



North Carolina Department of Environment and Natural Resources
Division of Soil & Water Conservation

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Governor

Patricia K. Harris
Director

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Secretary

MEMORANDUM

TO: Representative Pryor Gibson, Co-Chair
Senator Bob Atwater, Co-Chair
Senator Dan Clodfelter, Co-Chair
Environmental Review Commission
Patricia K. Harris
FROM: Patricia K. Harris, Director
Division of Soil and Water Conservation
RE: Pilot Program for Inspections of Animal Waste Management Systems 2010
Semiannual Report
DATE: April 15, 2010

I respectfully submit the Division of Soil & Water Conservation's *Pilot Program for Inspections of Animal Waste Management Systems 2010 Semiannual Report* pursuant to GS 143-215.10D and GS 143-215.10F.

Please contact me at (919) 715-6097 if you have any questions or need additional information.

**REPORT TO THE ENVIRONMENTAL REVIEW
COMMISSION AND FISCAL RESEARCH DIVISION OF
THE NORTH CAROLINA GENERAL ASSEMBLY
ON
THE PILOT PROGRAM FOR INSPECTIONS OF
ANIMAL WASTE MANAGEMENT SYSTEMS
2010 SEMIANNUAL REPORT
July 1, 2009 – December 31, 2009**

INTRODUCTION

In accordance with Section 12.7(b) of S.L. 2005-276, the objective of the Animal Waste Management Inspection Pilot (hereinafter the pilot), is to determine how DSWC staff can respond more quickly and effectively, with technical assistance, to complaints and problems to help farms achieve compliance with environmental regulations. In addition, the program allows Department of Environment and Natural Resources (DENR) staff to test approaches for earlier identification of problems and to target DENR's resources for expediting corrective actions.

The pilot program started in 1997 with Columbus and Jones Counties and was expanded in 1999 and in 2005 to include Brunswick and Pender Counties respectively. The General Assembly, through Session Law 2009-84, extended the pilot program through September 1, 2011.

In non-pilot counties, DWQ performs annual routine compliance inspections of all permitted livestock operations. However, in the pilot counties, DSWC staff conducts *routine* compliance inspections in addition to performing *routine* operation reviews of all permitted livestock operations. In the pilot counties, DWQ staff provides regulatory oversight, performs compliance audits with DSWC staff of "targeted" potential high environmental impact farms, responds to DSWC referrals, and conducts additional compliance inspections for further investigation and enforcement actions as warranted.

There are 166 active swine farms and one horse farm in the pilot area of Brunswick, Columbus, Jones, and Pender Counties. When the Environmental Protection Agency (EPA) revised its National Pollutant Discharge Elimination System (NPDES) regulation in response to the 2nd-Circuit Court of Appeals ruling in the *Waterkeeper et al. v. EPA*, the number of pilot farms operating under NPDES permits dropped from 95 to 1 in 2007. Currently, all 167 pilot farms are operating under State Non-discharge general permits.

PRECIPITATION

Annual precipitation amounts and events have the biggest impact on compliance performance by farms in the pilot program area. Animal waste management systems, including anaerobic lagoons and waste storage ponds, are generally designed to store one 25-year, 24-hour storm event (ranges from 7 to 8 inches in pilot area), 180 days of excess rainfall over evaporation, wash water, and animal waste. Heavy precipitation amounts greater than the historical average and/or periods of prolonged precipitation can strain the storage capacity of the waste system. In addition, the waste system's capacity to land apply waste to receiving crops is also diminished due to wet or frozen soil conditions, wind, and/or limited availability of adequate crops to utilize the nutrients in the waste. Conversely, dry conditions can negatively impact vegetative cover on dike walls of waste structures and damage receiving crops.

Figure A reflects the abnormally wet conditions experienced by the pilot area during the late fall of 2009. Actual precipitation totals for most of the pilot area were approximately 6% higher than normal from January 2009 through December 2009.

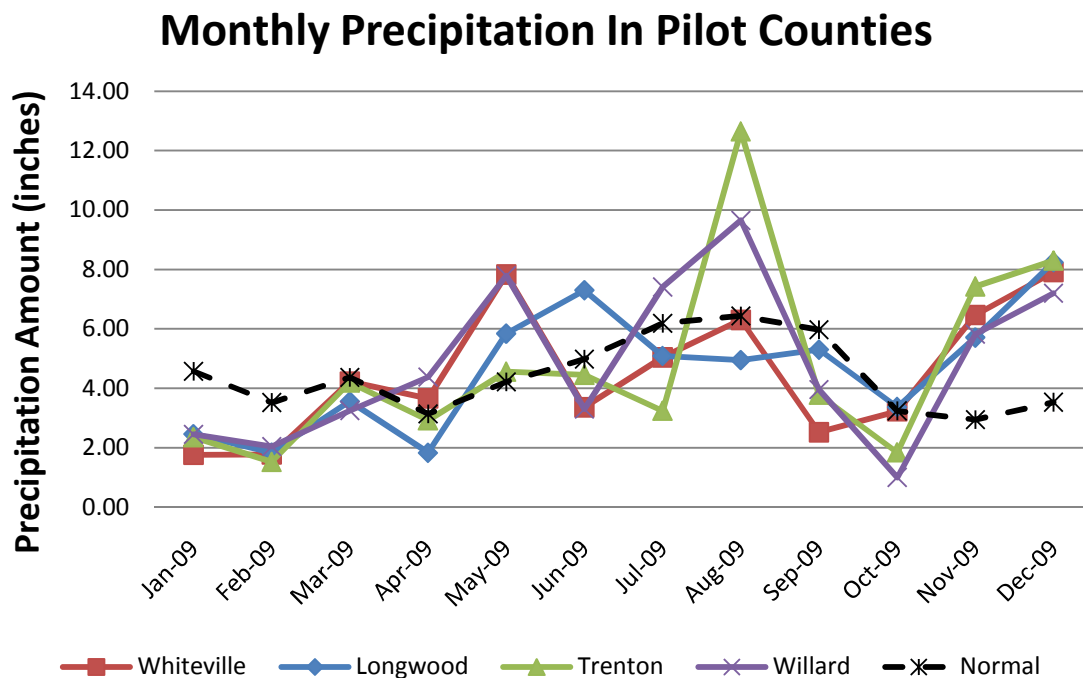


Figure A. January 2009 - December 2009 monthly normal and actual precipitation amounts measured at weather stations located within the four pilot counties. Source: North Carolina State Climate Office - CRONOS Database.

ENVIRONMENTAL IMPACT GROUPS

DSWC staff continued to use the environmental scale first described in the May 21, 2002 Addendum ERC Report to separate pilot animal operations based on their compliance performance and relative potential for environmental impact. Data is gathered through DENR's standard inspection form and entered into DWQ's Basinwide Implementation Management Systems (BIMS) database. The pilot's operational indicators and problem parameters are then queried and assessed from these documented site visits.

Table 1 lists the operational indicators used to assess animal waste management systems' performance on the pilot farms with assigned points to reflect the degree of "immediate" or "potential" threat a specific compliance deficiency would have on the environment. The program is based on the following 15 indicators with relative point values remaining constant since 2002.

Operational Indicators	Point Value
<i>Offsite discharge</i>	20
<i>Structural integrity compromised</i>	18
<i>Waste in structural freeboard range</i>	16
<i>Hydraulic overloading</i>	15
<i>Nitrogen over-applied $\geq 10\%$</i>	12
Waste level in storm storage	11
Irrigation system maintenance deficiency	11
Structural maintenance deficiency	10
Receiving crop inconsistent with waste plan	10
Irrigation records deficient	10
Lagoon level records deficient	9
Nitrogen over-applied $<10\%$	8
Receiving crop/sprayfield needs improvement	8
Waste analysis deficient	8
Soil analysis deficient	7

Table 1. Operational indicators and related point values are used by DENR staff to evaluate farm's potential impact on the environment. Items in italics represent "immediate threat" indicators.

Pilot farms were scored by the noncompliance points received for those operational indicators noted during each site visit and ranked by the total points received for all site visits in calendar year 2009. The farms were then

categorized into three potential impact groupings based on their total noncompliance scores.

Point ranges for these groupings, as shown in **Table 2**, were initially determined from farm performance in 2000 and remained unchanged through 2009.

Potential Impact Group	Noncompliance points
Low environmental impact	0 – 12 points per year
Medium environmental impact	13 – 30 points per year
High environmental impact	31 or more points per year

Table 2. Potential environmental impact groupings and corresponding noncompliance point ranges

Farms in the low and medium environmental impact groups are generally deemed to be responsive to technical assistance and subject to continued *routine* operation reviews and compliance inspections by DSWC. Farms scoring in the high impact group are subject to more intensive oversight by DSWC and DWQ staff.

PROGRAM FINDINGS

Site Visit Data

2009 activity from January 1 through December 31, both in and out of the pilot area, is reflected in the following data that was either queried from DWQ's Basinwide Implementation Management Systems (BIMS) database or presented in DWQ's Data Reports:

- Statewide - 2,421 animal operations were subject to permitting and inspection.
- Statewide - DENR staff conducted 4,809 site visits (2,505 by DSWC & SWCD and 2,304 by DWQ).

- Pilot area - 167 animal operations were subject to permitting and inspection.
- Pilot area - DENR staff conducted 357 site visits (343 by DSWC and 14 by DWQ).

Farm Performance Within the Pilot Program Area

In **Figure B**, pilot farms are grouped by their environmental impact scores and shown as a percentage of the total number of pilot farms in operation within a given year.

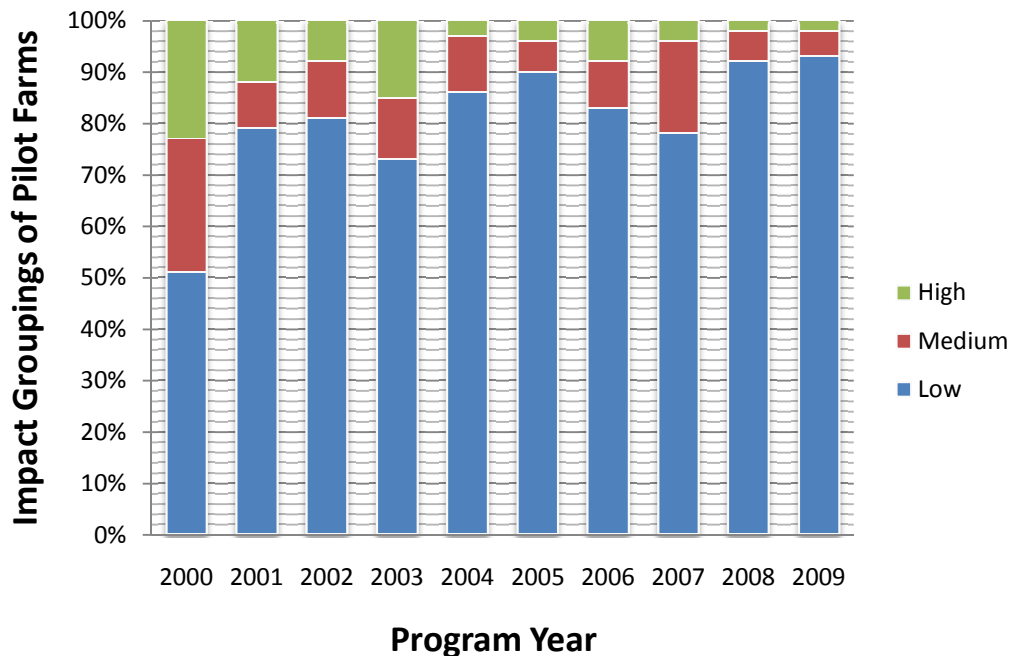


Figure B Pilot farms grouped into environmental impact categories

In 2009, 98% of the pilot farms were categorized in either the low or medium impact groups. The number of farms determined to have gross scores of 31 or more points, thus placing them in the high environmental impact group, remained unchanged from 2008 at only 3 (2%).

Due to heavy rainfall that occurred in November and December of 2009, there were a lot of “self-reported” high lagoon levels at the end of 2009, both in and out of the pilot area. If these self-reported incidents of non-compliance were considered when assigning impact scores to the pilot farms, the number of high impact farms would remain at 2% as shown in **Figure B**. There would be a small increase in the percentage of medium impact farms to 8%. The number of low impact farms would, therefore, decrease to 90%. As noted earlier, annual precipitation amounts and events have the biggest impact on compliance performance by farms in the pilot program area; however, the overall trend appears to reflect increased compliance over time.

Table 3 summarizes the frequency of occurrence for several of the program's operational indicators during 2009. The high frequency of *waste level in storm storage* is mainly due to the excess rainfall that occurred the last two months of 2009. Crop management issues that farmers are working to address contributed to the high frequency of deficiencies for *receiving crop/application field*.

Operational Indicator (%)	2009
<i>Offsite discharge</i>	0.00
<i>Structural integrity compromised</i>	0.60
<i>Waste in structural freeboard range</i>	0.00
<i>Hydraulic overloading or ponding</i>	0.60
<i>Nitrogen over-applied $\geq 10\%$</i>	0.00
Waste level in storm storage	12.57
Irrigation system maintenance deficiency	0.00
Structural maintenance deficiency	4.19
Receiving crop inconsistent with waste plan	1.20
Irrigation records deficient	2.99
Waste level records deficient	3.59
Nitrogen over-applied $< 10\%$	0.00
Receiving crop/application field deficient	13.77
Waste analysis deficient	2.99
Soil analysis deficient	4.19

Table 3. "Frequency of Occurrence" displayed as a percentage for finding an operational indicator on a pilot farm during 2009. Items in italics represent "immediate threat" indicators.

When DSWC and DWQ staff inspects a farm jointly, each division is required to enter a report into BIMS for the same site visit; therefore, it should be noted that duplications are included in the pilot area site visit findings. This double reporting

causes noted deficiencies to be counted and scored twice, thus increasing the rate of occurrence for any given operational indicator.

Impacts of Tropical Storm Ida and Chronic Rainfall

The remnants of Tropical Storm Ida moved across central and eastern North Carolina on November 11th and 12th causing heavy rainfall and flooding. Rainfall totals from the North Carolina State Climate Office show that pilot counties received between 3.9 and 5.6 inches of rain from this storm. In addition, the remainder of calendar year 2009 following Tropical Storm Ida was unseasonably wet due to the influence of El Nino. According to North Carolina State Climate Office data, the average total rainfall amounts for the pilot counties for the months of November and December were 6.4 and 7.9 inches respectively. This chronic rainfall continued into the first quarter of calendar year 2010.

To illustrate the impacts of this high rainfall on farm compliance in the pilot area, DSWC queried all incident reports logged into the BIMS database between November 1, 2009 and December 31, 2009 for the pilot counties. This data, along with other documented reports, revealed that 16 pilot farms were out of compliance due to high waste liquid levels. This represents 10% of pilot farms. The full impact of this chronic rainfall will be better understood and documented as site visits are conducted in the pilot counties in 2010. The 2010 findings will be discussed in the October 15, 2010 *Semiannual Report on the Pilot Program for Inspections of Animal Waste Management Systems*.

Cost & Labor Comparisons

Salaries, office rent, administrative and operating costs, coded work hours, and actual mileage costs were updated and compiled to determine a DSWC operating cost of \$29.30 per hour for the first two quarters of the 2009/2010 fiscal year. This cost is less than the \$30.73 per hour in the 2008/2009 fiscal year and is mainly due to a position vacancy in the DSWC operations review program.

Table 4 reflects key cost and labor comparisons. The DSWC's per-visit costs continue to remain less for pilot farms compared to non-pilot farms. Presently DSWC's per-farm costs are lower for pilot farms but will increase during the second half of the fiscal year when the second round of routine operations reviews are completed. Per-farm costs for pilot farms are higher than non-pilot farms as a direct function of the higher frequency of site visits made to pilot farms.

Pilot Farms	Non-pilot Farms
\$165.80 per DSWC visit	\$209.10 per DSWC visit
1.02 visits per farm	1.02 visits per farm
5.66 hours per visit	7.14 hours per visit
\$168.78 per farm	\$212.45 per farm

Table 4. Key Cost and Labor Comparisons for DSWC Operations Review Staff in the First Two Quarters of the 2009/2010 Fiscal Year

CONCLUSIONS

From 1999 through December 31, 2009, the Pilot Program has collected data from 3,832 documented site visits to 167 permitted animal operations in Brunswick, Columbus, Jones, and Pender Counties. DSWC staff continues to use the data to study and better understand the factors that influence compliance and affect the potential for environmental impact by conventional animal waste management systems. During the report period, DSWC experienced or observed the following:

- In 2009, 98% of farms in the pilot counties were identified as having a medium or low potential impact based on operation indicators. Overall, the trend since 1999 has indicated increased compliance.
- The chronic rainfall that occurred during November and December of 2009 resulted in increased incidents of non-compliance related to high waste liquid levels. The full impact of this chronic rainfall will be better understood and documented as site visits are conducted in the pilot counties in 2010.
- The impact of the statewide operation review program on producers, both in and out of the pilot area, indicate DSWC site visits are meeting the overall program objective of providing technical assistance.
- In accordance with current legislation, the Pilot Program is scheduled to terminate on September 1, 2011.