



Delaware Nutrient Management Commission

April 1, 2012



Introduction

2011 was an important year for nutrient management.

During 2011 the Nutrient Management Program in cooperation with DNREC continued to implement new Concentrated Animal Feeding Operation (CAFO) Regulations.

2011 was the first full year for updated outdoor manure staging and storage regulations developed during 2010.

As in previous years, farmers and other nutrient handlers are required to develop and implement phosphorus-limited nutrient management plans, maintain nutrient handling records, maintain nutrient certification and submit an annual report.

The implementation progress illustrated in this annual report demonstrates that nutrient handlers are making significant improvements in reducing nutrient runoff. Animal feeding operations, row crop farmers, horse operations, golf courses and lawn care companies are implementing nutrient management practices and demonstrating accountability.

The ongoing challenge will be to continue implementation and evaluate true water quality improvements resulting from the 1999 Nutrient Management Law (3 Del. C. §2200 et. al.).

The following sections fulfill the reporting requirement to the Governor and the General Assembly as stated in the Nutrient Management Law. Additional information is included to represent measurable results and accountability for nutrient handlers, poultry companies, agricultural agencies and the Nutrient Management Commission (Commission).

History

The Nutrient Management Law was passed in 1999 and mandates that all farmers, golf courses and other nutrient handlers develop and implement phosphorus-limited nutrient management plans, maintain nutrient handling records, maintain nutrient certification and submit an annual report. Voluntary programs are comprised of many practices offered by the County Conservation Districts, Natural Resources Conservation Districts



This Delaware farm utilizes many Best Management Practices (BMPs) including vegetative buffer strips.

Table of Contents

Introduction	1
History	1
Organizational Purpose	2
Nutrient Management Training, Education & Certification	2
Nutrient Management Program Adds Staff	3
Nutrient Management Planning	3
Nutrient Management Reports Due March 1	4
Nutrient Management Plan Audits	4
Nutrient Management Relocation	5
FY2011 Relocation Summary	5
Markets for Excess Manure	5
Nutrient Management Critical Areas	6
Delaware Environmental Stewardship Program	6
Permits for Certain Animal Operations	7
Total Daily Maximum Load (TMDL) and The Chesapeake Bay Watershed Implementation Plan (WIP)	8
Stormwater Control for Animal Feeding Operations	9
Nutrient Management and the Equine Industry	9
Complaint Resolution	10
Comparison of Methods for Estimating Poultry Manure	
Nutrient Generation within the Chesapeake Bay Watershed	10
Phosphorus Management and Phytase	12
Evaluating Excess Poultry Litter-Manure in Delaware	12
Best Management Practices	13
Field Staging of Poultry Manure	13
Winter Application	14
Handling Catastrophic Mortality	15
Budget	15
Background and Contacts	15
Members of the Nutrient Management Commission	15
Delaware Nutrient Management Program Staff	16
University of Delaware Staff	16
How to Contact the Nutrient Management Program	16
How to Contact Your Conservation District	16

(NRCS) and stand-alone initiatives by the property owners, farmers and nutrient handlers across the state. In the past several years, the U.S. Environmental Protection Agency (EPA) has become much more interested in agriculture’s influence on water quality and how Delaware officials, such as the Commission, were regulating nutrient runoff. EPA recognizes the success of the Nutrient Management Law but is very focused on two elements of the Clean Water Act called Concentrated Animal Feeding Operation (CAFO) permits and Total Maximum Daily Load (TMDL) limits. Both elements consist of EPA regulations that the States must address.

The Commission is working jointly with the Delaware Department of Agriculture (DDA) and the Department of Natural Resources and Environmental Control (DNREC) to evaluate these federal requirements. The University of Delaware and the NRCS are valuable resources for understanding and addressing these requirements.

Organizational Purpose

The organizational structure of the Nutrient Management Program is important and critical as budget shortfalls within state government are present and difficult decisions are needed. The mission of the Commission is “To manage those activities involving the generation and application of nutrients in order to help improve and protect the quality of Delaware’s ground and surface waters, sustain and promote a profitable agricultural community, and to help meet or exceed federally mandated water quality standards, in the interest of the overall public welfare.” In order to accomplish this mission, the following strategic goals are in place:

Strategic Goals:

1. Promote alternative use practices for excess nutrients generated in Delaware by developing and implementing incentive and market-based programs.
2. Institute a program to assist in developing and funding nutrient management plans according to law and program standards.
3. Implement nutrient management certification requirements by providing nutrient handlers with initial and continuing educational opportunities.
4. Implement the State’s National Pollutant Discharge Elimination System (NPDES) Permitting program for concentrated animal feeding operations (CAFOs) in cooperation with the Department of Natural Resources and Environmental Control (DNREC) and according to the Clean Water Act and Federal regulations.

5. Develop and implement demonstration projects within the farm community for best management practices.
6. Audit nutrient management activities to instill legal compliance and high quality services.
7. Respond to informal and formal complaints against nutrient management practices.
8. Recognize environmental stewards within the agricultural community with the cooperation and financial support of the agribusinesses and poultry companies operating within the state.
9. Facilitate and actively fund research projects according to priorities that will better balance science-based policy development with modern and responsible nutrient management practices.

Performance Measure Goals

Actual	FY2009 Actual	FY2010 Actual	FY2011 Actual	
Tons of poultry litter/manure relocated within Delaware for land application	20,107	28,791	19,549	
Tons of poultry litter/manure exported from Delaware for land application	19,396	20,684	20,107	
Tons of poultry litter/manure relocated to an alternative use project	26,020	33,836	19,182	
% of cropland and nutrient-applied land managed under a current plan developed by a certified consultant	100	100	100	
Acres managed under an updated nutrient management plan	76,828	129,235	91,922	
# of nutrient consultants	74	109	113	
# of commercial handlers	50	74	75	
# of private applicators	1,130	1,130	1,164	
# of nutrient generators	470	470	494	
# of nutrient management farm audits	34	6	20	
# of constituent complaints:	received	36	21	24
	resolved	35	20	21
# of CAFO permits	372	372	370	

Nutrient Management Training, Education and Certification

The Commission continues to view education as a priority for many nutrient management topics and depends on the University of Delaware and agribusinesses to educate nutrient handlers. As farmers and other nutrient handlers become certified and continue the educational requirements, better nutrient handling decisions are made. The Commission has issued 2,756 certifications since the January 2004 deadline. Currently, 1,846 different nutrient management certifications are maintained by the program and can be individually viewed on the Program’s website (http://dda.delaware.gov/nutrients/forms/2009/020409_Certified%20Users.pdf):

1. 494 Nutrient Generator certifications valid for three years;
2. 1,164 Private Nutrient Handler certifications valid for three years;
3. 75 Commercial Nutrient Handler certifications valid for one year;
4. 113 Nutrient Consultant certifications valid for one year

Nutrient Management Certification classes continue to be offered throughout the year for both initial and continuing certification. The University of Delaware Cooperative Extension conducts most of these classes. In 2011, 15 different classes were offered for initial certification along

with six different testing opportunities. The number of continuing education credits offered continued to increase in 2011. Public and private organizations conducted 129 continuing education programs, offering a total of 342.5 continuing education credits. A total of 2,555 individuals attended these programs.

In order to become certified as a consultant or a commercial nutrient handler, one must pass an examination. Three examination sessions for nutrient consultants and three examinations for commercial nutrient handlers were offered in 2011, resulting in 12 (60%) passing scores and eight (40%) failing scores. Nutrient consultant



There are many opportunities to obtain nutrient management continuing education credits.

test questions are pulled from a databank of questions shared by Delaware, Maryland, Virginia and Pennsylvania for reciprocal purposes. The test sessions are also coordinated with the national Certified Crop Advisor (CCA) program to expand the opportunities for crop consultants. University and Program Staff generated the exam for commercial nutrient handlers. All certifications, except Nutrient Consultants, are valid for a three-year period. Nearly one third of all certifications will expire on May 1, 2012.

Certification Session	# of Sessions	Total Attendance
Session I: General	4	86
Session II: Nutrient Generator	4	80
Session III: Private Nutrient Handler	4	55
Session IV: Commercial Nutrient Handler	1	4
Session V: Nutrient Consultant	2	18
Commercial Nutrient Handler Exam	3	4
Nutrient Consultant Exam	3	16

Continuing education opportunities can be integrated with any meeting or gathering of nutrient handlers. One continuing education credit is equivalent to approximately 50 minutes and is measured in quarter-credit increments. Credits are approved by providing the meeting or class agenda to the University of Delaware Carvel Research and Education Center or the State Nutrient Management Program prior to the event.

Summary

Delaware Nutrient Management Program Approved Continuing Education Programs

Year	Number of Programs	Number of Continuing Education Credits Available	Attendance
2007	92	200.75	3,028
2008	95	234.75	2,033
2009	119	253	3,260
2010	125	325.75	3,162
2011	129	342.5	2,555

Nutrient Management Program Adds Staff

During 2011 the Nutrient Management Program became fully staffed for the first time since 2008. Two new Environmental Scientist positions were filled. Duties for these new staff members will consist of helping to write and implement over 400 Delaware CAFO permits. In addition, these staff members will perform duties related to administrating the Nutrient Management Law. The new staff members are:

Lauren Torres joins the Nutrient Management Program from Perdue Farms where she was a Flock Supervisor. Her background in the industry also stems from summer work at the University of Delaware College of Ag & Natural Resources Cooperative Extension assisting the Integrated Pest Management Specialist in field and vegetable crop research, and having raced Standard-



Lauren Torres

bred horses for several years. She earned her Bachelor's Degree from University of Delaware in Agriculture & Natural Resources with a minor in Animal Science, and also has two Associate's degrees from Delaware Tech in Business Management and Agribusiness. Lauren also studied abroad focusing on Australian Livestock Production.

M. Benjamin Coverdale grew up on a small family farm in Harrington, DE. He graduated from the University of Delaware with a Bachelor's Degree in Food & Agribusiness Management and a minor in Resource Economics. He then worked in the private sector as an agricultural chemical and fertilizer sales representative. Prior to joining the Delaware Nutrient Management Program he worked in the Pesticide Compliance section in DDA.

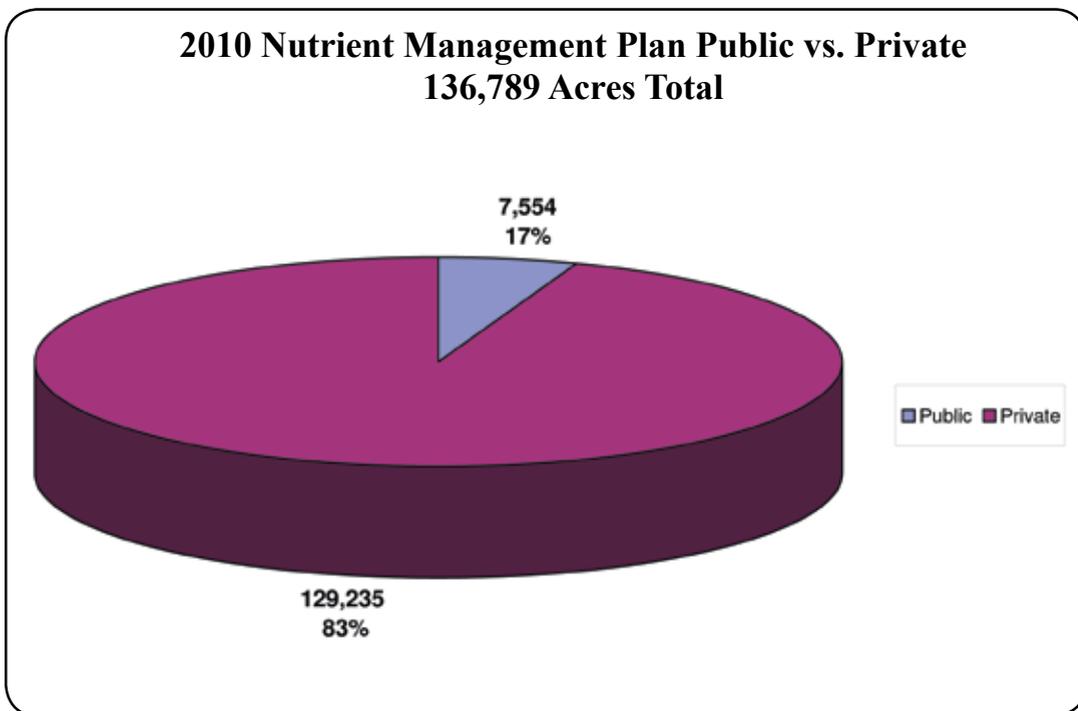


M. Benjamin Coverdale

Nutrient Management Planning

A nutrient management plan is a farmer's "business plan" for nutrients. The more efficiently fertilizers are used on the farm, the less nutrients escape to waterways. A plan is developed by a certified nutrient consultant and includes contents such as maps, soil analysis, manure analysis, crop yield goals and a budget for nutrients.

The Commission depends on private and public nutrient consultants to develop nutrient management plans. In 2011, 139 farms, one turf farm and one nursery/tree farm representing 91,922 acres were reimbursed at a capped rate for a plan developed by a private consultant. The Kent and Sussex Conservation Districts assisted Delaware farmers by writing nutrient management plans totaling 17,870 acres. These acres represent an obligation for at least three years of nutrient management planning. Also, 94 farms were assisted with an animal waste management plan or comprehensive nutrient management plan.



During 2011, Delaware farmers applied and were approved for a total of 109,790 acres of nutrient management planning. The total acreage covered by nutrient management planning reimbursement during 2011, including those farms approved during 2009 and 2010, was 296,699 acres.

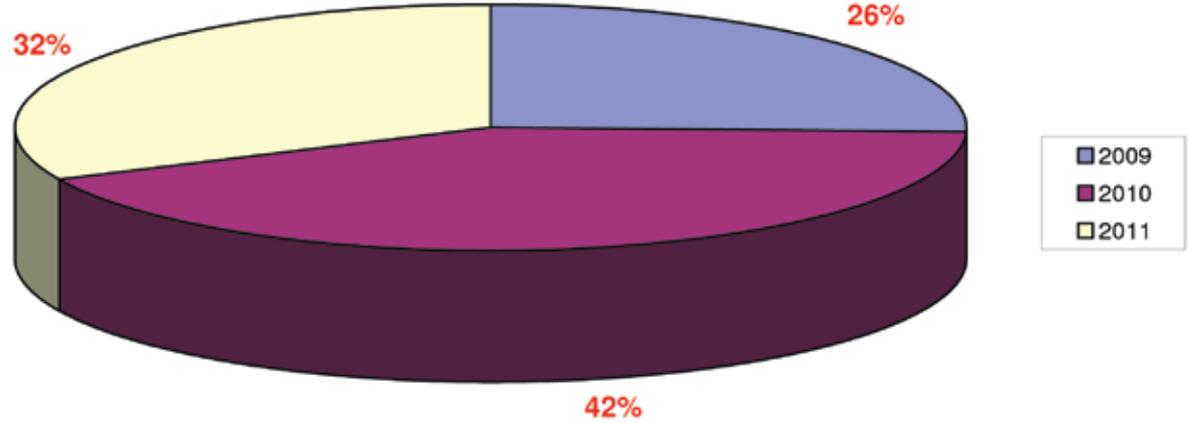
Nutrient Management Reports Due March 1

The Nutrient Management Law requires farmers and other nutrient handlers to submit an annual report by March 1 of every year summarizing the nutrients handled and applied within their operation. For 2011, the program received over 500 reports, which will be entered into a watershed-based database for aggregating progress and accountability.

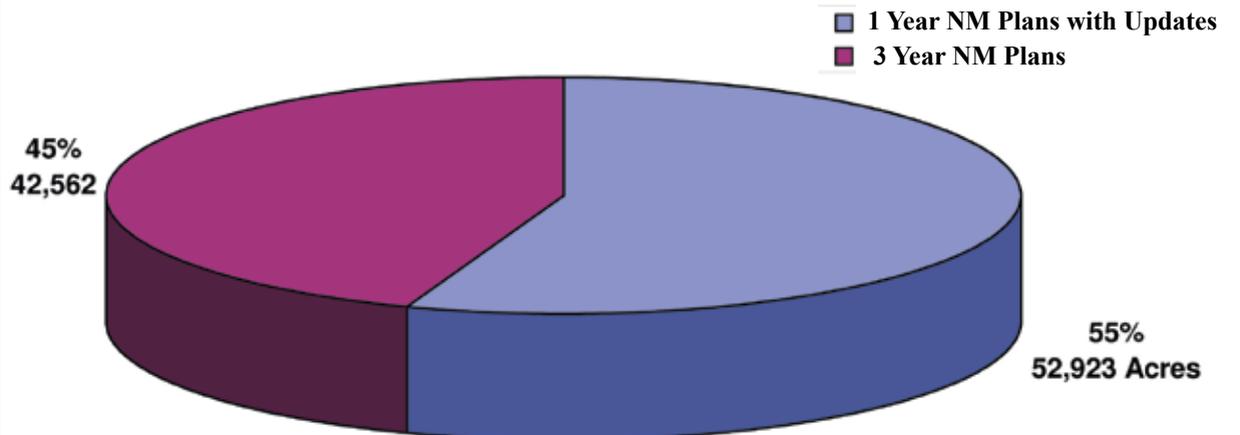
Nutrient Management Plan Audits

Each year program staff perform audits on a number of facilities required to operate with a nutrient management plan, records and certification. This process helps to ensure that plans meet the intent of the nutrient management laws and regulations. During 2011, program staff audited the nutrient management plans for 14 agricultural operations, one equine facility, one lawn care company, one golf course and seven concentrated animal feeding operations.

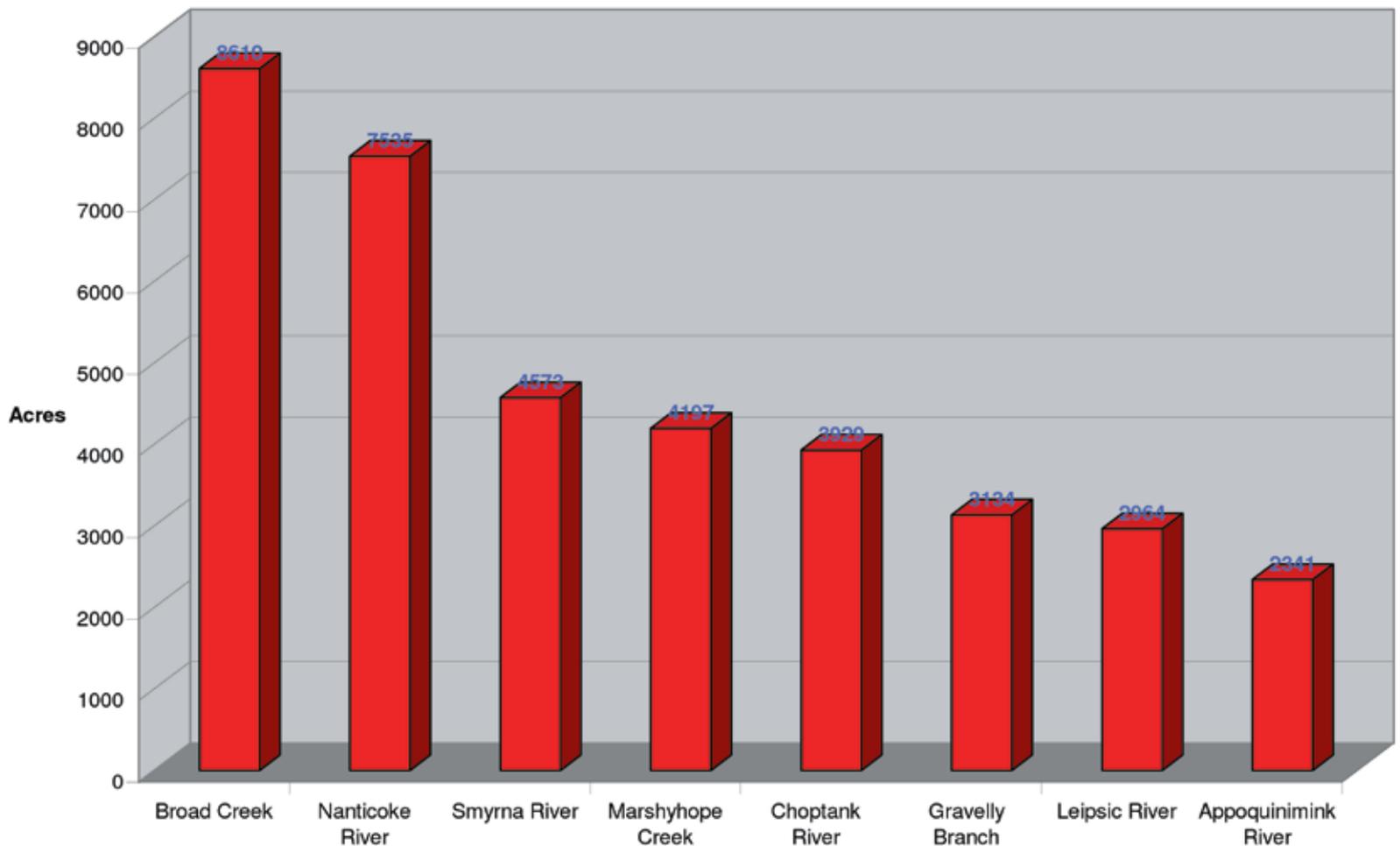
Total Acres in NM Planning 2011
299,684 Acres



2011 NM Plans 1 year vs. 3 year
95,485 acres



Largest 2011 NM Planning Applications by Watershed



Nutrient Management Relocation

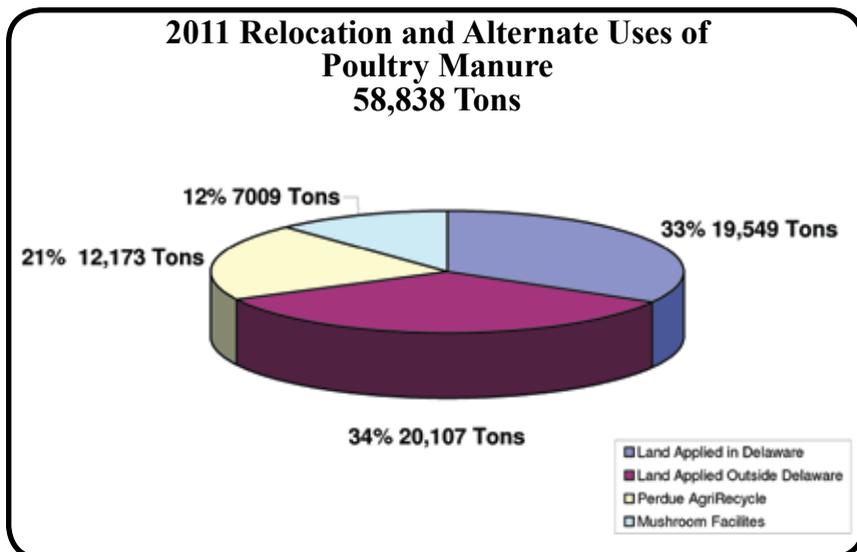
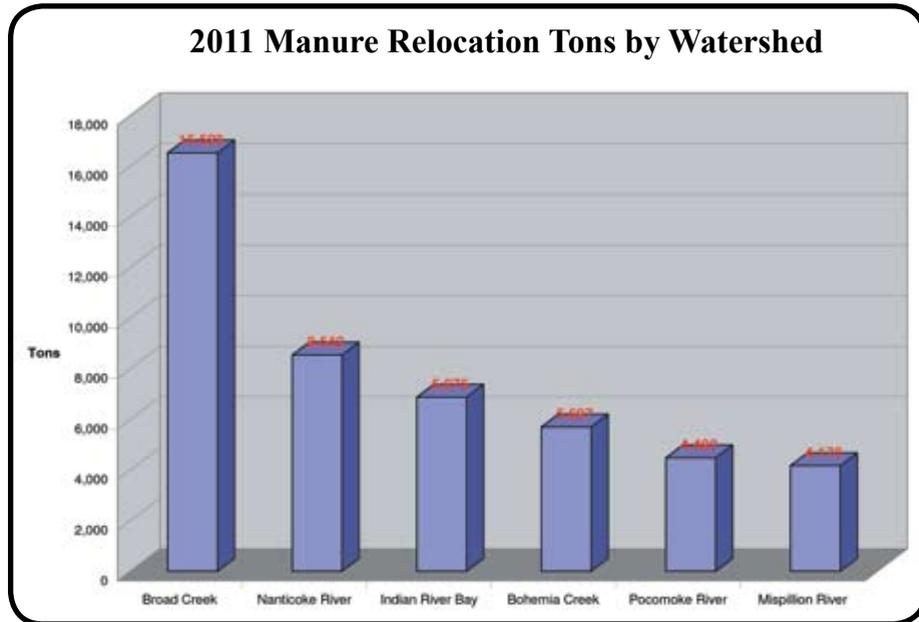
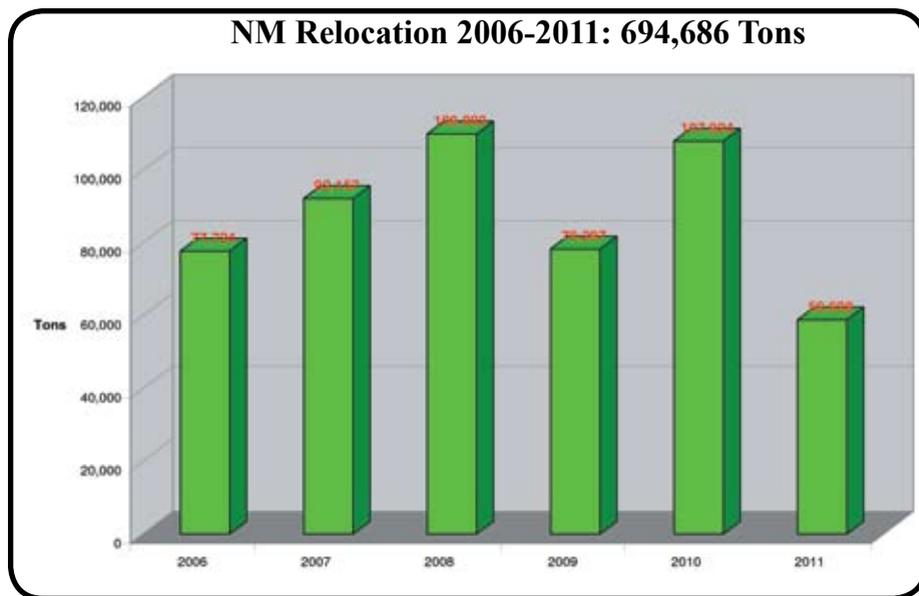
Managing excess poultry litter-manure has been a priority of the Commission since inception. Many farmers who have limited acreage or high soil phosphorous levels must find alternative uses for poultry litter-manure. Several businesses now help such farmers manage their excess litter-manure. The Relocation Program is one of several effective solutions to excess litter-manure generated in Delaware.

The Relocation Program provides financial reimbursement to farmers, brokers and trucking businesses for the transportation cost of relocating litter-manure from Delaware farms to alternative use projects or other farms for land application. The application process validates eligible senders, receivers, truckers and alternative use projects. Excess manure continues to be transported for land application throughout Delaware as well as Maryland, New Jersey, and Virginia. Alternative use projects are essential for managing excess poultry manure. In 2011, 58,838 tons of excess poultry litter-manure was relocated, for an eight-year total of over 660,000 tons. During 2011, over 33 percent of the excess litter-manure went to alternative use projects such as the Perdue AgriRecycle fertilizer plant in Blades, DE, and mushroom growers in Pennsylvania.

Farmers and others wishing to participate in relocation projects can register with the nutrient management matching service by contacting (302) 698-4500. The Relocation Program provides farmers with the option to move the litter-manure themselves or hire a broker.



The Perdue AgriRecycle Plant in Blades, DE, processed a total of 70,824 tons of poultry litter/manure in 2009, 39,508 tons of it generated in Delaware.



FY 2011 Relocation Summary

Relocation Category	Tonnage
Delaware relocation projects with financial assistance	58,838
Perdue AgriRecycle Inc. without relocation assistance	23,406
Ellis Farms Inc. Brokerage without relocation assistance	9,000
Total Excess poultry litter relocated	91,244
DE Relocation Program (financial assistance)	
Farm to Farm within DE	19,549
Farm to Farm exported from DE	20,107
Farm to Alt. Use: Perdue AgriRecycle	12,173
Farm to Alt. Use: Mushrooms	7,009

Markets for Excess Manure

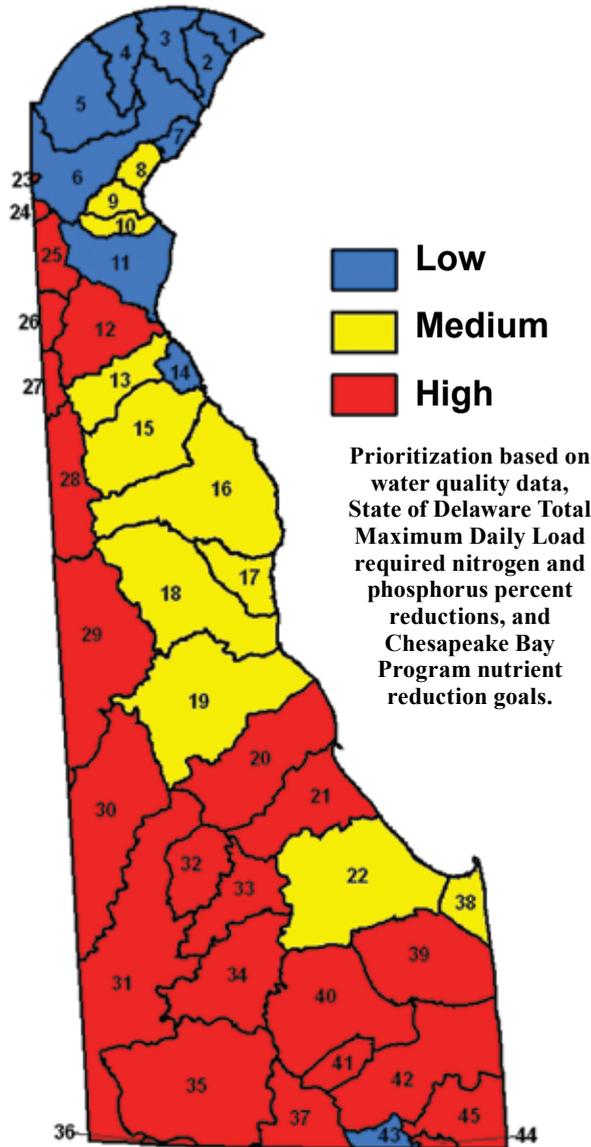
The following businesses have expressed interest in taking or buying excess manure for alternative use and/or brokerage. Please contact them directly:

Manure Type	Company
Poultry	Bowles Enterprises LLC Loveville MD 301-475-2139
Poultry	Ellis Farms Inc Millsboro DE 302-238-7275
Poultry	Perdue AgriRecycle LLC Blades DE 302-628-2360

Nutrient Management Critical Areas

The Commission established a “critical areas” map for Nutrient Management. The Department of Natural Resources and Environmental Control (DNREC) provided significant input based on water quality data for Nitrogen and Phosphorus impairments.

Nutrient Management Critical Area Priorities



Piedmont Drainage

1. Naamans Creek
2. Shellpot Creek
3. Brandywine Creek
4. Red Clay Creek
5. White Clay Creek
6. Christina River
- Delaware Bay Drainage
7. Delaware River
- 8 Army Creek
9. Red Lion Creek
10. Dragon Run Creek
11. C & D Canal East
- 12 Appoquinimink River
13. Blackbird Creek
14. Delaware Bay
15. Smyrna River
16. Leipsic River
17. Little Creek
18. St. Jones River
19. Murderkill River
20. Mispillion River
21. Cedar Creek
22. Broadkill River

Chesapeake Bay Drainage

23. Elk Creek
24. Perch Creek
25. C & D Canal West
26. Bohemia Creek
- 27 Sassafras River
28. Chester River
29. Choptank River
30. Marshyhope Creek
31. Nanticoke River
32. Gum Branch
33. Gravelly Branch
34. Deep Creek
35. Broad Creek
36. Wicomico
37. Pocomoke River/Indian Bays/ Atlantic Ocean
38. Lewes-Rehoboth Canal
39. Rehoboth Bay
40. Indian River
41. Iron Branch
42. Indian River Bay
43. Buntings Branch
44. Assawoman
45. Little Assawoman

Delaware Environmental Stewardship Program

The Commission partnered with two of the four poultry companies — Mountaire Farms Inc. and Perdue Farms, Inc. — to recognize the 2011 environmental stewards.

The environmental stewardship award was established in 2001 to recognize farmers whose stewardship and general farm practices contribute to the conservation of water quality and farmland. The program recognizes growers by evaluating nutrient management, best management practices, farm management, innovation, bio-diversity and wildlife habitat management.

The 2011 Delaware Environmental Stewardship Award was presented during the Delaware Agriculture Week conference held at the Delaware State Fairgrounds in Harrington. Jesse and Deborah Vanderwende of Greenwood were presented with a cash award of \$1,000, a lane sign and a plaque. The William Leager family, also of Greenwood, was presented with a check for \$500, a lane sign and a plaque.



From Left: Jeff Smith, director of Corporate Environmental Services Perdue Farms Inc.; Michele Minton, Live Production Manager, Perdue Farms Inc.; Deborah and Jesse Vanderwende, Locust Grove Farm. Locust Grove Farm took the top Delaware Environmental Stewardship Award for 2011.



From Left: Charles Leager, Mary Leager, Patty Leager and Bill Leager of Woods Edge Farm were recognized as first runner-up for the 2011 Environmental Stewardship Program.

Permits for Certain Animal Feeding Operations

The Nutrient Management Program manages the National Pollution Discharge Elimination System (NPDES) permit regulations for Delaware's animal feeding operations. The 1972 Clean Water Act and revised federal regulations require permits for some farms called Concentrated Animal Feeding Operations (CAFOs). Any farm that operates under a CAFO permit is subject to an inspection by program staff. The permit requires a nutrient management plan, records of implementation, annual report, certification and other site-specific practices

New CAFO Regulations Adopted

During 2009 and 2010, the Commission, DDA, DNREC, NRCS and the University of Delaware worked towards meeting EPA requirements for a CAFO program tailored to Delaware's unique circumstances. During a series of meetings, all parties worked to satisfy the legal and regulatory directives, and protect the environment. This regulatory development effort was often discussed during the Commission's monthly meetings. In addition, DDA, DNREC, and Commission staff met with the Delmarva Poultry Industry Environmental Committee on May 11, 2010, to present the Draft CAFO Regulations.

The draft regulations were presented to the public in a series of three public workshops on May 25-27, 2010, at the Farmington Fire Hall, Laurel High School and Millsboro Fire Hall. A total of 143 people attended. The input received at those public workshops resulted in revisions to the draft regulations. DDA, DNREC, and DNMC staff informed members of the Delaware General Assembly of CAFO regulation development progress at two meetings. The first, on April 28, 2010, was a joint meeting of the House and Senate Agriculture Committees, and the second on June 2, 2010, was a presentation before the House Agriculture Committee.

Due to feedback received from the public workshops and EPA, the Draft CAFO Regulations were revised. The revised Draft CAFO Regulations were then presented to the public for comment during the months of June and July 2010. DNREC and DDA published the complete *Draft 7201 Regulations Governing the Control of Water Pollution, Section 9.5* in the July, 1, 2010, Delaware Register of Regulations. A Public Hearing was held at the Delaware Department of Agriculture building in Dover on July 22, 2010. **The new CAFO Regulations became effective on November 11, 2010.**

During 2011 the State's CAFO Regulations were further modified. These modifications included changing several of the definitions in the regulations as well as clarifying setback distances from drainage conduits and Waters of the State. **These modifications took effect on November 11, 2011.**

Poultry farmers and other livestock operations in Delaware that are identified as CAFOs, or those with a discharge, will need to apply for a CAFO permit. To apply for the permit, farmers are required to submit a signed Notice of Intent (NOI) and a copy of their most recent nutrient management plan (NMP) or animal waste management plan (AWMP) to the Delaware Department of Agriculture (DDA).

Operations that are not currently defined as CAFOs but will become a CAFO in the future will need to submit a NOI at least 180 days prior to beginning operations or as assigned by the Secretary of Agriculture.

Producers and the public that have questions about CAFOs and the regulations may go to the DDA website www.dda.delaware.gov and find a copy of the regulations, Frequently Asked Questions (FAQs), and the NOI form. Those without computer access may call DDA directly for assistance and for hard copies of the regulations, FAQs, and the NOI.

Listed below are selected items from the FAQs:

- The owner or operator of any CAFO that discharges pollutants or proposes to discharge pollutants into the waters of the State is required to seek a NPDES CAFO permit.
- In general, a discharge occurs in situations when animal manure is improperly stored, handled incorrectly, or over-applied as defined by the nutrient management plan.
- The permit requires the farm to implement a nutrient management plan written by a certified plan writer, maintain records of nutrient handling activities, submit an annual report, maintain nutrient management certification and implement Best Management Practices (BMPs) on the farm to prevent a discharge.
- **There is no fee for the permit.**
- Any farm that operates under a CAFO permit is subject to periodic inspection by Program staff.
- The Delaware Department of Agriculture can assist owners and operators by providing a self-assessment/risk assessment tool that will help them make a determination of discharge.
- Acquiring a NPDES CAFO permit and implementation of associated BMPs will help provide protection to the owner-operator against action by the state and federal governments and against citizen suits if a discharge should occur.
- The Secretary of Agriculture may request additional information or changes to be made to the Nutrient Management Plan if necessary and all NOIs will be subject to public review.
- The permit application process will take a minimum of 60 days for approval after the NOI application is submitted.
- Permits may be granted for up to five years.
- Records must be maintained on site for six years.

Program Structure

The Environmental Protection Agency (EPA) maintains oversight authority of the Delaware CAFO program as the responsible agency of the Clean Water Act. The DNREC was delegated authority in 1974 to administer the National Pollutant Discharge Elimination System (NPDES) permits for surface water discharges. These permits are designed to limit discharges from CAFOs, combined sewage overflows, stormwater construction projects, industrial activities and municipal treatment activities.

The Delaware Department of Agriculture (DDA) and DNREC implemented the Delaware CAFO program under a formal agreement signed by the respective Cabinet Secretaries December 16, 2010. The Nutrient Management Commission (Commission) oversees the implementation of the State Nutrient Management Law and the administrative staff. CAFO regulations were adopted by DNREC and DDA, and became effective November 11, 2011. Nutrient Management Program staff is responsible for the enforcement of the CAFO regulations.



Most Delaware farms with animal feeding production raise poultry.

CAFO Site Visits

During the summer of 2011, Nutrient Management staff began to conduct onsite inspections of farms that had submitted NOIs during the previous winter and spring. The purpose of these site visits was to identify any special concerns regarding the layout and operation of the farm's animal production area as well as to brief applicants as to what to expect during the permitting process. One hundred thirty site visits representing 143 production areas were conducted during the remainder of 2011.

New State Technical Standards

During 2010, EPA initiated actions requiring all the Chesapeake Bay states to adhere to total maximum daily loads (TMDLs) for nitrogen, phosphorus and sediment. Each of these states was required to draft a Watershed Implementation Plan (WIP) laying out water quality goals and a path forward to meet the federally imposed TMDLs. Part of Delaware's plan for meeting the TMDLs was the successful implementation of the new CAFO regulations. Integral to the CAFO regulations are the accompanying state technical standards (best management practices). These serve as a guide to the proper implementation of the CAFO regulations. Referenced throughout the CAFO regulations are various technical standards for both the production and manure application areas. Use of these standards is crucial for nutrient plan writers, nutrient handlers and agricultural operators. Such use will ensure regulatory compliance when properly implemented.

In order to meet the state and federal requirements, Secretary of



Good housekeeping and manure handling in the production area is a must for all farms holding a CAFO permit.

Agriculture Ed Kee formed the Delaware State Technical Standards Review Committee. The Committee was comprised of a group of policy makers from the Nutrient Management Commission, Department of Agriculture, the Department of Natural Resources and Environmental Control, the University of Delaware, USDA/NRCS, USDA/FSA, and the private sector. All of the Nutrient Management Program's best management practices were reviewed, redrafted, and reformatted. In total, 42 technical standards have been completed to date. Each standard has been peer reviewed. The technical standards are posted on the Department of Agriculture's webpage at: http://dda.delaware.gov/nutrients/NM_TechStandards.shtml.

Total Maximum Daily Load (TMDL) and The Chesapeake Bay Watershed Implementation Plan (WIP)

During 2011 Program staff and commissioners worked closely with DNREC to develop the State's new WIP strategy. This included supplying information about the Nutrient Management Relocation Project and the numbers of various animal production facilities located in those Delaware watersheds that drain into the Chesapeake Bay.

President Barack Obama signed an Executive Order on May 12, 2009, recognizing the Chesapeake Bay as a "national treasure." He called upon the federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed. States within the bay's watershed will be expected to do their individual parts in cleaning up the bay. Delaware is taking proactive measures to be able to meet new regulations that may come along.

The U.S. Environmental Protection Agency was charged with



Proper use of TMDLs will enhance water quality.

defining the next generation of tools and actions to restore water quality in the bay and to describe changes to be made to regulations, programs and policies to implement these actions. The EPA's draft report on water quality, submitted in September 2009, includes significant potential changes to existing programs. EPA proposes to develop new regulations for the Chesapeake Bay to significantly reduce runoff pollution from urban, suburban and agricultural sources. EPA is establishing a federal Total Maximum Daily Load (TMDL) for nutrients and sediment for the bay and its tidal tributaries. The bay TMDL will allocate loadings of nutrients and sediment to all jurisdictions in its watershed.

EPA published regulations in 1992 establishing TMDL procedures. A TMDL represents the maximum amount of a pollutant that a body of water may receive and still meet its water quality standards, with a margin of safety. Pollutants are anything that prevents a water body from attaining the national goal of being "fishable and swimmable." The "loadings" are allocated to sources contributing to the problem. A TMDL is comprised of waste load allocations for "point sources" such as sewage treatment plants, urban storm water systems and large animal feeding operations; load allocations for non-point sources such as polluted rainfall runoff from agricultural lands and impervious surfaces; and a margin of safety.

EPA is working with its partner states and the District of Columbia to develop individual Watershed Implementation Plans (WIPs) and an overall TMDL implementation framework. The WIP will identify specific reduction targets by geographic location and sector to achieve allowable loadings, as well as a description and schedule of actions that the states, D.C., and local decision makers will take to achieve these reductions.

A meeting was held in Delaware in September 2009 to explore ideas in addressing performance-based nutrient management, for the purpose of establishing better accountability for agriculture. The group's goals were to provide accountability, paperwork relief and measurable nutrient load reductions. A plan was presented to the DNMC and approved.

Stormwater Control for Animal Feeding Operations

For the past several years, many farms experienced EPA and state inspections where the runoff of stormwater was the primary issue of concern. The Commission asked DNREC to evaluate stormwater management for typical poultry operations and provide recommendations in the form of BMPs. The following BMPs were provided and adopted by the Commission for consideration:

1. Further promote the use of existing BMPs, policies and procedures: Growers need to follow existing Commission policy and NRCS standards. This includes the use of the appropriate BMPs for each individual production area. Some of the critical BMPs that will assist in preventing runoff from polluting nearby waters follow:

- Time cleanouts to avoid rain events during litter-manure handling;
- Handle litter-manure under roof when practical;
- Prevent overfilling loaders and crusting machines that may result in spillage;
- Minimize exposed litter-manure in the production area;
- Clean up any spilled manure as soon as practical.

2. Adopt “good housekeeping” as a BMP. A proper procedure during clean-out and crust-out can prevent litter-manure from entering the environment and is essential. Many of the proposed BMPs include maintenance of grass around poultry houses, manure shed, and any ditches or waterways. Vigorous, well maintained grass areas between watercourses and poultry houses, manure sheds and composters will provide healthy vegetation that will facilitate filtering of nutrients and trapping sediments.

3. Follow new farm construction recommendations for poultry houses, manure sheds and composters. For those houses and manure sheds that have yet to be built, we stress the importance of working with the integrator, NRCS and the conservation districts to ensure the structures are properly sited. This would include the consideration of:

- Soils
- Wetlands
- Floodplains
- Tax ditch rights-of-way
- Utility easement
- Property lines
- Water-bodies, including ditches

4. Promote the construction of new buildings within the production area in a manner consistent with the State Sediment and Stormwater Law and policies. These include practices such as silt fences, stabilized construction entrance, sediment traps on some sites and vegetative stabilization. BMPs used during construction would be in accordance with the conservation plan for the farm and may include current county building code setbacks such as the following:

- 100 feet from a stream or ditch system
- 50 feet from tidal wetlands
- 25 feet from non-tidal wetlands
- 1 foot above floodplain

5. Explore additional outreach to include the University and certification curriculum. Furthermore, flock supervisors should be educated on many of the BMPs.

6. Drainage pipes within the production areas of a poultry farm should not be removed, but rather serve as a mindful reminder that stormwater leaves the farm and good housekeeping will **reduce the nutrients from being a part of the runoff.**



Farm ponds that drain the production area are excellent BMPs for nutrient and stormwater management.

Nutrient Management and the Equine Industry

The equine industry is one of the fastest growing sectors of Delaware agriculture. The state is home to many commercial and hobby stables as well as several large racing training facilities and three public racetracks. Facilities that house horses with a cumulative weight of 8,000 lbs. (about seven horses) or those that apply nutrients to greater than 10 acres need a Nutrient Management Plan. This plan allows the operator to better manage the handling of manure and used bedding. Such manure or used bedding should be stored under cover or in a manner to prevent runoff. Horse facilities also need to handle waste from animal wash down areas in such a way that it doesn't discharge into nearby ditches or other waters.



At right: Horse manure and wash down water should be managed in a way to prevent nutrients from entering public waters.

Complaint Resolution

Complaints related to manure management and general nutrient management practices are handled and resolved by program staff. Actions against any alleged violation of the Nutrient Management Law, regulations or standards are investigated by Program staff and recommended for action by the Commission.

Twenty-four public complaints were received and resolved by Program staff relating to manure management, livestock management, odor and nutrient management certification. The categories of complaints and operation types are as follows:

Complaint Category	
Manure management	66%
Mortality Management	4%
Odor	22%
Fertilizer Management	8%
Operation Type	
Poultry	70%
Horse	4%
Field Crop Only	22%
Swine	4%
Dairy	0%
Beef	0%

Comparison of Methods for Estimating Poultry Manure Nutrient Generation within the Chesapeake Bay Watershed

Modeling the Chesapeake Bay Watershed

- As part of the Chesapeake Bay Program, the USEPA has developed watershed models for estimating Nitrogen (N) and Phosphorus (P) loading into the Chesapeake Bay. *
- These models include algorithms for estimating manure generation from poultry production using manure excretion and chemical composition coefficients from the 2003 ASAE Standard 381.4.
- These coefficients are based upon studies performed about 20 years ago, and as a result, do not reflect recent innovations in bird genetics, nutrition, and production practices.

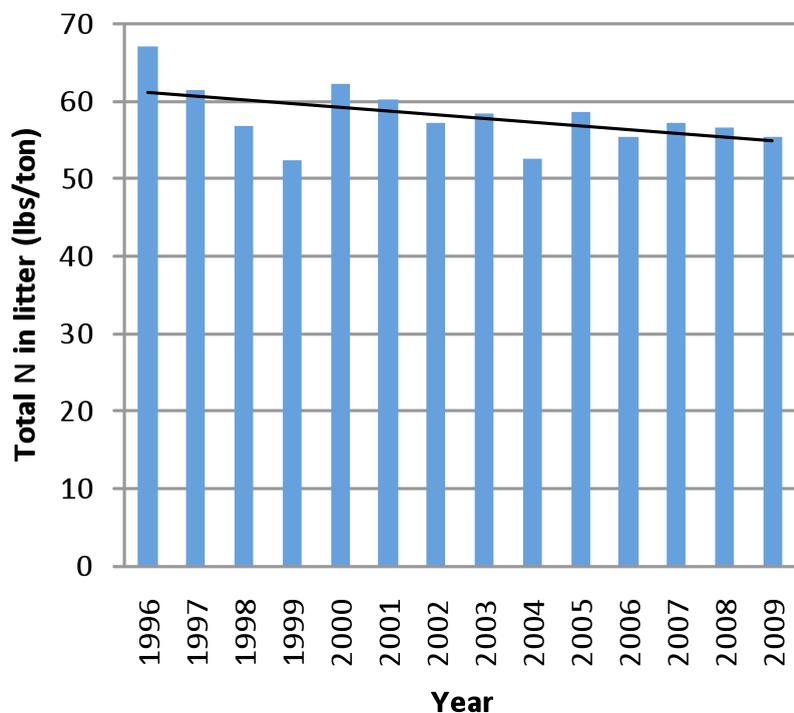
Objectives of this study

- Determine best estimates for modern poultry production manure and nutrient generation.
- Use this information to estimate current N and P generation within the Bay watershed.

**The Chesapeake Bay watershed is the largest estuary in the United States, and includes more than 64,000 square miles encompassing parts of six states - Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia - and the entire District of Columbia.*

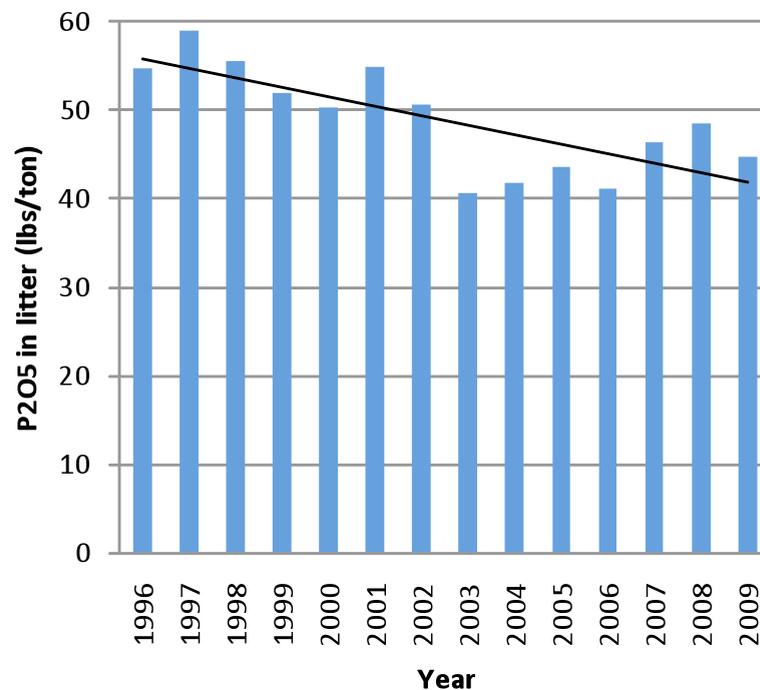
MANURE CHARACTERISTICS FROM MODERN POULTRY PRODUCTION

Trends in Litter Nutrient Content



Trend line slope equal to zero statistically significant at the 95% level.

Wet basis data from 3,400 manure samples analyzed by the Delaware Department of Ag from 1996 through 2009. Average moisture content from 2002 to 2009 was 31.5%.



Trend line slope not equal to zero statistically significant at the 95% level.

Survey of Litter-Manure Generation Estimates from Poultry Production

- University of Delaware 1.25 tons per 1000 birds
- University of Maryland 1.0 tons per 1000 birds
- Penn State 1.07 tons per 1000 small birds
1.65 tons per 1000 large birds
- NRAES 1.25 tons per 1000 birds
- 2004 ASAE STANDARD 85 lbs wet excretion per 1000 lbs of birds (~ 5.2 tons of wet excretion per 1000 birds)

Summary of key findings

Analysis of more than 3,400 manure samples by the DDA laboratory from poultry farms in Delaware revealed a significant trend downward in Phosphorus. A similar trend did not exist for Nitrogen. The reduction in Phosphorus content is the result of improvements in genetics, nutrition and production practices adopted by growers and integrator over time. Comparison of current manure generation estimates among several universities and poultry producing states indicates a range from 1.0 to 1.7 tons per 1,000 birds produced. These numbers are substantially lower than the 5.2 tons of wet excretion predicted using the ASAE Standard.

CASE STUDY: MANURE AND NUTRIENT GENERATION IN SUSSEX COUNTY, DE

Estimates Using the ASAE Standard

	EPA/ASAE Approach	units
Bird Inventory	43,620,576	# of birds on any given day (2007 Census)
Animal Unit Definition	455	# of birds per 1000 lbs of animal mass
Total Animal Unit Inventory	95,869	animal units on any given day
Manure Production	85	lbs of manure per animal unit per day
Total Manure Produced	1,487,174	tons wet excretion per year
Nitrogen Concentration	0.0129	lbs TKN per lb of manure
Phosphorous Concentration	0.0035	lbs Total P per lb of manure
Total Nitrogen Produced	38,491,563	lbs Total N per year
Total Nitrogen Not Volatized	35,332,221	lbs Total N per year
Total Phosphorous Produced	10,497,699	lbs Total P per year
Total Phosphorous Produced with 16% phytase credit	8,818,067	lbs Total P per year

- The table at left uses coefficients and nitrogen and phosphorus concentrations from the ASAE standard.
- Finished bird weight according to the 2003 standard is 4.4 lbs.
- Volatized nitrogen was computed using the method in CBP Watershed Model.
- The CBP model applies a 16% credit to P₂O₅ due to phytase in poultry diets.

Estimates Using Current Generation Data

	UD/DDA/UMD Approach	units
No of Birds	43,620,576	# of birds
No of Flocks per Year	4.8	flock per year
Total Number of Birds Produced	209,378,765	birds per year
Manure Production	1.25	tons per 1000 birds
Total Manure Produced	261,723	tons per year
Nitrogen Concentration	56.80	lbs Total N per ton
Phosphorous Concentration	19.50	lbs Total P per ton
Total Nitrogen Produced	14,839,720	lbs Total N per year
Total Phosphorous Produced	5,103,607	lbs Total P per year

- The table at left uses typical manure generation rates and current average nitrogen and phosphorous concentrations.
- The average finished bird weight on Delmarva is 7.1 lbs. Broilers finish at 5.7 lbs and roasters finish at 8 lbs.
- Comparison of the total manure, total nitrogen, and total phosphorous reveal significantly lower values compared to the values estimated with the ASAE standard.

Conclusions

Over 3,400 manure samples taken from 1996 to 2009 were analyzed for trends in N and P concentrations. While there was no significant change in N concentrations over this period, there was a statistically significant decrease in P concentrations.

A survey of production estimates from various poultry producing states was made and revealed that rates of production range from 1.0 to 1.7 tons of manure per 1,000 birds produced.

A case study was performed for Sussex County, Delaware, showing that about 260,000 tons of litter is produced annually in the county; approximately 20% of the 1.46 million tons of fresh wet manure estimated from the 2004 ASAE standard.

Using the manure N and P concentrations previously stated, actual N generation in the county was calculated to be about

15 million pounds which is 40% of the estimate using the 2004 standard. The actual P generation was calculated to be about 5 million pounds which is approximately 60% of the current estimate using the 2004 standard.

Acknowledgements

The authors would like to thank Mark Dubin and Chris Broesch from the Chesapeake Bay Program and University of Maryland for their cooperation during this study.

— James Glancey & Bill Brown
 University of Delaware
 Edwin Kee, Mark Davis & Larry Towle
 Delaware Department of Agriculture
 Jennifer Timmons
 University of Maryland
 Jennifer Nelson
 USDA NRCS Maryland

Phosphorus Management and Phytase

Managing phosphorus nutrient is required in the Nutrient Management Law by restricting phosphorus applications to the crop removal rate. Phosphorus-limited manure applications can be managed and applied as a three-year crop removal rate. Excess poultry litter-manure is managed by alternative use projects such as the Perdue AgriRecycle plant and the Relocation Program. Phosphorus is also managed in the feed formulations of the poultry companies. Phytase is significantly helping the industry better manage phosphorus in the feed and litter-manure.

Phytase is an enzyme currently added to poultry feed at the mill that helps broilers and other poultry utilize more indigestible (phytic acid) phosphorus. This, in turn, reduces the need to

add supplemental phosphorus to the feed, and also reduces the phosphorus concentration in the litter-manure. Reports indicate that phytase has decreased phosphorus content in litter-manure by at least 23 percent (Saylor, 2005). Recent poultry litter-manure analysis has identified an average of 44 pounds phosphorus (P_2O_5) per ton (Hansen, 2005). Analysis prior to 2001 was commonly seen at 60-70 pounds P_2O_5 per ton. This 30-40 percent phosphorus reduction is the result of phytase, litter-manure amendments and the overall litter-manure handling practices implemented. The average nutrient content of poultry litter-manure is 57-44-45 pounds of N-P-K per ton. The use of phytase is one of several strategies needed to meet the intent of the Delaware Nutrient Management Law.

Evaluating Excess Poultry Litter-Manure in Delaware

Poultry Litter/Manure Generation

Delaware growers produced 245.8 million broilers/roaster chickens in 2007 according to the Delaware Agricultural Statistics for 2007-2008. An industry-adopted litter-manure generation calculation is to multiply 1.25 tons per 1,000 birds. This calculation accounts for the size variation of poultry, namely broilers and roasters, and the bedding material typically consisting of wood shavings. Poultry litter-manure generation is estimated at 307,250 tons annually.

This annual generation does not necessarily indicate the amount available for disposition. The annual disposition is dependent on cleanout cycles such as three-year total cleanouts, annual cleanouts, center cleanouts and crust-outs. Other variables that influence disposition include the availability of bedding litter and disease pressure. It should be acknowledged that if disposition for one particular year is below average, there will be another year in which disposition is above average. It will be assumed that the generation is equal to the amount available for disposition.

Nutrient Value

The current nutrient value of poultry litter-manure is 57-44-45 pounds per ton of Total Nitrogen (TN), Phosphate (P_2O_5) and Potash (K_2O). Pounds per ton are illustrated as (TN- P_2O_5 - K_2O). The nutrient values of interest are nitrogen and phosphate and are utilized in evaluating the N and P balance for Delaware crop production.

Nitrogen and Phosphorus Mass Balancing

The fundamental tenet of economically and environmentally sound nutrient management is the strategic approach of nutrient mass balancing. Dr. Tom Sims and colleagues published a mass balance report in 2008 titled *Nutrient Mass Balances for the State of Delaware*. The concept is simple but difficult and expensive to implement. Nutrient inputs to a farm, watershed, county or state should be balanced by nutrient outputs from the area of interest. Preventing a nutrient surplus should prevent the scenario where manure-nutrients are treated as a waste and not a nutrient. Furthermore, preventing a nutrient deficit is important for the economic value of nitrogen and phosphate. Nitrogen and phosphorus fertilizers are significant costs in grain production and should be equally valued when in the form of litter-manure.

Excess poultry litter-manure currently supplies several alternative use markets. Most of the excess poultry litter-manure originates from Sussex County. The primary market drivers for excess poultry litter-manure are:

1. Phosphorus-limited nutrient management regulations;
2. Relocation funds to assist in the transportation cost of moving excess poultry litter-manure to crop farms low in soil-phosphate or alternative use projects;
3. Perdue AgriRecycle demand for litter-manure as a processed organic fertilizer; and

4. Mushroom industry demand for a nitrogen compost source.

Excess Poultry Litter Evaluations

The assessment of excess poultry litter-manure was conducted using three different methods:

1. Marketplace: The marketplace method was simply evaluating the amount of excess poultry litter-manure moving to alternative markets. These markets include land application on fields that have soil phosphorus levels less than 150 fertility index value within Delaware, relocation for land application outside of Delaware, Perdue AgriRecycle pelletizing plant and the mushroom industry located in southeast Pennsylvania. The three-year average for excess poultry litter entering the marketplace is 96,436 tons.
2. Phosphorus crop removal balance as required by the Nutrient Management Law: The Nutrient Management Law limits the application of phosphorus, primarily as animal manure, to a crop uptake level. As long as the expected crop has the capability to take up the phosphorus, it can be applied. This zero balance calculation prevents the over-application of phosphorus and permits application regardless of the phosphorus available in the soil from historical over-applications. According to the mass balance report, the phosphorus input in the form of poultry litter-manure is 66 percent and applies to excess poultry litter-manure proportionately. The 2006 total phosphorus excess of 590 tons calculates to be 389.4 tons (66 percent of phosphorus as poultry litter-manure, or 40,533 actual tons of poultry litter-manure (Sims, 2008). This surplus along with the 2006 relocation projects result in a total gross surplus tonnage of 118,257.
3. Agronomic recommendations for economically optimum yields: This method accounts for the agronomic demand of the plant and accounts for the presence of phosphorus stored in the soil. This method assumes that adequate phosphorus soil levels will result in no application of phosphorus in the form of poultry litter-manure or commercial fertilizer. This agronomic threshold method calls for application rates that are recommended by the University of Delaware and balanced between crop uptake and nutrient inputs. According to the mass balance report, the agronomic assessment accounts for 66 percent of the excess phosphorus (3,490 tons), which is 2,303 tons (Sims, 2008). When converted to a poultry litter-manure value, it represents 239,721 tons of litter-manure still surplus, or 78 percent of all litter-manure generated in one year.

In conclusion, methods #1 and #2 appear to be the realistic methods for determining excess poultry litter-manure. The average between method #1 and method #2 is 107,346 tons and should be used for planning purposes:

—Bill Rohrer 9/29/09

Delaware Poultry Litter/Manure and Mass Balance Data

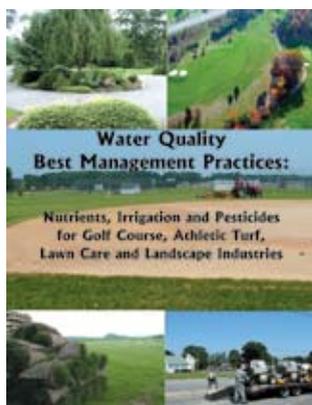
2007 statewide poultry production	245,800,000 birds
2007 litter/manure generation	307,250 tons
Method #1: Marketplace excess poultry litter/manure (07,08,09 average)	96,436 tons
Method #2: Mass balance report for implementing the NM law	118,257 tons
Method #3: Mass balance report for agronomic P demand	239,721 tons
Recommended planning figure for excess poultry litter/manure	107,346 tons

Best Management Practices

The Delaware Nutrient Management Program has two Best Management Practices (BMPs) booklets, available free of charge to anyone requesting them. These BMPs are endorsed by the Commission and are designed to reduce nutrient runoff. These

Golf Courses, Athletic Turf, Lawn Care and Landscape Industries

The Commission recommends BMPs for non-agricultural businesses such as golf courses and lawn care companies. The BMP booklet consists of six chapters that include: Introduction; Nutrient Management Certification; Nutrient Management BMPs; Fertilizer; Irrigation & Fertigation Management; and Pesticide Handling. This booklet is an invaluable resource that outlines who must be certified, how to become certified, and how to follow Best Management Practices in daily non-agricultural applications.



booklets are valuable training tools for nutrient handlers and are often found as a component of the nutrient management plan. For more information or to obtain a copy of these informative booklets contact the Nutrient Management Program at (302) 698-4500.

Container and Nursery Industries

The Commission recommends this BMP booklet for the greenhouse and nursery industries. The booklet contains several chapters which include: Nutrient Management Certification; Nursery Site Selection for optimum BMP usage, Irrigation and Water Conservation Strategies; Collection Basins; Stormwater Management; Fertilizer Application; Pesticide Application and more.



County Conservation Districts

The Commission works cooperatively with County Conservation Districts to promote and implement nutrient related Best Management Practices. Many practices that are coordinated by the Conservation Districts result in success that helps both the environment and the farmer. Kent and Sussex Conservation District offices staff a total of 10 Conservation Planners who develop nutrient management plans. The following is a 2011 summary of the Districts' accomplishments:

NEW CASTLE COUNTY

Construction/Planting Contracts

- Manure storage – 1
- Cover crop – 6,098 acres
- Roof runoff structures – 1
- Stream fencing – 814 ft (1,896 total fencing)

In-House Accomplishments

- Comprehensive Nutrient Management Plans (CNMPs) planned — 1 on 112 acres/ CNMPs applied — 1 on 112 acres
- Conservation Plan development – 126 “planned” totaling 16,361 acres with 158 “applied” totaling 24,765 acres

KENT COUNTY

Construction/Planting Contracts

- Manure storage – 2 Dairy, 3 Horse/Other, 7 Poultry
- Mortality storage – 5
- Cover crop (planted) – 15,965 acres
- Concrete pads for manure handling – 84

In-House Accomplishments

- Nutrient Management Plan development – 11 plans representing 2,946 acres
- Animal Waste Plan/CNMP development – 44
- Conservation plan development – 26,962 acres
- Pre-side dress soil nitrate test – 149 tests representing 5,620 acres

SUSSEX COUNTY

Construction/Planting Contracts

- Manure storage – 27
- Mortality storage – 18
- Cover crop – 21,809 acres
- Concrete pads for manure handling – 36

In-House Accomplishments

- Nutrient Management Plan development – 14,524 acres
- Animal Waste Plan / CNMP development – 52
- Conservation plan development – 27,918 acres

Field Staging of Poultry Litter-Manure

The following standards reference temporary staging of poultry litter for all poultry operations and anyone handling poultry litter-manure. As of January 2011, these will become enforceable regulations.

The most efficient method of handling and storing poultry litter results from handling the poultry litter as few times as possible. Ideally, total cleanouts and crust outs are immediately land-applied, transported to an alternative use facility, or moved

to a storage structure. However, timing considerations may require temporary, outdoor storage of the total cleanout of litter before use and must be conducted according to the Commission standards. In situations where temporary field staging is needed, litter may be stored temporarily to preserve litter quality and prevent application at the wrong time of the year. Temporary field staging is the least preferred storage practice but may be conducted according to the standards on the following page:

Temporary Field Staging of Poultry Litter Standards

Production Area Storage

“Production Area” means that part of an Animal Feeding Operation that includes the animal confinement area, the manure storage area, the raw materials storage area and the waste containment areas, also includes egg washing or processing facility and any area used in the storage, handling, treatment or disposal of mortalities. The Production Area should be defined in the operation’s Nutrient Management Plan.

Stockpiling storage within the “Production Area” (as defined above) is limited to 14 days without the use of an impervious cover.

The following BMP(s) are required for Production Area Storage:

1. The stockpile must be separated from any channeled runoff, standing water and other drainage systems such as roof runoff and down spouts.

The following additional BMPs are required for Production Area Storage of 2-14 days:

2. The stockpile must be at least 6 feet high; and
3. The stockpile site must meet Natural Resources Conservation Service (NRCS) standard or other containment area lining (standards) approved by the Commission.

Application Area Storage Up To 90 Days

Temporary field storage away from the “Production Area” can be staged for land application and is limited to 90 days without the use of an impervious cover.

“Application Area” means land under the control of an Animal Feeding Operation owner or operator, whether it is owned, rented or leased, to which manure, litter or process wastewater from a production area is or may be applied.

The following BMPs are required for Application Area Storage Up to 90 days:

1. The pile must be at least 6 feet high and in a conical cross section shape; and
2. Litter-manure shall not consist of more than 5% crust out material; and
3. The selection of the temporary storage site must consider the highest, most practical site possible and shall not use the same site more than once every two years without a storage site that meets NRCS standards or other containment lining standards approved by the Commission; and
4. The temporary field storage sites must be identified in the nutrient management plan; and
5. The site must be located at least 100 feet from a public road, 100 hundred feet from any surface water and 200 feet from any residence not located on the property; and
6. The site must be at least 200 feet from a domestic well and 300 feet from a public water supply well; and
7. Post litter-manure removal treatment must include the removal of all litter-manure and the top 1-2 inches of topsoil if the topsoil is co-mingled with the litter-manure to prevent nutrient loads; and
8. A production crop or cover must be established and maintained at the site as soon as practical following post removal treatment.
9. For temporary storage sites on soils classified as located within 1.5 feet of the depth to the seasonal high water table, any one of the following practices must be implemented:
 - a. The establishment of a storage site that meets NRCS standards or other containment lining standards approved by the Commission; or
 - b. The use of high carbon (content) material (straw, wood shavings, fodder) as the base of the pile at least 8 inches thick to serve as a barrier and easy post storage removal; or
 - c. The use of powdered bentonite or similar material that will seal the area under the pile.

Application Area Storage Over 90 Days

This additional outdoor staging time can only be used if the farmer has a written waiver from the Delaware Nutrient Management Commission.

For conditions that require temporary storage of litter-manure beyond 90 days, individual or general authorization may be granted by the Commission or Delaware Department of Agriculture.

The following BMPs are required for Application Area Storage Over 90 days:

1. The pile is to be constructed as large as possible and be at least 10 feet high and in a conical cross section shape; and
2. Litter-manure shall not consist of more than 5% crust out material; and
3. The selection of the temporary storage site must consider the highest, most practical site possible and shall not use the same site more than once every two years without a storage site that meets NRCS standards or other containment lining standards approved by the Commission; and
4. The temporary storage sites must be identified in the nutrient management plan; and
5. The site must be located at least 100 feet from a public road, 100 hundred feet from any surface water and 200 feet from any residence not located on the property; and
6. The site must be at least 200 feet from a domestic well and 300 feet from a public water supply well; and
7. Post litter-manure removal treatment must include the removal of all litter-manure and the top 1-2 inches of topsoil if the topsoil is co-mingled with the litter-manure to prevent nutrient loads; and
8. A production crop or cover crop must be established and maintained at the site as soon as practical following post removal treatment; and
9. The establishment and maintenance of a 24-foot vegetative buffer surrounding the pile site.
10. For temporary storage sites on soils classified as located within 1.5 feet of the depth to the seasonal high water table, any one of the following practices must be implemented:
 - a. The establishment of a storage site that meets NRCS standards or other containment lining standards approved by the Commission; or
 - b. The use of high carbon (content) material (straw, wood shavings, fodder) as the base of the pile at least 8 inches thick to serve as a barrier and easy post storage removal; or
 - c. The use of powdered bentonite or similar material that will seal the area under the pile.

Winter Application of Fertilizer and Manure

Winter application regulations continue and limit the application of commercial and manure- based fertilizer during the time of the year that is most vulnerable for nutrient runoff. The purpose of the regulation is to limit the application of Nitrogen (N) and Phosphorus (P) fertilizer and manure applications as follows, unless specified in the nutrient management plan that the application is necessary:

- The application may not occur between December 7 and February 15;
- The application may not occur on snow-covered or frozen ground;
- The application may not occur on impervious surfaces such as sidewalks, roads and other paved areas and the misdirected fertilizer must be removed on the same day of application.

Failure to comply with these and other regulations of the Commission may result in a compliance and enforcement hearing of the Commission.



This manure storage structure can hold four months of manure.

Handling Catastrophic Mortality

Every animal operation’s nutrient management plan is designed to address daily and catastrophic mortalities. Most daily mortalities are handled in environmentally friendly manners such as composting. Most farms are not designed to handle large-scale mortality events such as what Delaware experienced during the winter of ’09/’10. Many farmers faced the challenge of handling large amounts of mortalities from roof collapses caused by snow accumulation. The following recommendations were provided to the poultry industries and growers as they dealt with catastrophic mortalities. Compost all mortalities onsite in:

- A covered structure such as a manure shed. It is important that the proper amount of carbon is used in order to rapidly heat the pile and promote the breakdown of the birds. In general the mortality to carbon ratio is one to one. Acceptable carbon sources are straw, woodchips or shavings.
- Relocate the mortalities to a commercial composting site.
- Relocate the mortalities to a landfill. This option requires coordination and approval with the landfill.

Budget

The Nutrient Management Commission’s accomplishments were made possible by funding provided by the Legislature. The Nutrient Management Program continues to implement nutrient planning, relocation and mandated activities as required by the Nutrient Management Law.

The following budgets are represented as fiscal years.

	FY 2009 Budget	FY 2010 Budget	FY 2011 Budget
Program Operating Costs:			
Personnel	251,600	130,400	240,700
Federal Funds Section 319 (Clean Water Act)*	30,000	30,000	30,000
Travel	5,500	600	600
Contractual	17,000	17,000	16,000
Supplies	4,000	4,000	4,000
Information/Education/Certification	221,000	221,000	172,500
Nutrient Relocation Program	246,000	246,000	246,000
Federal Funds NRCS*	0	50,000	50,000
Federal Funds section 319 (Clean Water Act)*	200,000	200,000	200,000
Federal Funds Ches. Bay Program*	110,000	150,000	150,000
Poultry Companies*	125,499	176,011	164,000
Nutrient Management Planning	451,800	0	411,800
Nutrient Management Planning from Pesticide Revenues	0	451,800	0
Demonstration and Research	1,505	0	0
Penalties Collected	1,050	1,906	1,906
TOTAL	1,624,305	1,637,211	1,688,400

* All bold text represent funds that are not appropriated by the State of Delaware.

Background and Contacts

What is the Delaware Nutrient Management Commission?

The Nutrient Management Law established a 19-member Commission that is charged to develop, review, approve and enforce regulations governing the certification of individuals engaged in

the business of land application of nutrients and the development of nutrient management plans. The members of this Commission come from many different backgrounds and professions.

What are the Commission’s Responsibilities?

The Delaware Nutrient Management Commission will:

1. Consider establishing critical areas for voluntary and regulatory programs.
2. Establish Best Management Practices to reduce nutrients in the environment.
3. Develop educational and awareness programs.
4. Consider incentive programs to redistribute excess nutrients.
5. Establish the elements and general direction of the State Nutrient Management Program.
6. Develop nutrient management regulations.

Members of the Nutrient Management Commission

William Vanderwende, Commission Chairman, was appointed to the Commission by the Senate, and was named Chairman by the Governor. He is a full-time Sussex County dairy producer who represents the state’s dairy industry. He operates a farm with 700 head of dairy, and 3,000 crop acres. He can be reached at (302) 349-4423.



Mark Adkins was appointed by the Governor to represent swine farmers. He operates a 900-acre family grain farm and 1,000-head swine farm and is a director for the Delaware Swine Producers. He can be reached at (302) 732-3007.



David Baker, Commission Vice Chairman and Chairman of the Personnel and Planning Subcommittees, was appointed by the Senate as a representative of the New Castle County grain industry. He is a full-time grain farmer of 3,000 acres. He can be reached at (302) 378-3750.

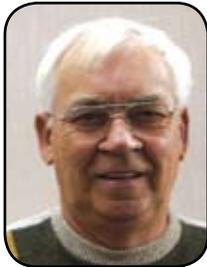


Robert Baldwin, is the Agricultural Liaison for the Department of Natural Resources and Environmental Control and is appointed by the Nutrient Management Law. He can be reached at (302) 739-9921.



F. Kenneth Blessing, Jr. was appointed by the Senate to represent Kent County vegetable farmers. Kenny is part of a diversified farming operation consisting of approximately 3,500 crop acres including vegetables, grain and beef cattle. He can be reached at (302) 422-5746.

Jim Elliott was appointed by the House of Representatives as an Environmental Advocacy Group representative. Former Mayor of Fenwick Island, he is no stranger to public service. He can be reached at (302) 337-3653.



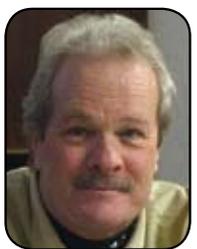
Laura Hill was appointed by the House of Representatives to represent Sussex County poultry farmers. She is part of a family farm that operates a 130,000-capacity broiler operation and farms 3,000 acres of grain and vegetable crops. She can be reached at (302) 945-0725.

Tony Keen, Chairman of the Technology Subcommittee, was appointed by the Senate as a nutrient consultant. He has owned and operated a private crop consulting firm since 1980. He can be reached at (302) 684-5270 (work) or (302) 684-3196 (home).



Larry Lee was appointed by the House of Representatives. He was appointed to represent commercial applicators in Delaware. Larry is employed with FS Growmark in Milford. He can be reached at (302) 424-2835.

Lisa McCormick was appointed by the Governor as a Sussex County public citizen representative. She is part of a family sod farm in Sussex County. She can be reached at (302) 988-8235.



Bud O'Neill was appointed by the Governor as a representative for the golf course/lawn care industry. He owns an agronomic service firm that plans and manages turfgrass for golf courses, athletic complexes and lawns.

He is past chairman of the Delaware State Golf Association greens section and can be reached at (302) 653-8618.



Richard Sterling was appointed by the Governor as a representative of the commercial nursery industry. He operates a 75-acre nursery specializing in evergreens. He can be reached at (302) 653-7060.



Scott Webb was appointed by the House of Representatives to represent Kent County poultry farmers. He is part of a family farm that operates a 119,000-capacity broiler operation and farms 1,000 acres of grain crops. He can be reached at (302) 381-0402.

Edwin Kee, Secretary of the Delaware Department of Agriculture, is an ex-officio member of the Commission. He can be reached at (302) 698-4500.



Dr. Gerald Llewellyn serves for Secretary Rita Landgraft and is currently Chief of the Environmental Health Evaluation and Toxicology Branch at the Division of Public Health, within the Department of Health and Social Services. His position is ex-officio and he can be reached at (302) 744-4824.

David Small, Deputy Secretary of the Delaware Department of Natural Resources and Environmental Control, is an ex-officio member of the Commission. He can be reached at (302) 739-9000.



Delaware Nutrient Management Program Staff



W. Larry Towle is the Program Administrator of the Delaware Nutrient Management Program and an ex-officio member of the Nutrient Management Commission. He can be reached at (302) 698-4500 or larry.towle@state.de.us.

Bob Coleman is the Environmental Coordinator for the Delaware Nutrient Management Program. He can be reached at (302) 698-4556 or robert.coleman@state.de.us.



Judy Baines is the Administrative Assistant for the Delaware Nutrient Management Program. She can be reached at (302) 698-4558 or judy.baines@state.de.us.



Lauren Torres is an Environmental Scientist for the Delaware Nutrient Management Program. She can be reached at (302) 698-4628 or lauren.torres@state.de.us.

Ben Coverdale is also an Environmental Scientist for the Delaware Nutrient Management Program. He can be reached at (302) 698-4627 or michael.coverdale@state.de.us



University of Delaware Staff

Several specialists from the University of Delaware provide certification training for the Nutrient Management Program. They also assist the program by providing technical recommendations and by conducting research and demonstration projects on nutrient management practices. They are:

Phillip Sylvester, Kent County Extension Office at (302) 730-4000.

Shawn Tingle, Extension Associate, at (302) 856-2585, Ext. 572.

Corey Whaley, Sussex County Extension Agent at (302) 856-2585, Ext. 594.

Sydney Young Riggi, Extension Associate, at (302) 856-2585, Ext. 571.

How to Contact Your Conservation District

The Conservation Districts provide technical agricultural professionals who can assist in nutrient management strategies and recommendations. All nutrient consultants are certified and in most cases, are certified crop advisors.

New Castle County: (302) 832-3100
Kent County: (302) 741-2600
Sussex County: (302) 856-3990

How to Contact the Nutrient Management Program

Information about the Nutrient Management Program can be found on the Internet at www.state.de.us/deptagri/nutrients/index.shtml.

'Water Quality is Everyone's Responsibility'