

Chapter 7

Agriculture and Water Quality

7.1 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 Smith field 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 11 summarizes (by subbasin) the number of registered livestock operations, total number of animals, number of facilities, and total steady state live weight (SSLW). These numbers reflect only operations required by law to be registered, and therefore, do not represent the total number of animals in each subbasin. No violations or problems have been reported for any of the registered animal operations in the Hiwassee River basin.

Table 11 Registered Animal Operations in the Hiwassee River Basin (March 2006)

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*
04-05-01	14	1,317	1,382,400	0	0	0	0	0	0
04-05-02	6	835	977,000	1	1,050,000	4,200,000	1	60	85,020
Totals	20	2,152	2,359,400	1	1,050,000	4,200,000	1	60	85,020

* 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.

7.2 Impacted Streams in Agricultural Areas

In the Hiwassee River basin, the majority of agricultural land is pasture. There is also some row cropping. 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), most of the agricultural land use in the Hiwassee River basin has decreased from the year 1982 to 1997. Cultivated and uncultivated cropland decreased by 78.6 percent (6,600 acres) and 17.4 percent (400 acres), respectively. Pasture use increased by 21.7 percent (4,800 acres). This same data also shows that urban and built-up areas increased by 100.8 percent (12,200 acres) (USDA-NRCS, 2001). Refer to Appendix III for more information related to land use changes in the Hiwassee River basin.

2007 Recommendations

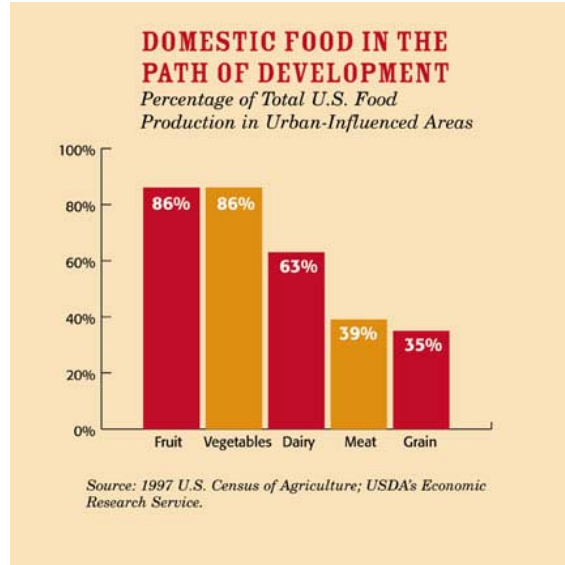
DWQ will identify streams where agricultural land use may be impacting water quality and aquatic habitat. Local Soil and Water Conservation District (SWCD) and NRCS staff should investigate these streams to assess agricultural impacts and recommend best management practices (BMPs) to reduce the impacts. DWQ recommends that funding and technical support for agricultural BMPs continue and increase. Refer to Appendix VII for agricultural nonpoint source agency contact information.

7.3 Working Land Conservation Benefits

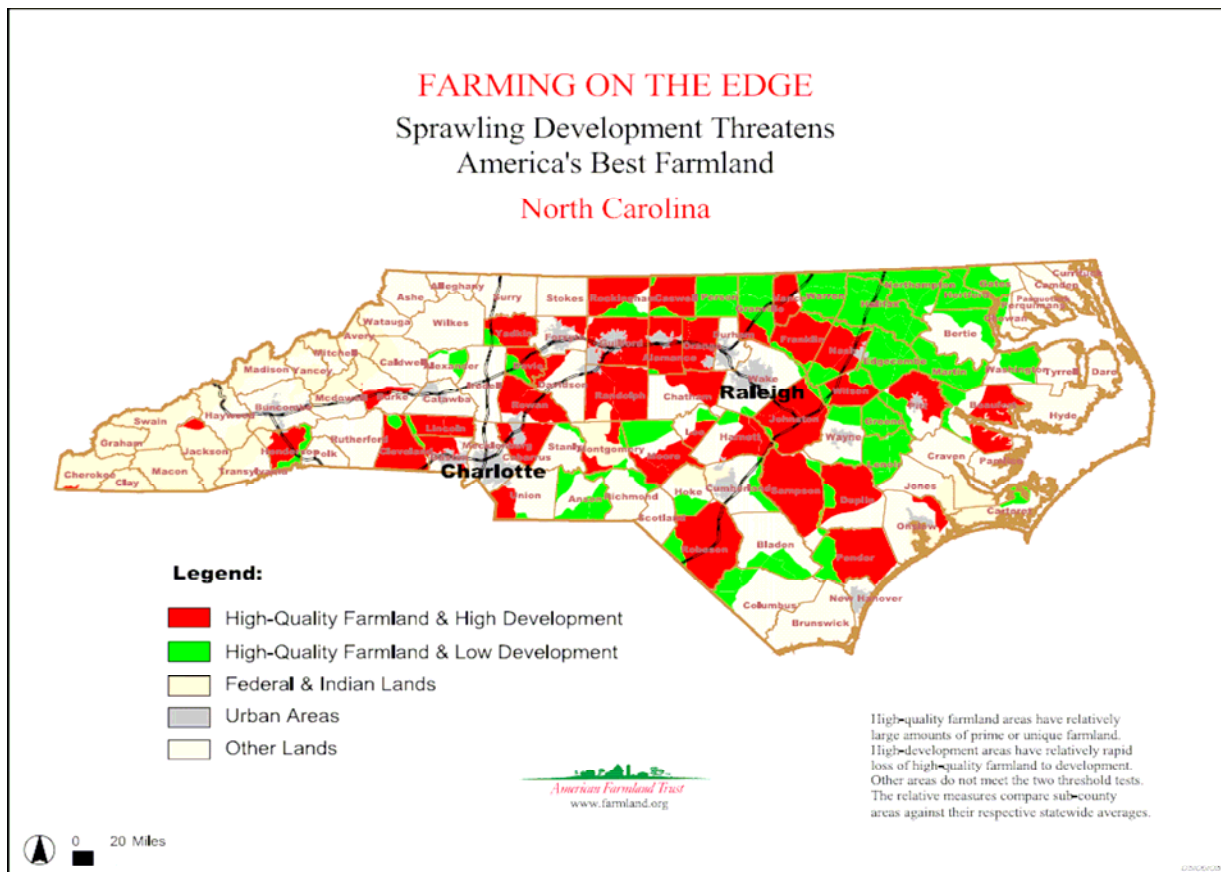
Working Lands are those used for agriculture, forestry or other natural resource industries. Well-managed working lands provide important non-market goods and services. For example, farms, ranches, and forestlands provide food and cover for wildlife, help control flooding, protect

wetlands and watersheds, and maintain air quality. They can absorb and filter wastewater, runoff, and provide groundwater recharge.

Rapid urbanization is forcing the conversion of working land to developed land at an astonishing rate in North Carolina. From 1992-1997, over 170,000 acres of agricultural land was converted to developed land. That was the 12th highest rate in the nation. The figures for Prime Farmland, the best land for growing crops, are even more disturbing. North Carolina is losing prime farmland at the fourth fastest rate in the nation (USDA, 2001). The 1997 U.S. Census of Agriculture shows that a large percentage of cropland is in urban-influenced areas, making them prime targets for development. It is well established that developed land negatively impacts water quality (See Section 5.1). Therefore, preserving North Carolina's working lands should be a priority.



The value of specific working lands can be calculated for any watershed by performing a Cost of Community Services (COCS) study. COCS studies are a case study approach used to determine a community's public service costs versus revenues based on current land use. Their particular niche is to evaluate the overall contribution of agricultural and other open lands on equal ground



with residential, commercial and industrial development.

As of January 2002, 83 COCS studies conducted in 19 states found that tax and other revenues collected from farm, ranch and forest landowners more than covered the public service costs these lands incur. COCS studies show that on average, residential development generates significant tax revenue but requires costly public services that typically are subsidized by revenues from commercial and industrial land uses. The special contribution of COCS studies is that they show that farm, ranch, and forestlands are important commercial land uses that help balance community budgets. Working lands are not just vacant land waiting to be developed (Freedgood and others, 2002).

A recent analysis of the fiscal impact of different land uses in Macon County, NC demonstrates the cost-saving benefits to the county of maintaining farmland and open space. Using county budget data and tax data from fiscal year 2000, the study indicates that typical residential and commercial properties cost the county budget by demanding more in tax-supported services than they contribute in property tax revenues. Such services include schools, roads, water and sewer lines, fire and police protection, and social and administrative services. On the other hand, the typical farmland/open-space parcel contributed more property tax to the county budget than it demanded in expenditures for county services. Analyzing a scenario of a 30-acre parcel of farmland/open-space, the study estimated that the county budget would gain \$290 if the land remained as farmland, but would lose a net \$532 if converted to ten 3-acre lots with houses on them (Jones and Kask, 2001).

The opportunities for private landowners to protect working lands are growing. North Carolina cities and counties have now begun to use the new set of farmland protection tools authorized by the General Assembly in 2005 through Session Law 2005-390. Along with an expanded definition of agriculture and a revamped Agricultural Development and Farmland Preservation Trust Fund, this legislation authorized a new category for localities to promote the stability of their agricultural sectors. Counties and municipalities now have the authority to create an Enhanced Voluntary Agricultural District (EVAD) option, which offers an increased set of incentives for landowners to restrict development over a ten-year period. Polk County in the mountains and Wentworth in the Piedmont are amongst the first jurisdictions in the state to utilize this new tool, with the recent adoption of local EVAD ordinances. Landowners interested in working land protection should contact their local land trust; NRCS field representative, or Soil and Water Conservation District. The Farmland Information Center is also an excellent online resource: <http://www.farmlandinfo.org/>. Local government officials interested in the value of working land conservation should visit the Land Trust Alliance's Economic Benefits of Open Space Protection web page at: http://www.lta.org/resources/economic_benefits.htm.

7.4 Agricultural Best Management Practices and Funding Opportunities

7.4.1 USDA – NRCS Environmental Quality Improvement Program (EQIP)

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, the Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements.

The 2002 Farm Bill reauthorized national EQIP funding at \$6.16 billion over the six-year period of FY 2002 through FY 2007. Program priorities are as follows:

- Reduction of nonpoint source pollution including nutrients, sediment, pesticides, and excess salinity in impaired watersheds consistent with TMDLs where available; reduction of groundwater contamination; reduction of point source pollution including contamination from confined animal feeding operations
- Conservation of ground and surface water resources
- Reduction of emissions including particulate matter, nitrogen oxides (NO_x), volatile organic compounds, and ozone precursors and depleters that contribute to air quality impairment violations of National Ambient Air Quality Standards
- Reduction in soil erosion and sedimentation from unacceptable levels on agricultural land
- Promotion of at-risk species habitat conservation.

EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. These contracts provide incentive payments and cost-shares to implement conservation practices. Persons who are engaged in livestock or agricultural production on eligible land may participate in the EQIP program. EQIP activities are carried out according to an environmental quality incentives program plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions. The local conservation district approves the plan.

North Carolina EQIP Funding 2000-2005

<u>2000</u> :	\$1.1 Million
<u>2001</u> :	\$3.5 Million
<u>2002</u> :	\$7.1 Million
<u>2003</u> :	\$10.0 Million
<u>2004</u> :	\$13.2 Million
<u>2005</u> :	\$14.3 Million

EQIP may cost-share up to 75 percent of the costs of certain conservation practices. Incentive payments may be provided for up to three years to encourage producers to carry out management practices they may not otherwise use without the incentive. However, limited resource producers and beginning farmers and ranchers may be eligible for cost-shares up to 90 percent. Farmers and ranchers may elect to use a certified third-party provider for technical assistance. An individual or entity may not receive, directly or indirectly, cost-share or incentive payments that, in the aggregate, exceed \$450,000 for all EQIP contracts entered during the term of the Farm Bill.

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

7.4.2 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, 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 to be installed according to NCACSP standards. The annual statewide budget for BMP cost sharing is approximately \$6.9 million. Table 12 summarizes the cost and total BMPs implemented (i.e., acres, units, and linear feet) throughout the Hiwassee River basin.

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

Table 12 Summary of NCACSP projects in the Hiwassee River Basin (1998 to 2003)

Purpose of BMP	Subbasin 04-05-01		Subbasin 04-05-02	
	Total Implemented	Cost	Total Implemented	Cost
Erosion Reduction/Nutrient Loss Reduction in Fields	3 acres	\$7,611	17.6 acres 145 linear ft.	\$3,654 \$268
Sediment/Nutrient Delivery Reduction from Fields	0.2 acres 2,570 linear ft.	\$5,123 \$62,118	0.3 acres 100 linear ft.	\$489 \$1,015
Stream Protection from Animals	277.2 units 62,550 linear ft.	\$301,178 \$69,234	621.1 units 51,559 linear ft.	\$194,107 \$59,864
Proper Animal Waste Management	1 unit	\$15,000		
Agricultural Chemical Pollution Prevention				
Total Costs		\$460,264		\$259,397

Benefits*	Subbasin 04-04-01	Subbasin 04-04-02
Total Soil Saved (tons)	961.38	823.00
Total Nitrogen (N) Saved (lb.)	148.00	443.50
Total Phosphorus (P) Saved (lb.)	21.25	31.00
Total Waste-N Saved (lb.)		
Total Waste-P Saved (lb.)		

* 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 NCDENR. 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.

