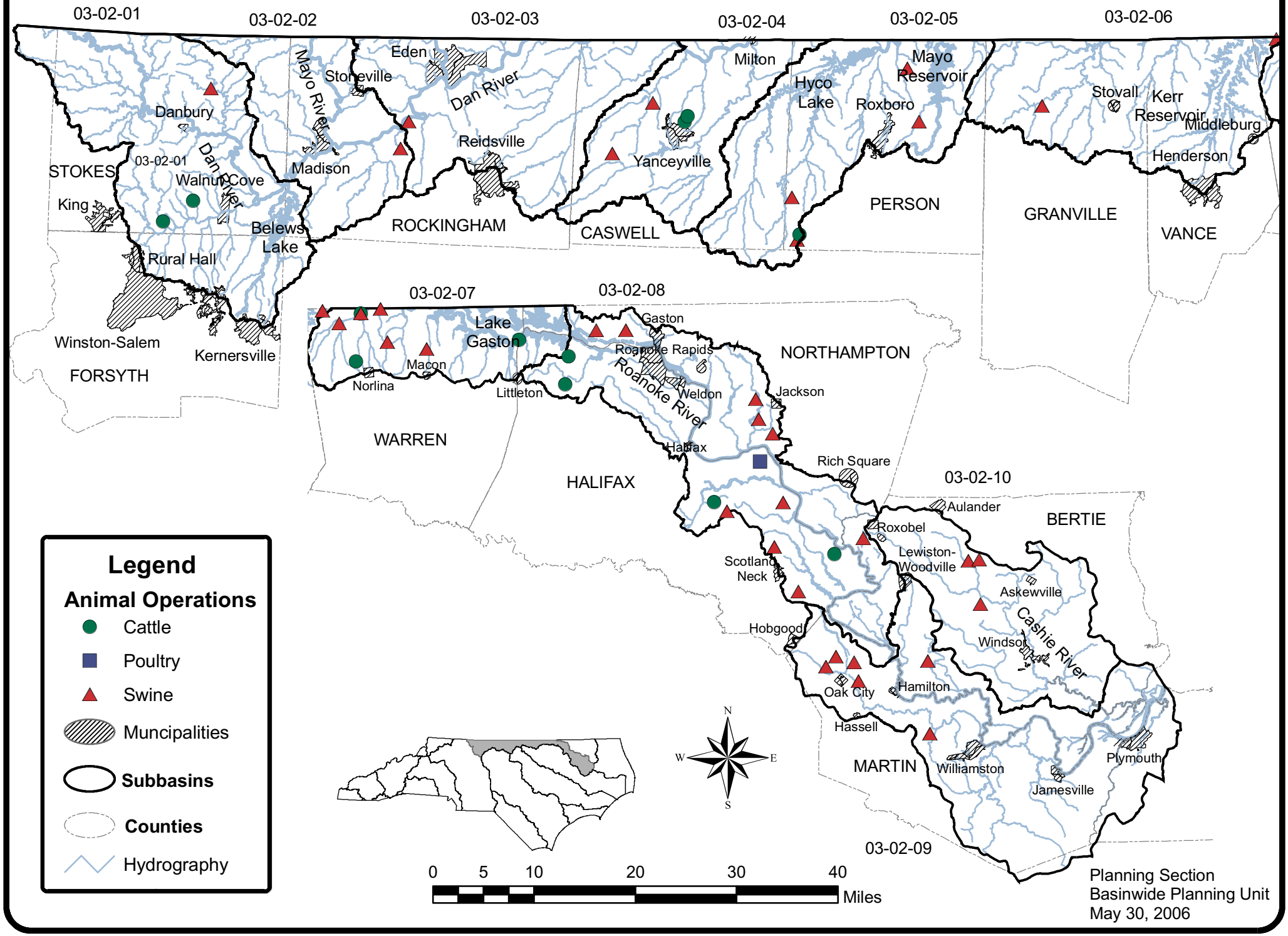
In the Roanoke River basin, the majority of agricultural land is cultivated crop. Impacts to streams from agricultural activities can include excessive nutrient loading, pesticide and herbicide contamination, bacterial contamination, and sedimentation.

Based on the most recent information from the USDA Natural Resources Conservation Service (NRCS) National Resources Inventory (NRI), agricultural land use in the Roanoke River basin has decreased. Cultivated cropland decreased by 20.4 percent (9,700 acres) and uncultivated crop increased by 89.5 percent (22,200 acres), respectively. Pasture use decreased by 21.5 percent (2,400 acres). This same data also shows that urban and built-up areas increased by 136.1 percent (74,700 acres) (USDA-NRCS, 2001). Refer to Appendix III for more information related to land use changes in the Roanoke River basin.

2006 Recommendations

DWQ will identify streams where agricultural land use may be impacting water quality and aquatic habitat. Local Soil and Water Conservation District (SWCD) and NRCS staff should investigate these streams to assess agricultural impacts and recommend best management

Figure 23 Anima l Operations in the Roanoke River Basin



practices (BMPs) to reduce the impacts. DWQ recommends that funding and technical support for agricultural BMPs continue and increase. Refer to Appendix VIII for agricultural nonpoint source agency contact information.

16.3 Agricultural Best Management Practices Funding Opportunities

16.3.1 USDA – NRCS Environmental Quality Incentives 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. Two to ten-year contracts are made with eligible producers. 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 be made to implement one or more land management practices, such as nutrient management, pest management, grazing land management and long-term conservation tillage.

Sixty percent of the funding available for this program is targeted at natural resource concerns relating to livestock production. The program is carried out at the county level with base funding levels made available to each county. In North Carolina, EQIP was funded at approximately $14.0 million for 2005.

NRCS district contacts for the Roanoke River basin are provided in Appendix VIII or visit the website at http://www.nrcs.usda.gov/programs/eqip/ for more information.

16.3.2 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. 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 to improve water quality. Practices include: critical area planting, cropland conversion, water diversion, long-term no-till, pastureland conversion, sod-based rotation, strip cropping, 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 (e.g., 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 to be installed according to NCACSP standards. The annual statewide budget for BMP cost sharing is approximately $5.2 million, and another $2.1 million is provided for technical assistance for local soil and water conservation district staff. From September 1, 2000 to August 31, 2004, $3,0396,686 was implemented for projects in the Roanoke River basin. Table 17 summaries the cost and total BMPs implemented (i.e., acres, units, and linear feet) throughout the Roanoke River basin.

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

Table 17 – NC Agriculture Cost Share Programs Contributions, BMPs Implemented and Potential Loadings Saved within the Roanoke River Basin

Purpose of BMP									
	Erosion Reduction[1]		Sediment Reduction[2]		Stream Protection[3]		Animal Waste[4]		Total Cost ($)
	Total	Cost ($)	Total	Cost ($)	Total	Cost ($)	Total	Cost ($)	
Subbasin 03-02-01	165.74 acres	48,319	5.51 acres	11,805	372 units 15,785 ft.	73,942 11,958	2 unit	18,905	164,929
Subbasin 03-02-02	405.9 acres 2,445 ft.	69,521 2,459	19.93 acres	28,916	377 units 16,105 ft.	81,347 12,650	4 units	31,613	226,506
Subbasin 03-02-03	448.36 acres 1,938 ft.	49,035 2,107	25.86 acres 1 unit	33,017 955	10 units 18,785 ft.	21,515 11,746			118,375
Subbasin 03-02-04	770.66 acres 10,913 ft.	93,275 11,050	37.67 acres	50,489	7 units 943 ft.	13,688 637			169,139
Subbasin 03-02-05	263.62 acres 18,493 ft.	32,997 19,523	101.19 acres 4 units	148,482 3,849	2 units 12,742 ft.	3,728 13,315	2 units	9,082	230,976
Subbasin 03-02-06	2852.46 acres 49,462 ft.	301,314 48,771	251.44 acres 5 units	313,996 4,804	403 units 50,136 ft.	132,687 39,402	6 units	40,695	881,669
Subbasin 03-02-07	629.02 acres 8,320.3 ft.	91,126 7,710	34.89 acres	35,497	6 units	10,609			144,942
Subbasin 03-02-08	1978.68 acres 17,343 ft.	226,707 15,498	104.2 acres 2 units	128,146 1,465	26 units	34,738	5 units 1 ton	60,139 6,000	472,693
Subbasin 03-02-09	1053.18 acres 0.5 ft.	71,023 1,120	78.55 acres	155,916			19 units 1 gallon 5 tons	203,025 6,000 24,000	461,084
Subbasin 03-02-10	676.6 acres	32,607	37 acres	43,219			13 units 3 tons	111,547 12,000	199,373

[1] Erosion Reduction/Nutrient Loss Reduction in Field
[2] Sediment/Nutrient Delivery Reduction from Field
[3] Stream Protection from Animals
[4] Proper Animal Waste Management

Total Benefits					
Subbasin	**Soil Saved (tons)**	**(N)itrogen Saved (lb.)**	**(P)hosph-orous Saved (lb.)**	**Waste-N Saved (lb.)**	**Waste-P Saved (lb.)**
03-02-01	4,871	8,849	1,610	61,457	38,571
03-02-02	9,045	22,325	2,363	75,907	47,530
03-02-03	7,638	33,382	1,449	193	188
03-02-04	8,600	92,650	1,607		
03-02-05	9,783	82,887	1,588	40,316	21,358
03-02-06	47,300	301,830	15,276	116,628	69,112
03-02-07	28,599	22,038	9,026		
03-02-08	32,523	94,312	39,321	115,570	97,500
03-02-09	11,457	54,711	25,015	266,082	101,934
03-02-10	2,259	20,545	2,355	128,256	72,086

16.3.3 Agricultural Sediment Initiative

In 2000, the NC Association of Soil and Water Conservation Districts and the NC Soil and Water Conservation Commission initiated an effort to assess stream channels and watersheds of streams on the state's 2000 303(d) list due to sediment where agriculture was included as a potential source. The primary objective of the Agricultural Sediment Initiative was to evaluate 303(d) listed waters in order to assess the severity of sedimentation associated with agricultural activities within the watershed and to develop local strategies for addressing sedimentation. The initiative involved 47 Impaired stream segments in 34 counties and 11 river basins.

Within the Roanoke River Basin, Smith Creek in subbasin 03-02-07 (Chapter 7) was targeted through this initiative. The Division of Soil and Water Conservation and the Warren Soil and Water Conservation District have obtained two section 319 grants, totaling $178,803 to fund best management practices and water quality education efforts in this watershed.

16.3.4 Conservation Security Program

The Conservation Security Program (CSP) is a voluntary conservation program that identifies and rewards farmers who are meeting the highest standards of conservation and environmental management on their operations. In addition, CSP creates powerful incentives for other producers to meet those same standards of conservation performance. CSP is administered by USDA's Natural Resources Conservation Service (NRCS). The Lower Roanoke watershed was selected as a CSP watershed in 2005, which includes Northampton, Bertie, Halifax, Washington and Martin counties. Approximately 701 farms in this watershed are eligible to join the program. For more information on the CSP program visit the NRCS website at: http://www.nrcs.usda.gov/programs/csp/2005_CSP_WS/.