

AGRICULTURE AND THE LAW

A Guide to Pennsylvania's Agricultural Laws and Regulations for Farmers and Their Neighbors





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For more information regarding agricultural compliance and clean water in Pennsylvania, contact:

Kimberly L. Snell-Zarcone, Esquire Agricultural Policy Analyst Citizens for Pennsylvania's Future (PennFuture) 610 North Third Street Harrisburg, PA 17101 (717) 214-7920 snell-zarcone@pennfuture.org www.pennfuture.org



Table of Contents

Introduction	2
Section 1: Concentrated Animal Feeding Operation Program.	3
Section 2: Nutrient Management Program	8
Section 3: Water Quality Management Program	. 13
Section 4: Erosion and Sedimentation Program	. 15
Section 5: Chesapeake Bay Programs	. 17
Section 6: Nutrient Credit Trading Program	. 20
Section 7: Commercial Manure Hauler and Broker Certification Act	. 25
Section 8: Odor Management Program	. 28
Section 9: Mortality Management	. 31
Section 10: Antibiotics	. 34
Section 11: Local Land-Use Proceedings	. 36
Appendix A: List of Acronyms and Abbreviations Used in the Handbook	. 41
Appendix B: ACRE Fact Sheet	. 42
Appendix C: PennFuture Model Nutrient Management Ordinance	. 44
Notes	. 46

Introduction

Portion of the Chesapeake Bay Watershed. The majority measure between 50 and 179 acres, with an average size of 124 acres. While the number of farming operations within Pennsylvania has remained fairly constant, the types of farms are becoming increasingly diverse in terms of the animals they raise and crops they grow and sell to remain financially sound. Additionally, a focus on efficiency has meant that animals are being raised in more densely populated barns and are often confined for some or all of their lives. Because Pennsylvania operators often import animal feed from the Midwest rather than growing it on their own farms, these farms often have an overabundance of nutrient-laden manure and insufficient land on which to spread it as fertilizer.

Citizens for Pennsylvania's Future (PennFuture) encourages farmers to view manure as a resource that must be thoughtfully managed and carefully land applied. Manure, and the nutrients in manure, escapes from farms and enters into the larger environment along many paths. Once in the environment, particularly in local streams and rivers, manure and the nutrients within can cause serious pollution and accompanying public-health problems. In light of these threats, state and federal governments have imposed a number of regulations upon farming operations. As part of the ongoing efforts to clean up the Chesapeake Bay, the federal government has also required states to better implement and enforce their existing laws and regulations governing farming and water quality.

This handbook is intended to provide general education about the laws and regulations governing farming operations in Pennsylvania. The handbook provides an overview of the relevant federal, state, and local programs that regulate and seek to limit pollution from farming operations. It contains 11 sections, each of which identifies a program by name and is followed by four subsections: What the program addresses; How it tackles the issue; Water-quality problems; and Opportunities for community involvement and public participation. Where needed, it provides tables or charts with more detailed information. Citizens can play a critical role in monitoring and ensuring agricultural compliance with the laws, while farmers may find this resource to be a handy reference to guide their operations. We hope the material within will ensure greater compliance with the laws and regulations designed to prevent pollution and protect public health.

Section 1:

Concentrated Animal Feeding Operation Program

What the program addresses

Pennsylvania's Concentrated Animal Feeding Operation, or CAFO (pronounced *kay-foe*), program is a water-quality program administered by the state Department of Environmental Protection (DEP). CAFOs, a specific type of large farm, are regulated at the federal level by the Clean Water Act¹ under the National Pollutant Discharge Elimination System (NPDES) program. Pennsylvania is authorized by the federal Environmental Protection Agency (EPA) to administer the NPDES CAFO program at the state level. DEP is charged with overseeing the program, which also operates under the jurisdiction of the Pennsylvania Clean Streams Law.

The CAFO program's goal is to protect both groundwater and surface water. Thus its permitting process evaluates an entire farm's potential impacts on water quality. In administering this process, DEP considers the impacts of the land application of manure, manure storage facilities, silage areas, and dead-animal composting areas at such facilities. From the perspective of the farm's immediate neighbors and local citizens, specific concerns may include its potential to affect limestone bedrock or karst water systems or to pollute drinking water sources, and the proximity of the facility to an impaired waterway or watershed or to a legally defined *high quality*² or *exceptional value*³ waterway.

Farms regulated by DEP under the CAFO program are not permitted to discharge pollutants to waters of the Commonwealth. A "discharge" is interpreted as land application of manure in excess of what is allowed in an approved Nutrient Management Plan or a direct release to surface waters. A Nutrient Management Plan (NMP) is a site-specific plan that details when, where and how manure should be applied. Typically, an NMP allows for crop usage of 15 to 20 percent of the nutrients that are applied to fields. The unused portions of nutrients are allowed to be volatilized (passed off as vapor) or to run off into the environment without being considered a discharge requiring a permit.

How it tackles the issue

The underlying premise for regulating CAFOs is that they have the potential to pollute groundwater and surface water, given the amount of manure generated, collected, stored and land applied at these operations. The federal Clean Water Act defines a CAFO as a point source⁴ and prohibits any CAFO from discharging pollutants into a waterway. The Pennsylvania Clean Streams Law is even more



protective of resources, requiring that those facilities with a *potential* to pollute surface or groundwater obtain a permit.

Pennsylvania law contains its own definition of a CAFO, which was recently updated to include federal criteria. The state regulations now require all existing, expanding, or new animal-production facilities that meet the following criteria to apply to DEP for an NPDES CAFO permit:

- A concentrated animal operation (CAO)⁵ with greater than 300 AEUs*
- Any agricultural operation with greater than 1,000 AEUs
- 700 mature dairy cows, whether milked or dry
- 1,000 veal calves
- 1,000 cattle (other than mature dairy cows or veal calves). "Cattle" includes but is not limited to heifers, steers, bulls, and cow/calf pairs
- 2,500 swine each weighting 55 pounds or more
- 10,000 swine each weighing less than 55 pounds
- 500 horses
- 10,000 sheep or lambs
- 55,000 turkeys
- 30,000 laying hens or broilers, if the animal feeding operation uses a liquid manure-handling system
- 82,000 laying hens, if the animal feeding operation uses something other than a liquid manurehandling system
- 125,000 chickens (other than laying hens), if the animal feeding operation uses something other than a liquid manure-handling system
- 5,000 ducks, if the animal feeding operation uses a liquid manure-handling system
- 30,000 ducks, if the animal feeding operation uses something other than a liquid manure-handling system

* An AEU, or animal equivalent unit, is defined as one thousand pounds of live weight of livestock or poultry animals, on an annualized basis, regardless of the actual number of animals comprising the unit.

A livestock operation that falls within the NPDES CAFO permitting system must obtain either a general or an individual permit. These different categories are designed to take into consideration both the size of the animal facility and its potential to impact water quality. A farming operation must apply for an individual permit if it is located in a high quality or exceptional value watershed, which enjoy special protections. A farming operation must also apply for an individual permit if it intends to house more than 1,000 AEUs. A farming operation may apply for a general permit if the farm is a CAFO as defined in the state Nutrient Management Program (page 8) and has more than 300 but less than 1,000 AEUs. A farming operation may also apply for a general permit if it meets the federal regulatory definition of a large CAFO and houses fewer than 1,000 AEUs. Finally, dry poultry operations (those that use something other than a liquid manure-handling system) and horse farms with more than 1,000 AEUs may also apply for a general permit. Table 2 (page 6) specifies the average number of animals needed to equal 300 and 1,000 AEUs, respectively, for various animal species. DEP may deny coverage under a general permit and require application for an individual permit based on review of the permit application and other information.

An applicant for an NPDES CAFO permit is required to submit numerous supporting documents with the permit application. (See box, page 7). NPDES CAFO permits, like other NPDES permits, are valid for five years. Holders must apply to renew an NPDES CAFO permit at least 180 days before expiration. Once issued, permits are generally renewed, though DEP may stipulate additional conditions to the permit during the renewal process to address problems at the facility.

Permitted facilities must comply with the terms of their NMP, including following best management practices (page 8) and implementing an Erosion and Sediment Control Plan (page 15) for plowing and tilling operations. All CAFO operations are required to complete self-inspections of the production area and to document the adequacy, stability and operation of manure-storage facilities, stormwater-management devices, sub-surface drainage systems, and leak-detection systems. Some CAFOs are required to submit their self-inspection reports to DEP on a quarterly basis.



Compliance with CAFO permit conditions is obtained through inspections by DEP and county conservation district staff and via complaints lodged by neighbors of CAFOs. DEP is required by EPA to inspect all CAFOs a minimum of once every five years. However, the Department attempts to inspect CAFOs with an individual permit at least once a year. In addition, officials from county conservation districts inspect all CAFOs for compliance with nutrient management requirements annually, and must report any violations occurring at a CAFO to DEP.

Neighbors who are concerned about water pollution resulting from a farming operation, such as manure running into streams and waterways from the overapplication of manure to fields, and/or fish kills near the farm, should lodge a complaint with their regional office of DEP. The most effective method is via phone. The emergency phone numbers for the various DEP regions are listed in Table 1, below. Be aware that it is useful to document any problems, such as manure running into a stream, with photographs or video footage. However, it is also important not to trespass upon another's property in an attempt to obtain photos or footage of a pollution incident. It may also be constructive to contact the operator of the farm where a discharge into a stream is occurring. Section 691.601(d) of the state Clean Streams Law stipulates that persons reporting an incident are entitled to accompany the DEP inspector on the resulting field investigation. Callers that wish to accompany an inspector must tell the emergency dispatcher that they would like to observe the investigation.

Water-quality problems

The main concern with the CAFO program is that it relies almost exclusively on the Nutrient Management Program to meet the goal of water-quality protection. While the Nutrient Management Program is very detailed and has been updated to account for phosphorus, it effectively ignores up to 85 percent of the total nutrients in manure. While the nutrients that are lost to the environment are not all being lost to waterways, it can be argued that large portions of the nutrients are finding their way to surface and groundwater.

Region	Emergency	Region Headquarters	Counties Supervised
	Phone		
Southeast	484-250-5900	2 East Main Street	Bucks, Chester, Delaware, Montgomery, Philadelphia
		Norristown, PA 19401	
		Phone: 484-250-5900	
Northeast	570-826-2511	2 Public Square	Carbon, Lackawanna, Lehigh, Luzerne, Monroe,
		Wilkes-Barre, PA 18711-0790	Northampton, Pike, Schuylkill, Susquehanna, Wayne,
		Phone: 570-826-2511	Wyoming
Southcentral	877-333-1904	909 Elmerton Avenue	Adams, Bedford, Berks, Blair, Cumberland, Dauphin,
		Harrisburg, PA 17110	Franklin, Fulton, Huntingdon, Juniata, Lancaster,
		Phone: 717-705-4700	Lebanon, Mifflin, Perry, York
Northcentral	570-327-3636	208 West Third Street	Bradford, Cameron, Centre, Clearfield, Clinton,
	24 Hours	Suite 101	Columbia, Lycoming, Montour, Northumberland, Potter,
		Williamsport, PA 17701	Snyder, Sullivan, Tioga, Union
		Phone: 570-327-3636	
Southwest	412-442-4000	400 Waterfront Drive	Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene,
	24 Hours	Pittsburgh, PA 15222-4745	Indiana, Somerset, Washington, Westmoreland
		Phone: 412-442-4000	
Northwest	814-332-6945	230 Chestnut Street	Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson,
	After Hours:	Meadville, PA 16335-3481	Lawrence, McKean, Mercer, Venango, Warren
	800-373-3398	Phone: 814-332-6945	

TABLE 1: DEP REGION EMERGENCY NUMBERS



Another criticism of the CAFO program is that it is not linked directly to any of the nutrient- and sedimentreduction programs overseen by DEP, such as the Chesapeake Bay Program (page 17). Thus, there is a serious disconnect between programs with similar goals in terms of water-quality protection, particularly between a program that can readily *identify* operations that are causing nutrient and sediment loading (the CAFO program) and those programs attempting to *mitigate* nutrient and sediment loading (Chesapeake Bay Program and the associated Total Maximum Daily Load implementation [page 17]).

Opportunities for community involvement and public participation

The NPDES CAFO permitting process allows for public participation. Notice of an application for a permit is published in the *Pennsylvania Bulletin*, the Commonwealth's official gazette for information and rulemaking (http://www.pabulletin.com). Citizens can file written comments on the proposed permit with DEP during the comment period (i.e., 30 days from the date of publication in the *Pennsylvania Bulletin*). Additionally, they can present oral comments at a public hearing if they have requested one from DEP. DEP is required to consider and respond to all public comments before taking final action on a proposed permit. All final actions of DEP are also published in the *Pennsylvania Bulletin*.

Anyone adversely affected by a final action of DEP, such as issuance or denial of a permit, can appeal the decision to the Environmental Hearing Board (EHB) for an administrative review (http://ehb.courtapps. com/public/index.php). Appeals must be made to the EHB within 30 days of receipt of notice of the Department action. Proceedings before the EHB are formal and mirror practices of a regular court. While it is not necessary to be represented by an attorney in an appeal before the EHB, it is recommended.

Additional resources

- For more detailed information about DEP's CAFO program, visit http://www.portal.state.pa.us/portal/ server.pt?open=514&objID=554279&mode=2.
- For more detailed information about EPA's NPDES program, visit http://cfpub.epa.gov/npdes/.
- To find your local county conservation district, visit http://pacd.org/your-district/find-your-district/.

Animal Type	Number of Animals to Equal Approximately 300 AEUs	Number of Animals to Equal Approximately 1,000 AEUs
Beef cattle	300 slaughter and feeder cattle	1,000 slaughter and feeder cattle
Dairy cattle (milked or dry)	200 mature dairy cattle	700 mature dairy cattle
Swine (approx. 55 lbs)	750 swine	2,500 swine
Sheep	3,000 sheep or lambs	10,000 sheep or lambs
Horses	150 horses	500 horses
Chickens (continuous flow water- ing system used)	30,000 laying hens or broilers	100,000 laying hens or broilers
Chickens (liquid manure system used)	9,000 laying hens or broilers	30,000 laying hens or broilers
Turkeys	16,500 turkeys	55,000 turkeys
Ducks	1,500 ducks	5,000 ducks

Table 2: Number of Animals Needed to Equal 300 and 1,000 Animal Equivalent Units (AEUs)

Source: John C. Becker et al., A Guidebook on Community Participation in Addressing Disputes Over Intensive Livestock Operations, pp. 49-50.



NPDES General and Individual Permit Application Requirements

- A Nutrient Management Plan that has been approved by the county conservation district or the State Conservation Commission under Act 38 (page 42). The plan must include manure-application setbacks of at least 100 feet or vegetated buffers of at least 35 feet from surface waters. Also, manure that is stockpiled at CAFOs for 15 days or more must be covered or otherwise stored to prevent discharge to surface waters. The application must also include the approval letter from the county conservation district or State Conservation Commission.
- A copy of the Erosion and Sediment Control Plan for plowing and tilling operations for all land owned or leased by the permit holder
- When required by regulation, a water-quality management permit or engineer's certification for manure-storage structures associated with the facility
- A copy of any water-quality management permit application, if the facility will include discharge of treated wastewater (fairly atypical)
- A Preparedness, Prevention and Contingency Plan to address the handling of chemicals at the facility
- A copy of measures to be taken to prevent discharge to surface water from storage of raw materials such as feed and supplies, if the Nutrient Management Plan does not address these issues
- An E&S Plan or general NPDES Permit for Stormwater Discharges for earth disturbances related to construction activities such as a new building or manure-storage facility, if applicable
- A copy of all notices sent to municipal governments
- A U.S. Geological Survey (USGS) topographic map noting the farm location

Section 2: Nutrient Management

What the program addresses

Program

The Nutrient Management Program is a state waterquality protection program. The program is legislatively mandated through Act 38 of 2005, aka ACRE, (formerly through Act 6 of 1993; see fact sheet, page 42). The program is overseen by the State Conservation Commission, an agency that falls under the jurisdiction of both the Pennsylvania Department of Agriculture and DEP (see http:// www.agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_0_2_24476_10297_0_43/AgWebsite/ OrganizationDetail.aspx?name=State-Conservation-Commission&navid=34&parentnavid=0&orgid=21&). An extensive regulatory framework directs the agency's actions under the program.

The purpose of the Nutrient Management Program is, as the name suggests, to estimate the amount of manure that a facility will generate and how that manure will be utilized by the facility or other facilities. The program also helps farmers to identify best management practices (BMPs) that should be implemented to help protect water quality.

The NPDES CAFO program relies heavily on the Nutrient Management Program as the foundation of its permitting program.

How it tackles the issue

An agricultural operation that exceeds a certain density, and is therefore defined as a CAO, must develop a Nutrient Management Plan (NMP).⁶ NMPs require a site-specific evaluation of the agricultural operation's farming practices to determine when, where, and how manure should be applied. The mathematical calculations required in developing an NMP help the operator to meet the nutrient needs of crops and attempt to limit the off-site migration of nutrients from manure and fertilizer. NMPs are detailed documents and must be drafted by a certified nutrientmanagement specialist.

NMPs report:

- the type and number of animals raised;
- the amount of manure those animals generate;
- the type of crops grown;
- the nutrient needs of those crops;
- the amount of manure and fertilizer applied to the crops;
- the time of year manure is applied; and
- whether or not the manure is incorporated when it is applied.



The nutrients nitrogen and phosphorus are of particular concern in Pennsylvania's Nutrient Management Program. Excessive amounts of nitrogen or phosphorus in waterways can cause eutrophication. Eutrophication causes adverse conditions in ecosystems, such as increased plant growth and decay, a lack of oxygen in waterways, and reductions in fish and other animal populations. In an effort to control eutrophication, emphasis is placed on the *limiting nutrient*, or the nutrient that is in shortest supply relative to other nutrients and whose depletion or elimination will limit cellular growth. Generally speaking, phosphorus is the limiting nutrient in streams and lakes in Pennsylvania. However, nitrogen is the limiting nutrient in the Chesapeake Bay. Because Pennsylvania's Nutrient Management Program seeks to protect the state's streams and lakes, as well as the greater watershed of the Chesapeake Bay, the program must be concerned with both phosphorus and nitrogen loading to local watersheds that will ultimately drain to the Bay.

Nitrogen is generally considered to be the more mobile and phosphorus the less mobile of the two nutrients. Therefore all NMPs must balance nutrient applications (manure, generally) with the nitrogen needs of the crop. In limited circumstances, discussed below, nutrient applications are restricted to the phosphorus needs of the crop being planted.

As noted, NMPs under this program must be written by a certified nutrient-management specialist. The specialist begins by determining how much manure is generated by the animals at a certain facility and the nutrient content of that manure. He or she must then examine the crop rotation of the farm and the nutrient needs of the crops in the rotation, and then determine optimal manure-application rates that match the nutrient needs of the crop with the nutrients available in the manure.

The specialist's final consideration is whether or not manure applications must be restricted because of the potential to cause pollution to surface waters. To determine whether there is such a risk, the Nutrient Management Program utilizes a matrix, the *Phosphorus Index* (P-Index), to identify whether manure applications should be restricted. The P-Index (found at http://pubs.cas.psu.edu/freepubs/pdfs/ uc180.pdf) is a field-by-field analysis of the planned manure applications at a farming operation. Based on the results of the P-Index, the nutrient-management specialist either proceeds in calculating manureapplication rates based on the nitrogen needs of a crop or limits the manure applications to the phosphorus needs of the crop grown on a particular field. In certain circumstances, additional nutrient applications are prohibited.

To run the P-Index, the specialist starts with a screening tool that asks four basic questions:

- Is the farm field located in a special-protection watershed?
- Has there been a significant farm-management change as defined by the program's regulations?
- Is the soil test result for the field greater than 200 parts per million for phosphorus?
- Is the contributing distance from this field to receiving waters less than 150 feet?

If the answer to all of these questions is no, then the nutrient-management specialist can continue planning nutrient-application rates based on the nitrogen needs of the crops. If the answer to *any* of these questions is yes, the nutrient-management specialist must run Part B of the P-Index on the fields for which a yes answer was given. Part B requires consideration of *source factors* and *transport factors* that affect water quality.

The source factors are: soil test results, phosphorus in fertilizer, fertilizer application method, phosphorus in manure, manure application rate, and phosphorus source coefficient.⁷

The transport factors are: erosion rate, runoff potential of the soil, subsurface drainage, contributing distance to receiving waters, and modified connectivity to receiving waters.

Based on the figure obtained in the Part B analysis, the specialist may continue planning nutrient application rates based on the nitrogen needs of the crops; be required to modify the application rates based on the phosphorus needs of the crops; or restrict completely any phosphorus applications.



In addition to identifying where manure may be applied, the specialist must identify any areas where manure application is restricted, such as setbacks and buffers, and indicate these in the NMP. Generally, manure may not be applied within 100 feet of a perennial or intermittent stream, lake, pond, or sinkhole unless a permanent 35-foot-wide vegetated buffer is used. Manure also may not be applied within 100 feet of an active private or public drinking-water source such as a well or spring. Application of manure during the winter months is discouraged, although not banned outright. However, the NMP must identify specific fields where there is sufficient crop residue, minimal slope and minimal proximity to water in order for winter applications to be deemed acceptable.

In recent years, agricultural operations have been encouraged to focus attention on their pastures⁸ and animal concentration areas (ACAs).⁹ Pastures are to be evaluated under the P-Index, as described above. If the P-Index indicates total phosphorus restriction, the regulations allow for the continued use of the pasture *if* the farmer restricts the number of animals on the pasture and the animals' access to streams, lakes, or ponds. ACAs are not considered in the P-Index. However, they must still be addressed in the NMP. The goal in managing ACAs is to ensure that water remains clean and that manure and dirty water from these areas is collected so that it can be applied to cropland or otherwise managed in a manner consistent with the NMP.

Another recent focus has been field stacking of dry manure. Regulations now require dry manure that is to be placed in a field for storage purposes to be land applied within 120 days. If the dry manure is not applied within this time frame, it must be covered to keep rainwater from entering the stacks or placed on a permanent stacking pad. Locations where dry manure is to be stacked must be noted in the NMP. The Nutrient Management Program allows dry manure to be stacked in a field uncovered much longer than does the CAFO program, which requires dry manure that is stacked in a field for 15 days or more to be covered.¹⁰ If a facility is covered under both programs, the facility must comply with the shorter time frame of the CAFO program.

NMPs must identify any BMPs that need to be implemented at an agricultural operation, including but not limited to manure-storage facilities. Manure-storage facilities must be designed, constructed, located, operated and maintained in a manner that protects surface water and groundwater quality and prevents the offsite migration of nutrients. Generally, manure-storage facilities may not be constructed: within 100 feet of an intermittent or perennial stream, river, spring, lake, pond, or reservoir; within 100 feet of a wetland; within 100 feet of an active public well or drinking-water source, private well, or open sinkhole; or within 100 feet of a property line.¹¹ The setback distance generally increases to 200 feet if the manure-storage facility sits on a slope exceeding 8 percent or the facility has a capacity of 1.5 million gallons or more.

NMPs must detail whether the agricultural operation imports additional manure or exports excess manure. If the operation exports manure, the NMP must identify any known parties to which the manure may be exported. The NMP must also detail how much manure will be exported to this person or entity and how the manure will be used on the importing farming operation. Nutrient Balance Sheets (NBS) are typically utilized to meet this requirement.

NMPs are generally submitted to the county conservation district for review and approval. As part of the review process, the districts or DEP must verify that the operation has a current agricultural Erosion and Sedimentation Plan.¹² Conservation Plans are often submitted to meet the Erosion and Sedimentation Plan requirement. Action on NMPs must be taken at a public meeting of the county conservation district board. The Board must allow public input on the plan during both the technical review and evaluation stages of the plan and at the public meeting where formal action (approval or denial of the plan) is intended. Submission and approval of NMPs for agricultural operations that are also governed by the CAFO program must be announced in the *Pennsylvania Bulletin*.

Anyone who violates regulations set forth under the Nutrient Management Program may be subject to a financial penalty, the amount of which depends upon a number of factors. Some of these factors include the potential harm to the public, potential effect



on the environment, and past violations. Penalties cannot exceed more than \$500 for the first day of each violation or \$100 for each additional day of noncompliance.

Water-quality problems

The major water-quality problem built into the Nutrient Management Program is a tension between more complete utilization of the nutrients in manure and attempts to limit soil loss. Both nutrient pollution and sedimentation are major contributors to water-quality problems associated with agriculture. Pennsylvania has therefore been encouraging farmers to convert to no-till farming. No-till farming practices do much to minimize soil loss from erosion. When manure is not incorporated into the soil, however, fewer nutrients are available for the crop to utilize and are poised for loss to the environment.

For example, only 15 percent to 20 percent of the nitrogen in manure is available for crop use in Year One¹³ when manure is not incorporated into the soil. This leaves 80 percent to 85 percent of the nitrogen

ripe for loss to the environment. Compare this amount with the 40 percent to 75 percent nitrogen availability in Year One when manure is incorporated into the soil within one to two days of land application. This would result in the potential loss of only 25 percent to 60 percent of the nitrogen.

Choosing practices that limit the loss of soil actually increase the loss of nitrogen. The converse is also true-practices that limit nitrogen loss increase soil loss. However, there is good reason for Pennsylvania's efforts to reduce sediment losses. While increased nitrogen in the Chesapeake Bay presents problems associated with eutrophication, sedimentation also presents a problem for the Bay's health. Increased sedimentation can cause adverse impacts on the recovery of underwater grass beds and increased mortality and reduced reproduction in bottom-dwelling organisms. Sedimentation can also cause adverse impacts on fish by affecting their feeding, clogging gill tissues and smothering eggs. Experts estimate that 1.2 million tons of sediment a year currently flows into the Bay from the Susquehanna River at a rate of about 95 pounds a second. They also estimate that 5.2 mil-



Historically, a series of four dams along the Susquehanna River have helped keep sediment and phosphorus from reaching the Bay. These four dams trap between 1.4 million and 2 million tons of sediment and 3.5 million pounds of phosphorus annually.¹⁵ However, scientists have recently discovered that the sedimenttrapping reservoirs at three of the four dams are at capacity and the fourth is dangerously close to reaching capacity. Once the sediment reservoirs reach their sediment-trapping capacity,





huge amounts of sediment and phosphorus will reach the Bay. Experts estimate that the amount of sediment reaching the Upper Chesapeake will more than double and phosphorus levels will rise by approximately 50 percent. Such events would severely hamper ongoing efforts to restore the quality of the Bay.

Therefore, the state has been faced with the daunting task of deciding whether to focus on limiting sedimentation from agricultural operations, which would mean accepting an increase in nitrogen levels, or reducing nitrogen, which risks allowing pollution of the Bay from sedimentation, phosphorus, and nitrogen. Pennsylvania has emphasized reducing the sediment load to our waterways and ultimately to the Bay. Ultimately, however, if we are to protect the Bay we must also develop ways to make manure nutrients more available to crops when the manure is not incorporated, thereby reducing potential nutrient losses to the environment.

Opportunities for community involvement and public participation

As noted earlier, the Nutrient Management Program allows for public participation. After a county conservation district or the State Conservation Commission reviews an NMP submission for administrative completeness, the plan is subject to review by the public. Citizens can file written comments on the plan with the county conservation district or the Commission until the day these bodies take action on the plan at a public meeting. It is best to submit comments prior to the meeting so the comments can be considered and any necessary revisions made to the plan. Additionally, citizens can present oral comments at the public meeting before the board or commission takes final action on a plan. It is best to communicate with the conservation district staff about your intentions to submit oral or written comments; they can provide information about the required procedures for doing so.

Additional resources

- For comprehensive information about NMPs, visit http://panutrientmgmt.cas.psu.edu/.
- More information about the nutrient management certification process can be found at http://www.agriculture.state.pa.us/portal/server. pt/gateway/PTARGS_0_2_24476_10297_0_43/ http;/10.41.0.36/AgWebsite/ProgramDetail. aspx?name=Nutrient-Management-Certification-Program-&navid=12&parentnavid=0&palid=74&.
- To search for nutrient-management specialists by geographic region, see https://www.paplants.state. pa.us/NOMHB/NOMHBServiceAreaSearch.aspx.

Section 3

Water Quality Management Program

What the program addresses

The state Water Quality Management Program is a catchall program whose purpose is to protect water from becoming polluted by various sources, including agriculture, through regulation of manure-storage facilities, land-application areas for manure, and direct discharges of other pollutants to water. The program operates under ACRE, the Pennsylvania Clean Streams Law, and the regulations promulgated under the authority of the Clean Streams Law. It is overseen by the DEP.

The importance of this program is that its provisions apply to all farming operations, though various requirements are aimed at certain categories of farms, such as CAOs or CAFOs. These water-quality management regulations were recently overhauled when both the CAFO and nutrient-management regulations were updated. The regulatory update included the addition of the setback provisions outlined in ACRE.

How it tackles the issue

Pennsylvania's water-quality management regulations (25 Pa. Code § 91.36) are divided into three main categories: those focused on manure-storage facilities, those focused on land application of manure, and those focused on the direct discharge of a pollutant.

Manure storage

The water-quality management regulations require a farming operation to obtain a permit for a new manure-storage facility if the facility is of a certain volume. Any storage facility with more than 2.5 million gallons of manure-storage capacity, which includes agricultural-process wastewater such as egg washwater or dairy barn washwater, is required to obtain a permit.¹⁶ The regulations also require manure storage ponds with a capacity of between 1 million and 2.5 million gallons to obtain a permit in certain circumstances. Pond owners must obtain a permit if they are either in the vicinity of a High Quality or Exceptional Value stream or in the vicinity of an agriculturally impaired watershed. The permit requires the manure-storage facility to be designed, constructed, maintained, and operated in accordance with engineering practices intended to ensure that the facility is structurally sound, water tight, and located and sized to prevent a discharge to surface or groundwater.

All manure-storage facilities have *freeboard* requirements that must be maintained. Freeboard is the distance from the top of the manure or wastewater



in a manure-storage structure to the top of that structure. The freeboard requirements were changed when the regulations were updated to parallel the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) freeboard recommendations. A new or expanded animal operation with 1,000 or more AEUs must maintain 24 inches of freeboard in its manure storage if the manure storage structure is exposed to rainfall and 6 inches of freeboard if the manure storage facility is not exposed to rainfall. All other facilities must maintain 12 inches of freeboard for manure storage ponds and 6 inches of freeboard for all other types of manure-storage facilities. Visit http://www.portal.state.pa.us/portal/ server.pt?open=514&objID=554280&mode=2 link for more information about DEP's manure-storage requirements.

Land application

There are two components to the land-application section of the water-quality management regulations. The first component is a requirement that all farming operations apply manure or agricultural process wastewater according to certain agronomic standards and for water-quality protection. The second component proscribes certain land-application setbacks from surface water¹⁷ for various farming operations.¹⁸ These regulations prohibit the land-application of manure or process wastewater within 100 feet of surface water unless a vegetated buffer of at least 35 feet in width is used.

For more information on land application of manure, visit http://www.portal.state.pa.us/portal/server.pt?ope n=514&objID=554281&mode=2.

Direct discharge

The water-quality regulations state that an agricultural operation cannot discharge pollutants to waters of the Commonwealth without a permit from DEP. Discharges that could arise from an agricultural operation include those from an animal mortality composter or a silage storage area. The new federal CAFO regulations require smaller facilities that are discharging to waters of the Commonwealth to be regulated under the Pennsylvania CAFO program. However, while DEP has historically taken the position that a CAFO permit is not needed, under the Clean Streams Law, the direct discharge must be eliminated. EPA has indicated a preference to bring CAFOs with a direct discharge into the CAFO program and to require such facilities to obtain a NPDES CAFO permit. EPA has also expressed interest in designating those facilities with a direct discharge as CAFOs under its Clean Streams Law powers. It remains to be seen whether EPA will designate facilities directly under federal authority or require DEP to amend its CAFO program and have the state designate facilities as CAFOs.

Water-quality problems

The main problem with these water-quality regulations is that they do not apply universally to all facilities; instead, some standards vary depending on the facility's size. Additionally, the Water Quality Management Program relies heavily on the standards established by other agencies to guide its own programs. While this reliance allows agencies with more technical expertise to guide the Department, it does not always result in the adoption of practices or technologies that are most effective at protecting water quality.

Opportunities for community involvement and public participation

This program allows for participation by the public. Permit applications are posted in the *Pennsylvania Bulletin*, and interested persons are given 15 days to comment on a permit application. If the comments are received within the appropriate timeframe, they must be considered by DEP when making a decision on the application. Additionally, final decisions on an application are announced in the *Pennsylvania Bulletin*.

Section 4: Erosion and Sedimentation Program

What the program addresses

The erosion and sediment-control regulations promulgated under the authority of the state Clean Streams Law (25 Pa. Code § 102) were intended to mitigate soil losses to surface water and groundwater. A section of those regulations, 25 Pa. Code § 102.4(a), addresses agricultural practices that result in accelerated soil erosion and could result in contamination of waterways. Examples of areas on a farm where accelerated erosion could occur are lands that are plowed, stream banks where animals cross the stream, and pasture areas. This program is administered by DEP in conjunction with county conservation districts.

The plans required under this program may also be used to meet requirements under the state CAFO program. As noted, the CAFO program requires an applicant for an NPDES permit to submit a copy of an Erosion and Sedimentation Control Plan (E&S Plan) for plowing and tilling operations for all land owned or leased by the permit holder. As noted earlier, Conservation Plans are often submitted to meet the E&S Plan requirement.

How it tackles the issue

To minimize the risk of accelerated soil erosion leading to sedimentation in waterways, the program requires those individuals engaged in "earth disturbance" activities to implement BMPs that limit the risk of accelerated erosion and sedimentation for agricultural fields and pastures. BMPs can include any activities, facilities, measures, or procedures that are meant to meet this goal. Design standards for different types of BMPs are found in the *Erosion* and Sediment Pollution Control Program Manual published by the Commonwealth of Pennsylvania, Department of Environmental Protection, No. 363-2134-008 (April 2000); it is available electronically at http://elibrary.dep.state.pa.us/dsweb/Get/ Document-65564/363-2134-008.pdf. Practices specific to agriculture are further discussed in the Pennsylvania Soil and Water Conservation Technical Guide (http://efotg.sc.egov.usda.gov//efotg_locator. aspx) and A Conservation Catalog: Practices for the Conservation of Pennsylvania's Natural Resources (http://www.pa.nrcs.usda.gov/Publications/ conscatalog.pdf).



For those involved in agricultural plowing or tilling activities that impact 5,000 or more square feet of land, BMPs must be described in a site-specific written E&S Plan that includes the following: plan maps, soils maps, location of waterways and drainage patterns, plus a description of the BMPs including tillage systems, schedules, and cost- effective and technically practical conservation measures.¹⁹ Landowners, tenants or renters who currently plow or till, or who plan to in the future, are jointly responsible for designing, enacting, and maintaining the E&S Plan.

Agricultural operations may also have to secure a general or individual NPDES Permit for Stormwater Discharges Associated with Construction Activities. Such permits are required when an activity (generally construction) will disturb five or more acres of land. Such disturbance often occurs when a farming operation is adding one or more barns.

Water-quality problems

The biggest risk to water quality posed by agricultural operations is the failure to design and adhere to BMPs and E&S Plans. Additionally, BMPs are at risk of failing to prevent erosion and sedimentation if they are not maintained. However, DEP and county conservation districts are given the authority to inspect construction sites and to verify that BMPs, E&S Plans, and permits are being implemented and maintained. All plans must be updated and available for review by DEP or the county conservation district at any point during the disturbance activity.

Opportunities for community involvement and public participation

Although the Clean Streams Law does not provide the public with a formal role in the establishment and regulation of erosion and sedimentation controls, it is important that people be aware of the guidelines and act as watchdogs for any violations. Any observation of the following events (during conditions less extreme than a 10 year/24- hour storm event) may indicate a violation and warrant a call to DEP and the county conservation district:

- Soil or manure runoff from the site that accumulates on stream beds and banks
- Muddy runoff entering a stream
- Reoccurrence and development of soil-erosion channels (carved streams) in pastures or fields
- Stream bank erosion caused by agricultural tilling located near the stream
- A decrease in stream bank stability due to the loss of vegetation from farm practices
- Accelerated soil erosion where farm animal or equipment activity is taking place

Complaints and reports of violations should lead to inspections and investigations. Enforcement actions may result in the revocation, withholding, or denial of permits or approvals, civil penalties, or court action.

Additional resources

 For more information on Conservation Plans, visit http://www.pa.nrcs.usda.gov/technical/ Conservation_Planning/ConservationPlanning.htm.



Section 5: Chesapeake Bay Programs

What the program addresses

The Chesapeake Bay ("Bay") is the largest estuary in the United States. The Bay and its tidal tributaries have approximately 11,684 miles of shoreline, which is more than the entire West Coast of the United States. The Bay holds more than 15 trillion gallons of water. The Susquehanna River provides about half of the Bay's fresh water, flowing at a rate of 19 million gallons per minute.

The Bay is home to more than 3,600 species of plants and animals, including 348 species of finfish, 173 species of shellfish, and more than 2,700 species of plant. The Bay produces around 500 million pounds of seafood per year to help feed the 16 million people who live in the watershed. In addition, it is home to 29 species of waterfowl and is a major part of the Atlantic Flyway.²⁰

For many decades, the Bay has been struggling to meet the standards of the federal Clean Water Act, whose goal is to restore and maintain the health of the nation's waters, making them or maintaining them as fishable and swimmable. The Bay states and the District of Columbia have entered into a number of non-binding, voluntary agreements to restore the Bay's water quality, but because of the non-binding nature of these agreements, little progress has been made to restore the Bay to fishable and swimmable standards.

However, the Clean Water Act requires each state to develop a list, known as the 303(d) list,²¹ of its waters that are impaired and do not meet the fishable and swimmable standards. States are also obligated to develop a Total Maximum Daily Load (TMDL) for these impaired waters. A TMDL can be thought of as a "pollution diet" that identifies the maximum amount of a pollutant that can enter a waterway and still allow the waterway to be fishable and swimmable.

In 1998, the EPA listed the Chesapeake Bay and several of its tidal tributaries as impaired because of excess nitrogen, phosphorus and sediment. These pollutants cause algae to grow rapidly, using enormous amounts of the oxygen in water and blocking sunlight from filtering through it. The result of low oxygen levels in water is the creation of *dead zones* where fish and shellfish cannot survive and aquatic plants die. Thus scientists evaluate the recovery of the Bay based on water-quality standards for dissolved oxygen, water clarity, underwater grasses and chlorophyll-a.

Since 2000, Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia have been working with EPA to establish a TMDL for the Bay. This TMDL integrates commitments



made in a number of consent decrees, Memos of Understanding, litigation settlement agreements, and Executive Order 13508 signed by President Obama in May 2009. For extensive information on the Chesapeake Bay TMDL, visit http://www.epa.gov/ chesapeakebaytmdl/.

How it tackles the issue

Because the Bay encompasses multiple states and jurisdictions, EPA undertook the task of allocating the pollutant loads in the TMDL among the various basins and jurisdictions. In developing the TMDL, EPA used a series of models calibrated to decades of water-quality data, stream-flow characteristics, sources of pollution, distribution and acreage of the various land uses, appropriate BMPs, pollutant transport tendencies, and precipitation data. The models are reviewed, refined, and continually updated by government scientists.

EPA then tasked the Bay states and the District of Columbia with developing Watershed Implementation Plans (WIP). A WIP is an individualized state or jurisdiction plan that details with reasonable assurance how that state or jurisdiction intends to meet the pollutant limitations established in the TMDL. In their WIPs, states and jurisdictions allocate nitrogen, phosphorus and sediment to the point source and nonpoint source sectors within their boundaries. The WIPs must also detail the state or jurisdiction "road map" for attaining those pollutant allocations. In this way, the WIPs provide information about existing laws and regulatory programs, as well as areas where additional legal authority and regulatory programs may be needed. The WIPs also discuss how the state or jurisdiction is utilizing federal programs, grants and resources to reduce nitrogen, phosphorus and sediment pollution. The WIPs further discuss how state or jurisdiction resources may be better utilized to achieve the goals of the TMDL. While the WIP is a narrative of a state or jurisdiction's programs and policies and plan for reaching pollutant limitations, it also contains specific commitments to implement specific quantities of urban/suburban, stormwater and agricultural BMPs.

States and jurisdictions submitted Phase 1 WIPs to EPA in 2010. The WIPs are being updated during 2011 to further refine the point and nonpoint source sector allocations to the county or sub-watershed level. Pennsylvania has chosen to engage the counties within the Bay watershed to help plan the distribution of pollutant limitations between urban/suburban, stormwater and agricultural uses. The refined Phase 2 WIPs must be submitted to EPA in early 2012. States and jurisdictions will update their WIPS again in 2017 to make any mid-course adjustments to nitrogen, phosphorus and sediment reduction strategies.

Visit http://pa.gov/portal/server.pt/community/ chesapeake_bay_program/10513 for additional information about the WIP process.

In addition to the WIPs, states and jurisdictions must set incremental commitments for specific practices to be implemented and pounds of pollutants to be





reduced. These commitments are referred to as twoyear milestones. Though previous Bay-restoration plans were very ambitious, they lacked any real implementation provisions; requiring two-year milestones is EPA's attempt to hold states and jurisdictions accountable. States and jurisdictions are currently required to track, verify, report and assess progress on the implementation of these milestones. By 2017, they are required to have implemented 60 percent of the management practices needed to restore the Bay to fishable and swimmable status. Additionally, all management practices needed to restore the Bay's water quality must be in place by 2025.

The TMDL scheme recognizes the time lag between installation of management practices and the realization of the water-quality benefits of those practices. For this reason, tracking the installation of management practices through two-year milestones is critical. If they are not achieved, the states and the District of Columbia risk losing federal funds. Additionally, EPA could revoke its delegation of certain programs implemented by the states, such as the NPDES program.

Water-quality problems

Under the Clean Water Act, EPA has direct authority to regulate only point sources of pollution. However, the agency has not discouraged states and jurisdictions from targeting nonpoint sources of pollution in their WIPs. In fact, without nitrogen, phosphorus and sediment pollution reductions from nonpoint sources, recovery of the Bay is unlikely.

One of the main problems with focusing on pollutant reductions at agricultural operations themselves is the difficulty in measuring the benefits of those efforts. Agricultural pollution is diffuse and varies widely, given the management practices used by farm operators. Additionally, the sheer number of farming operations within the state makes it difficult to track and verify management practices at all farms in Pennsylvania's portion of the Bay watershed. Nevertheless, Pennsylvania's waters are likely to benefit from efforts to reduce agricultural pollution to the Bay because Pennsylvania's WIP focuses intensively on improving conditions of barnyards and preventing erosion and sedimentation at small farms.

Opportunities for community involvement and public participation

To keep the Commonwealth on track for achieving its commitments to restore the Bay, citizens must ensure that TMDL milestones are properly tracked, verified and reported to both DEP and EPA. Interested persons should become familiar with the two-year milestone commitments the state has made. Additionally, they should examine the methods used to calculate implementation of management practices or pollutant reductions. While the milestones are two-year commitments, DEP reports annually to EPA on progress to achieve them.

Many state and federal programs have historically supported Bay restoration efforts. But in these hard economic times, funding streams for water restoration projects are drying up. Persons interested in Bay restoration should strongly encourage their state and federal representatives to support legislation that funds Chesapeake Bay related programs.

Additional resources

- For more detailed information about the history of the Bay agreements, visit http://www.chesapeakebay.net/historyofcbp. aspx?menuitem=14904
- More detailed information about the Chesapeake Bay Programs can be found at: http://pa.gov/portal/server.pt/community/ chesapeake_bay_program/10513.

Section 6: Nutrient Credit Trading Program

What the program addresses

The nutrient credit trading (NCT) program was established in 2006 as a lower-cost means of allowing NPDES permit holders to reach their nutrient discharge permit limitations under the federal Clean Water Act. This program was originally a Department policy, but was replaced by formal regulations in October 2010.²² NCT is by nature a water-quality protection program. It provides an option for NPDES permit holders to meet their pollution limitations under the federal Clean Water Act by purchasing nutrient-reduction credits from others (typically nonpoint sources) instead of installing expensive bricksand-mortar upgrades. The program looks to market mechanisms that may be more flexible and more efficient to solve water-quality pollution problems. The NCT program is voluntary and is administered by DEP.

As the Commonwealth was working with regional partners on a plan to reduce nitrogen, sediment and phosphorus discharges to the Chesapeake Bay during the Tributary Strategy²³ process, sewage-treatment plants and other point-source dischargers became an immediate focus for reducing nutrient discharges to local waters and ultimately to the Chesapeake Bay. The Commonwealth has jurisdiction over the permits that regulate the quantity of nutrients and sediment that sewage-treatment plants can discharge.²⁴

Additionally, Pennsylvania has more than 1,000 publicly owned sewage treatment plants (POTWs) that range in size from very large to very small. The total number of treatment plants is much larger when including institutional and educational systems, as well as small private systems that service campgrounds, mobile home parks, developments and industry. Pennsylvania sought to get substantial nutrient-discharge reductions from sewage- treatment plants by ratcheting down the discharge limits of POTWs' NPDES permits.

The cost estimates for POTWs to reach their new discharge limits through bricks-and-mortar upgrades were prohibitive. Early estimates put the cost of sew-age-treatment plant upgrades in the range of \$190 million to more than \$1 billion.²⁵ The American Society of Civil Engineers later estimated that it would cost about \$2 billion over the next 20 years for the plants to meet the new nutrient-discharge limitations and to repair or expand existing facilities to meet current and future needs.²⁶ Sewage-treatment plant upgrade efforts have been only minimally funded, through the Pennsylvania Infrastructure Investment Authority



(PENNVEST), the American Recovery and Reinvestment Act (ARRA) of 2009, and the water bond approved by Pennsylvania voters in 2008.

Thus DEP developed the NCT program to help sewagetreatment plants meet their new nutrient-discharge limits at a lower cost to ratepayers. The program acknowledges that certain types of facilities (such as farms) are able to make reductions of nitrogen and phosphorus discharges to waterways for a lower cost than can sewage-treatment plants. Facilities that have made these lower-cost reductions of nitrogen and/or phosphorus may then sell nutrient credits to sewagetreatment plants so that they can meet the nutrient limitations in their NPDES permits. The program allows other NPDES permit holders, such as residential developers, to participate as well. The program also allows for the trading of sediment credits.

How it tackles the issue

A nutrient credit, the unit of trade in the NCT program, is calculated in pounds of pollutant per year (lbs/year). As noted, the NCT program allows for the trading of nitrogen, phosphorus and sediment credits; however, trades must involve comparable credits (i.e., nitrogen for nitrogen and phosphorus for phosphorus). Credits are generated by facilities that install BMPs that reduce nitrogen, phosphorus and/or sediment discharges to waterways beyond what is legally required. While both point sources and nonpoint sources can theoretically generate credits, most credits in Pennsylvania are generated by nonpoint source activities (i.e. farming operations).

Point sources can generate tradable credits if they discharge pollutants below the discharge loading limit or effluent limit specified in their NPDES permit. Credits are calculated as the difference between effluent limits specified in a permit and actual discharge information from discharge-monitoring reports (DMRs). Trading ratios, discussed below, will decrease the total number of tradable credits.

Credit generation by nonpoint sources is more common, but involves a much more complicated process for determining the number of tradable credits. Nonpoint source credits are most often generated by farming operations. Credits are generally determined by estimating the rate of nutrient loss from the farm adjusted for the installed BMPs and self-imposed nutrient limitations. This calculation includes consideration of nutrients and/or sediment being caught or captured by the natural environment (the edge of segment ratio) and diluted by or settling out of waterways (the *delivery ratio*). In order to be eligible to trade nutrient or sediment credits from installation of a BMP, an agricultural operation must be in compliance with all applicable conservation and nutrient/ manure management requirements as dictated by law. These requirements are known in the NCT program as the baseline requirements. Agricultural operations must also meet threshold requirements in order to qualify to generate credits in the trading program.

To meet baseline requirements, an agricultural operation must:

- have and implement either a written manuremanagement plan as required by Chapter 91.36 of the Pennsylvania Code²⁷ and the Manure Management Manual or a written nutrient management plan as required by Act 38;
- ensure that animal manure storage facilities are adequately sized and properly maintained/operated in accordance with Chapter 91.36;
- have and implement a written E&S Plan for agricultural plowing and tilling as required by Chapter 102.4(a)(4)(i) and (ii) to minimize soil loss from accelerated erosion;
- have and implement a written E&S Plan to minimize accelerated erosion and sedimentation from animal heavy use areas as required by Chapter 102.4(a)(4)(iii);
- have and implement an NPDES CAFO permit, if required by Chapter 92;
- prohibit the uncontrolled flow of stormwater into or through manure storage or animal concentration areas; and,
- prohibit direct discharges of runoff or water mixed with manure, sediment, milk house waste, or silage leachate from weather events.²⁸



Compliance with these baseline requirements must be verified by DEP, a conservation district, or another DEP approved entity.

The threshold requirement is met by satisfying *one* of the following: (a) a 100-foot mechanical setback or equivalent thereof; (b) a 35-foot vegetated buffer or equivalent; or (c) a 20 percent reduction in nutrients. The 100-foot mechanical setback is achieved by meeting *one* of the following criteria:

- manure is not mechanically applied within 100 feet of surface waters (noting that setbacks for CAFOs apply to a broader range of surface waters than non-CAFO operations); or
- there are no surface waters on or within 100 feet of the farm; or
- the farm uses no manure applications and applied commercial fertilizer at or below Penn State recommended agronomic rates.

The 35-foot vegetated buffer is achieved by meeting *both* of the following criteria:

- a minimum of 35 feet of permanent vegetation is established and maintained between the field and surface water (a 50-foot buffer or greater may qualify to generate nutrientreduction credits); and
- 2. the area can be grazed or cropped under a specific management plan, but permanent vegetation must be maintained at all times.

The 20 percent reduction in nutrients is met by reducing the farm's overall nutrient usage by 20 percent below that allowed under current regulations.

The NCT program requires that the number of credits actually available for trading be less than the total credits generated by a practice in order to create a margin of safety. This reserve amount is held by DEP as an insurance policy on the credit-trading program.

Agricultural activities that generally qualify to generate nutrient credits include, but are not limited to, no-till farming, cover crops, riparian buffers, streambank fencing, rotational grazing, precision nutrient management, field-lane stabilization, manure storage, mortality composting, poultry manure export, use of digester-like technologies, and chicken litter gasification and/or incineration. Credits can be generated for new or existing BMPs, so long as the BMPs continue to be utilized and maintained. Credits are good for only one year (October to September). They must be used in the year they are generated and credits cannot be banked for use in future years. If a credit-generating BMP has a lifespan longer than one year, the practice must be re-verified each year in order to continue to generate credits.

To meet the limits of an NPDES permit, credits must be certified, verified, and registered prior to being used. During the certification process, overseen by DEP, the credit generator and the Department enter a dialogue regarding the circumstances, calculations, and assumptions described in the application. For structural BMPs, this process involves much back-and-forth communication between credit-generation applicants and DEP. (However, credits can be certified before a BMP is installed on the ground.)

After the nutrient- or sediment-credit generating activity is installed, the practice must be verified by an agricultural consulting company and the resulting credits registered with DEP. Verification and registration of credits often happen after the credit generator has entered into a trade. The purpose of the verification process is to ensure that the credits that were certified are actually being generated by the installed BMPs. Verification plans must be submitted annually to DEP and must contain sufficient documentation to demonstrate that the certified nutrient-reduction activities are in place for a particular compliance year. Implementation and maintenance documents for BMPs must be submitted for each year that the generator seeks to apply credits toward a particular NPDES permit.

One major criticism of the NCT program is that onthe-ground verification of BMPs may be completed by an agricultural consulting company. While there are many agricultural consultants in Pennsylvania, only a few firms work with farming operations in the NCT program. This situation creates an inherent conflict of interest: the same consultants who seek to benefit financially from a continued relationship with a farming operation that participates in the NCT program



are asked to police and verify the practices of these operations and to ensure that those farms are meeting certain legal and regulatory requirements.

After the credits are certified and verified, they must be registered annually with DEP. This final step occurs after the credits are traded, but before they are utilized. As part of the registration process, parties to a trade must submit to DEP a contract that details the terms and conditions of the trade. At this stage, the credits are also given a unique identifier for reporting and tracking purposes. The NPDES permit holder who is using the nutrient credits to meet the effluent limitations in a permit records this trade identification number on a supplemental Discharge Monitoring Report (DMR). As noted, the credits must be used toward permit limitations in the compliance year in which the nutrient reduction activities occurred.

Permit holders have a duty to ensure that credits being used to meet permit conditions are certified and verified, and to enforce the terms and conditions of credit-purchase agreements where those credits are needed to bring the operator into compliance with NPDES permit-effluent limitations. If a BMP fails and therefore generates no credits, DEP has the authority to take compliance actions against *both* (1) the permit holder who was relying on those credits to meet effluent limitations *and* (2) the party that agreed to generate or broker the credits.

To date, there have been relatively few nutrient-credit trades. The main explanation for this lack is that sewage-treatment plants and other potential credit purchasers have viewed the NCT system as having long-term uncertainty. That is, while the financial cost of nutrient credits has been low, would-be credit purchasers appear hesitant to enter into them given the uncertainty of credit costs in the future. Credit purchasers also seem uneasy about relying on BMPs that are administered by someone else in order to meet their own NPDES permit-effluent limitations, particularly when the credit purchaser can be held liable for permit violations if those nutrient credits are not realized. Sewage-treatment plants and other potential credit purchasers appear to prefer to invest in bricks-and-mortar improvements and know upfront the total upgrade costs for their ratepayers. It has yet to be seen whether new effluent limitations for smaller sewage systems will be a game-changer for



the NCT program. Many believe that economies of scale do not favor the cost effectiveness or technical viability of plant upgrades at these types of plants. Fortunately, DEP has already certified a number of credits, and if the demand for these credits increases, the supply certainly exists to meet the need.

Water-quality problems

In order to further the goal of keeping productive farmland in use, Pennsylvania's NCT program prohibits parties from generating credits by idling whole or substantial portions of farms. This policy prevents developers or sewage-treatment plants from purchasing farmland, retiring it, and then claiming the nutrient credits for use against their NPDES-permitted facilities. Additionally, the NCT program



also limits the number of credits that may be traded in each watershed segment. The purpose of these trading limitations is to ensure that the trading program does not over-utilize nutrient reductions needed from agriculture in order to meet TMDL and WIP requirements.

Pennsylvania's nutrient-trading system also considers local water quality when a credit certification proposal is under consideration by DEP, such as whether the local stream has been degraded and the reasons for the stream impairment. However, the Department does not require anything more unless the stream has a local TMDL. In instances where there is a local TMDL, a facility hoping to obtain nutrient-credit certification must install technologies sufficient to meet the requirements of that TMDL before it can generate credits. If the stream is impaired but does not have a local TMDL, it could be argued that necessary nutrient reductions are being traded away to other watersheds when they are in fact needed locally.

The current nutrient credit-trading program allows nutrient credits to be generated for best practices and activities that have been ongoing or in use for many years. While it is good policy to reward forwardthinking farmers, these practices do not result in further improvement of water quality. However, if the management practice was in place prior to January 1, 2005, it has been included in the Chesapeake Bay watershed modeling system and, according to Pennsylvania program regulations, it is not eligible to generate credits. However, the Pennsylvania program recently allowed nutrient credits to be generated and traded for a management practice that a farmer had used for more than 20 years. Clearly, there has been inconsistency between the formal program policies/ regulations and what is occurring in practice.

Point to non-point trading

Pennsylvania's trading program has been sharply criticized because it allows trading between point sources and non-point sources of pollution. Some critics point out that pollution discharges and corresponding pollution reductions at non-point sources are by nature diffuse and difficult to measure. They therefore argue that the reductions attributable to non-point-source management practices are less certain and should not be given as much "credit" as practices that are easy to measure (i.e. discharges from the end of a pipe). Additionally, increasing evidence suggests that advanced wastewater treatment techniques can reduce or remove synthetic organic compounds such as pharmaceuticals and health products, including antibiotics, birth-control pills, antibacterial agents, and other endocrine-disrupting compounds.

Opportunities for community involvement and public participation

The public has an opportunity to review and comment on nutrient-credit proposals during the certification process. After initial review by the Department, notice of the application submission is published in the *Pennsylvania Bulletin* and open for public comment. After the initial public-comment period, the Department takes action upon the credit-generating proposal, either approving or denying it. Upon final action by DEP of the proposed credit-generating project, DEP again publishes a notice in the *Bulletin*. DEP also places notice of credit registration (i.e. intent to use credits) in the *Bulletin* for public notice and comment. Persons adversely affected by DEP's approval or denial of the action may appeal the decision to the Environmental Hearing Board.

Monthly DMRs for NPDES-permitted facilities also provide an opportunity for community oversight. The DMRs must include the credit identification number if nutrient or sediment credits are being used to meet permit conditions. The information included on the DMR allows an interested party to access DEP's NCT program website (Nutrient Net) and obtain more specific information about the BMPs generating the credits.

Additional resources

- For in-depth information about Pennsylvania's Nutrient Trading program, visit http://www.dep. state.pa.us/river/Nutrient%20Trading.htm.
- Visit DEP's electronic DMR website at http:// pa.gov/portal/server.pt/community/edmr/17879.

Section 7: **Commercial Manure** Hauler and Broker Certification Act

What the program addresses

The Commercial Manure Hauler and Broker Certification Act of 2004 (Act 49) is intended to work in conjunction with the Nutrient Management Program to ensure the safe transport and proper land application of manure. The Act regulates the sector of the agricultural community that is paid to move manure from one place to another as well as the sector compensated to spread manure in fields. It does not regulate farmers and their employees who transport or apply manure on their own or neighboring farms if they do not receive financial compensation for hauling or application of that manure.

When the Nutrient Management Program was first initiated, critics argued that the program would be effective only if NMPs were implemented. As farming operations become larger, operators are relying increasingly on commercial manure haulers, brokers, and land applicators to deal with increasing volumes of manure. Because these businesses and individuals are not employees of a farming operation, one cannot assume that they are familiar with crop rotations and farm-management practices at that operation. Thus, to ensure that manure is spread on farming operations at agronomic rates appropriate for the crop, soil type, nutrient levels of the soil, and management practices of the farming operations, the Act places the burden on commercial manure haulers, brokers, and land applicators to apply manure generated by a CAO, CAFO, or volunteer operation in accordance with the terms of an approved NMP or nutrient balance sheet (NBS). Nutrient balance sheets are a scaled-down version of NMPs that detail when and how manure should be applied on a particular field.

How it tackles the issue

Act 49 states that all proprietors and employees of commercial manure hauler or broker businesses must be certified by the Pennsylvania Department of Agriculture (PDA) in order to haul or land-apply manure. As noted above, all commercial haulers and brokers who apply manure that is generated by a CAO, CAFO, or volunteer operation must apply the manure in accordance with the provisions of an approved NMP or NBS.

Act 49 establishes various levels of certification, depending upon the type of work an owner, supervisor, or other staff member completes. Education and training programs are required for all levels of certification. Following the successful completion of a training program and an examination, applicants will be certified at a particular level to haul or broker manure within Pennsylvania.



Certified persons must keep records of all manure brokered, transported, or land applied. Procedures for maintaining records are similar to those required by the Nutrient Management Program (page 8). Records must be kept at the hauler or broker's place of business for three years and must contain information pertaining to where the manure was obtained, transported and applied; the name, certification number, and signature of the person land-applying the manure; and the date, total amount of manure applied, application rate, total number of acres to which the manure was applied, and the crop grown. The records do not have to be submitted to PDA, but they must be made available to the Department for inspection if requested.

The relevant certification levels for manure broker and hauler business owners and employees are as follows:

Broker Level 1 and 2

These levels apply to those who assume temporary rights or possession of manure from an agricultural operation and organize arrangements for the transfer and/or application of that manure for use at a different facility. Those persons who achieve either Broker Level 1 or Level 2 status must submit an NBS to receiving facilities. Both commercial brokers and commercial haulers who wish to broker manure are eligible to apply for either certification.

In order to obtain Broker Level 1 certification, a person must attend classroom training and successfully pass an exam. By so doing, that person is certified to manage, transport, and broker manure so long as there is an approved NMP or NBS for the fields where manure is to be applied.

If there is no NBS for the fields in question, a Broker Level 2 must draft and submit an NBS for those fields to the receiving facility and the county conservation district. Before a Broker Level 2 may draft an NBS, he or she must attend NMP and NBS writing training sessions and pass an NBS exam.

Brokers Level 1 and 2 are responsible for submitting NBSs to conservation districts for receiving facilities. They must also oversee the activities of individuals with a lower certification rank and keep records of all brokered manure.

Hauler Level 1

This certification category applies to those who transport manure as part of a contractual agreement for an agricultural facility or certified broker or hauler by order of the facility, hauler or broker. This category pertains mostly to the trucking portion of the industry, which only transports manure. Persons certified at this level may work for a broker or Hauler Level 3 (below). Applicants may consist of peak season truckers, who are employed by applicators during intensive manure-application periods; on call truckers, who are employed by applicators whenever needed; and single destination truckers who transport manure one way as per contractual agreement with a farmer or broker. In order to achieve Hauler Level 1 status, applicants must complete a workbook, after which these persons are certified to transport manure according to specifications set forth by the agricultural facility, a certified Hauler Level 3, or a broker.

Hauler Level 2

This certification category pertains to recent or current employees of a hauler or broker whose responsibilities are restricted under the program. Applicants may be employed by either a certified broker or a Hauler Level 3. To obtain certification, persons must complete a workbook and pass an examination. Once the requirements have been satisfied, the individual will be certified to haul and/or apply manure under the guidance of a certified Hauler Level 3 or a broker. A Hauler Level 2 is also eligible for Level 3 certification. Those who are Hauler Level 2 certified must apply manure for the receiving facility in accordance with an approved NMP or NBS.

Hauler Level 3

Hauler Level 3 is a designation that certifies a business proprietor or employee to haul and/or apply manure on behalf of an agricultural facility and denotes a greater degree of responsibility for the activities that occur within the program. Anyone who is hired full time by a broker or a Hauler Level 3, who is a supervisor/ administrator/ proprietor of a



commercial broker or hauler, or who is a Hauler Level 2 who wants a higher certification may apply for Hauler Level 3 status.

To achieve this certification, persons must attend a classroom-training program and pass an examination. Following successful completion of the requirements, applicants will receive a certificate and be eligible to apply for Broker certification. All Haulers Level 3 must ensure that manure application is performed in accordance with the approved NMP or NBS for the receiving facility and keep records of all manure that is transferred or applied to the land. In addition, Haulers Level 3 must oversee the activities of workers with lower certifications.

Anyone who violates regulations set forth under Act 49 may be subject to a financial penalty, the amount of which depends upon a number of factors. Some of these factors include the potential risk to the public, the degree of intent, and past violations. Penalties cannot exceed \$500 for the first day of each violation or \$100 for each additional day of noncompliance. In addition to a financial penalty, violation of Act 49 may result in a revocation or suspension of one's certification.

Water-quality problems

The biggest risk to water quality related to manure is the failure by land applicators to follow NMPs or NBSs. However, the purpose of Act 49 is to avoid this very possibility. Its recordkeeping requirements are intended to make it very unlikely that land applicators will not follow NMPs or NBSs.

Opportunities for community involvement and public participation

This program does not afford any opportunities for community involvement or public participation in the certification process. However, the public can play a vital role in ensuring that NMPs and NBSs are followed. NMPs and NBSs are public documents that must be kept on file at a county conservation district. These documents are available for review by the public and can be requested from the nutrient management specialist at the relevant conservation district. If someone observes a hauler, broker, or land applicator violating the terms of an NMP or NBS, he or she should report the violation to the nutrient-management specialist at the county conservation district.



Section 8: Odor Management Program

What the program addresses

Odors from agricultural operations occur during animals' digestion process and when the resulting animal waste decomposes. These odors are not caused by a single chemical but rather by a number of gases and *volatile organic compounds* (VOCs) including ammonia and hydrogen sulfide. Factors that affect odor generation are: air temperature,²⁹ relative humidity,³⁰ the amount of time manure is allowed to accumulate,³¹ ventilation of animal housing buildings,³² weather conditions³³ and dust levels.³⁴ These factors also affect odor transportation and human perception of the odors.

Pennsylvania's Odor Management Program is *not* a water-quality protection program, but rather an attempt to limit odors from barns or manure-storage areas of a very limited number of agricultural operations. While it is important to understand what the program regulates, it is equally important to understand what the program *does not* regulate, namely land-applied manure.

The odor program is legislatively mandated through Act 38 of 2005 (ACRE). This program, as well as the Nutrient Management Program, is overseen by the State Conservation Commission (SCC), an agency that falls under the jurisdiction of both the Pennsylvania Department of Agriculture and DEP. This program was adopted very recently; its final regulations took effect in February 2009.

While some may have high hopes for this program, PennFuture does not foresee it doing much to limit the impacts of pungent odors from large-scale industrial farming operations. The Odor Management Program will not be broadly applied to agricultural operations, nor will it address the lion's share of the problems associated with land-applied manure.

How it tackles the issue

Act 38, and the odor-management regulations promulgated under the Act (25 Pa. Code § 83.701 et seq.) require only two types of facilities to obtain an odormanagement plan: 1) new agricultural operations that will be regulated as a CAO or CAFO,³⁵ and 2) existing CAOs and CAFOs that are expanding or constructing a new animal-housing facility (i.e. barn) or manuremanagement facility.

An agricultural operation that must develop an odor-management plan utilizes an *Odor Site Index* (OSI) to evaluate the potential impacts of the off-site migration of odors from the regulated portions of the



facility. The OSI is intended to help the facility evaluate the potential risk of odor impacts associated with its operations and to guide the operator in the siting, sizing, and management of regulated facilities. The OSI looks at site-specific factors such as proximity to adjoining landowners; land use of the surrounding area; type of structures proposed; species of animals; local topography; and direction of the prevailing winds to determine the potential for odor impacts. Then, it provides the facility with a numeric score that determines which BMPs the facility must install and maintain to control the migration of odors off site.

A factor limiting the effectiveness of manure-management plans at existing operations is that the plan *need only address the new or expanded portion of the agricultural operation*. Obviously, to have any sort of meaningful impact, odor-management plans would have to govern all areas of the agricultural operation in addition to all sources of odor and gas emissions (i.e., manure generation, storage, and land application). As stated previously, Act 38 and the odormanagement regulations promulgated under the Act specifically exempt land-applied manure.

They also stipulate that compliance with an approved and implemented odor-management plan will be considered a mitigating factor in any civil action for penalties or damages caused by odors emanating from an agricultural operation. While some may point to the nuisance-liability protection provisions of the Act and its regulations, PennFuture argues that the scope of the liability-protection provisions is as limited as the reach of the regulations themselves. In short, these provisions apply only to the sections of an agricultural operation that are implementing an odormanagement plan. If an entire farm is implementing such a plan, then the whole farm can claim the liability-protection provisions. If the odor-management plan covers only sections of the farming operation and does not include certain buildings and land-application areas, then the farm is still subject to liability from odors emanating from those areas.

Water-quality problems

Ammonia and hydrogen sulfide are two of the main gases emitted from agricultural operations. Ammonia emissions cause the formation of small airborne particles, which affect visibility and cause odors. Ammonia gas can also be redeposited on the earth as acid rain, which in turn can cause algal blooms. Algal blooms are a concern because they ultimately die and decompose through a process that sucks oxygen out of the water. At sufficiently high levels, ammonia causes injury or death to fish and other aquatic species. Hydrogen sulfide can also form small particles,





resulting in decreased visibility and increased haze formation.

While water-quality problems are associated with these gases, the more serious concern for neighbors of agricultural operations is the impact of the gases on personal health, due to their elevated levels of exposure. Exposure to ammonia and hydrogen sulfide can cause eye, nose, and throat irritation in addition to coughing; inhalation for thirty minutes or more can be fatal. Exposure to hydrogen sulfide alone can also cause diarrhea, nasal congestion, heart palpitations, shortness of breath, stress, mood alterations, sudden fatigue, headaches, and nausea. Those at the greatest risk for exposure to very high levels of ammonia and hydrogen sulfide exposure are farm workers during agitation (mixing and stirring) at manure-storage facilities.

Another major health risk from agricultural operations is exposure to particulate matter. Particulate matter, or dust, is a generic term for a broad class of chemically and physically diverse substances. It is one of the six criteria pollutants, common pollutants used as air-quality indicators by the U.S. Environmental Protection Agency and regulated through the National Ambient Air Quality Standards (NAAQS). Animal feed is usually the main component of particulate matter generated at a farming operation, but manure solids, animal dander, and feather and hair particles are also included. Dust is generated by a number of activities at an agricultural operation: animal movement, building ventilation, tilling of soil, and the manure-drying processes. Liquids can also form into particulate matter. At agricultural operations, liquid particulate matter can be generated through animal breathing, the pressure washing of barns, and manure handling.

Particulate matter absorbs odor and gases and carries bacteria, and is thus a potential transmitter of odor and diseases. It can be particularly harmful to humans because dust particles can easily penetrate into the respiratory system and decrease lung function—and ultimately increase the risk of cardiovascular disease. In turn, decreased lung function and increased cardiovascular disease can lead to increased hospital admissions. Extensive medical research shows that workers in swine and poultry buildings often suffer from acute and chronic respiratory disease and dysfunction as a result of their exposure to particulate matter and gaseous pollutants.

Opportunities for community involvement and public participation

The odor management program allows for public participation. After the SCC reviews a submitted plan for administrative completeness, the plan is subject to review by the public. Citizens can file written comments with the Commission until the day it takes an action on the plan at a public meeting. However, it is best to submit comments well in advance of the public meeting so that they can be considered and any necessary revisions made to the plan. Additionally, citizens can present oral comments at the meeting before the Commission takes a final action on a plan. It is best to communicate with the Commission staff about your intentions to submit oral or written comments.

Additional resources

More information about the Odor Management Program can be found at http://www. agriculture.state.pa.us/portal/server.pt/gateway/ PTARGS_0_2_24476_10297_0_43/agwebsite/ProgramDetail.aspx?name=Odor-Management-Progra m&navid=12&parentnavid=0&palid=24&.

Section 9: Mortality Management

What the program addresses

Livestock deaths occur at every farming operation, whether due to illness, stress, accidents, or other factors. Properly handling and disposing of dead animals is crucial to preventing the spread of disease to other animals and in forestalling a nuisance to neighbors of the farming operation. The Pennsylvania Domestic Animal Law³⁶ details the allowable methods of disposal of dead animals and regulates businesses that perform this task. The PDA administers this program in the Bureau of Animal Health and Diagnostic Services. The DEP may also become involved if the handling of mortality presents water-quality issues to waters of the Commonwealth.

How it tackles the issue

The Domestic Animal Law places some general requirements on farming operations when dealing with mortality. First, the law requires agricultural operations to dispose of the carcass within 48 hours after the animal dies.³⁷ Second, it states that an agricultural operation must prevent exposure of the carcass to other living farm animals, domestic animals, and the public.³⁸ Additionally, the law requires persons who are transporting deceased animals to protect the environment, other animals, and the public from contamination.³⁹

The law also specifically identifies four methods for the proper disposal of dead animals: burial, composting, incineration, or rendering. Beyond that, there are no discernable regulatory requirements for farming operations to follow. However, both PDA and DEP maintain lists of suggestions and BMPs to ensure that carcass disposal does not create environmental or health concerns.

Burial

Burial has long been the preferred method of disposal of dead animals. Generally, the operator digs a large pit or trench into which he places the deceased animals and then covers them with soil. It is well understood that burying carcasses poses the largest number of environmental, public health and safety, and neighbor-conflict considerations.

Burial sites must be well chosen and well maintained to avoid groundwater contamination. This is because the burial pits have a tendency to fill with water and cause the deceased animals to float to the surface. The water in the pits is bacteria-laden and may be hazardous to both animal and human health. There



is also high potential for groundwater contamination from both bacteria and nutrients.

Carcass disposal by burial requires an agricultural operation to possess heavy equipment that can dig deep holes and lift large animals. Operators of an agricultural site must be sure to cover carcasses adequately with soil after they have been placed in the burial pit so as to avoid scavengers such as wild animals, domestic dogs, or birds from removing part or all of the carcass from the burial pit. Poor coverage of the dead animals can also lead to the spread of disease to other animals at the agricultural operation, create nuisance concerns for neighbors, and attract rodents and flies.

PDA and NRCS recommend that burial sites be:

- Iocated outside of the 100-year flood plain;
- a minimum of 100 feet from waters of the

Commonwealth (such as streams, ponds, wetlands, etc.), although 200 feet is recommended; and

 covered with a minimum of two feet of soil within 48 hours.

The agencies also recommend that burial sites be:

- located a minimum of 100 feet from wells and sinkholes, although 200 feet is preferred;
- at least 100 feet from a property line, although 200 feet is preferred; and
- away from the public view.

Various agencies also recommended that the bottom of burial sites be:

- at least two feet above bedrock;
- at least two feet above the seasonal high water table; and
- at least two feet above highly permeable soils.





Composting

Composting is a process that allows deceased animals to decompose through the action of bacteria and other microorganisms. Composting of carcasses can be done under a covered structure or on a welldrained or improved surface. Additional material, such as wood chips, sawdust, straw, hay and/or bones from animals that have already been composted, are generally added to the compost pile to aid in the decomposition process. Compost piles should reach a temperature of between 150 degrees and 160 degrees to ensure that disease-causing organisms are killed.

Incineration

Incineration is one of the safest disposal methods for carcasses because there is little risk of disease and it does not attract rodents or insects. However, it requires a unit specifically designed to burn dead animals.⁴⁰ These units may be expensive, slow to burn the carcasses, and require fuel to operate. Additionally, the units must be carefully managed to prevent air pollution and nuisances to neighbors. PDA notes that the best incinerators are fitted with a flue after-burner to eliminate smoke.

Rendering

Rendering plants recycle dead animals, slaughterhouse waste, and supermarket waste into products known as recycled meat, bone meal, and animal fat. These products are used as sources of protein to feed dairy animals, poultry, and swine, and as an ingredient of pet food, cattle feed, and sheep feed. The dead animals are collected for rendering at the agricultural operation and transported to a rendering facility. At the plant, the carcasses are cut into small pieces and then simmered to separate the meat from the fat and bones. Rendering is a convenient method of disposing of deceased animals and requires minimal labor for the agricultural operation, mainly placing the carcasses in containers for the rendering company to pick up on a regular schedule. However, the procedure can be expensive and presents biosecurity concerns for the agricultural operation. The trucks that collect the deceased animals on each farm can potentially transport disease from one farm to another.

Water-quality problems

The largest threat to water quality from animal mortality is runoff from areas where animals are composted or buried. Water-quality issues arising from burial sites can occur if the site is not properly located away from waterways or if the dead animals are not properly covered after they are placed in a burial pit. Two solutions to these problems are the use of concrete composting pads or roofing over a composting area that allow for easier capture of rainwater and diversion of the additional wastewater or rainwater to a containment structure where it can be properly handled.

Opportunities for community involvement and public participation

Pennsylvania's mortality management program does not incorporate public participation, as there is nothing for which the agricultural operation must obtain approval. However, anyone who notices leachate running off of a mortality area should contact DEP so that groundwater and surface water pollution can be avoided or addressed.

Section 10: Antibiotics

What the program addresses

Antibiotics are essential for the effective treatment of bacterial infections in humans as well as in animals. However, doctors increasingly report that bacterial infections fail to respond to antibiotic treatment, a condition called *antibiotic resistance*. The problem especially threatens young children, seniors, diabetics, and people with compromised immune systems such as cancer, transplant, and AIDS patients. The U.S. Centers for Disease Control (CDC) have declared antibiotic resistance to be one of their top concerns.

Healthy animals at industrial-scale agricultural operations are routinely fed low doses of antibiotics to enhance their growth and to compensate for the crowded conditions in barns. Low doses of antibiotics kill *some* bacteria, but other bacteria that are resistant to the drugs continue to live and reproduce. Over time, this overuse of antibiotics creates stronger, more resistant strains of bacteria.

Many of the antibiotics used in livestock production are also used in human medicine. Yet livestock producers use an estimated 70 percent of all U.S. antibiotics and related drugs to enhance growth and prevent disease in healthy animals. This amount is eight times greater than the quantity of antibiotics used in all human medicine, and does not include the antibiotics used by livestock producers to treat sick animals.⁴¹

Resistant bacteria can be transferred from animals to humans in three ways: (1) via food that has been contaminated with antibiotic-resistant bacteria; (2) by working directly with infected animals and handling their bodies, feed, or manure; and (3) via contact with groundwater, surface water, and/or soil that is contaminated with antibiotic-resistant bacteria in the animal manure.

The routine feeding of low levels of antibiotics to healthy animals at industrial-scale farming operations is a widespread practice in Pennsylvania. Pennsylvania ranks 19th in the nation for the amount of antibiotics in animal feed, and animal operations in Lancaster County rank 12th among all U.S. counties for the amount of medically important antibiotics used in animal feed, as well as 12th for the amount of antibiotics excreted in animal waste. Currently there is no program in the Commonwealth nor are there laws in the federal code addressing antibiotic overuse in agriculture.



How it tackles the issue

While there are no programs in Pennsylvania regarding antibiotic resistance, PennFuture has a campaign called Safe Food, Safe Families (http:/www. pennfuture.org/water) that seeks to educate the public on the risks to human health from the routine feeding of low levels of antibiotics to healthy animals at industrial-scale farming operations.

The principles of the Safe Food, Safe Families campaign are as follows:

- to recognize the growing threat to human health caused by bacteria resistant to antibiotics;
- to support a ban on the practice of feeding antibiotics to healthy animals where such antibiotics are used in human health medicine or are closely related to human drugs;
- to support veterinary oversight of the administration of antibiotics to animals;
- to support the prudent use of antibiotics in human medicine, including doctors' prescribing them only for bacterial infections and patients' taking the entire course of the drug;
- to support the use of sustainable agricultural practices as an alternative to feeding antibiotics to healthy animals;
- to support livestock producers, supermarkets, and restaurants that have voluntarily stopped using, buying, and selling meat, poultry and fish that have been produced with the assistance of antibiotics that are important to human medicine;
- to support efforts to collect and make public data that is reliable and objective regarding the production and use of antibiotics in both human medicine and animal agriculture;

- to support efforts to collect and make public data that is reliable and objective regarding antibiotic residues and antibiotics resistance, including antibiotics and antibiotic-resistant bacteria both on food and in surface waters and groundwater; and,
- to call on the Pennsylvania General Assembly to enact legislation to ban the administration of antibiotics to healthy animals at livestock production facilities.

Specifically, PennFuture (in conjunction with environmental partners and public health organizations) is working to pass state legislation that would prohibit the use of antibiotic drugs to enhance growth or prevent disease outbreaks in healthy animals in livestock facilities if those same drugs are also used to treat infectious diseases in humans. The legislation would not prohibit the use of antibiotics to treat sick animals.

Water-quality problems

One of the three main ways antibiotic-resistant bacteria from an industrial agricultural operation can reach the public is through polluted water. For this reason, the public should report to DEP, the county conservation district, and PennFuture any incidents of manure discharging to surface waters or running off fields where it was applied.

Opportunities for community involvement and public participation

Public participation is critical to moving forward on progressive legislation. Visit PennFuture's website at www.pennfuture.org to sign on as an endorser of the Safe Food, Safe Families campaign.

Section 11: Local Land-Use Proceedings

By law, local governments have authority to protect the health, safety, and general welfare of residents. Municipalities have two broad powers in these areas: the power to regulate land use under state law (the Municipal Planning Code) and general "police power" to regulate activities that might harm the public. This power allows local governments to develop ordinances that restrict aspects of agricultural operations that are not addressed by state or federal law.

The use of land-use restrictions and building and zoning regulations in Pennsylvania's 2,500-plus townships and boroughs is quite varied. Some municipalities have enacted additional ordinances that address other concerns arising from agricultural operations as well.

Following are the main types of land-use restrictions that pertain to farming operations.

Building Codes and Permits

What the program addresses

In 1999, the Pennsylvania General Assembly passed and Governor Tom Ridge signed into law a statewide Uniform Construction Code (UCC).⁴² Prior to that, the state government did not oversee building codes; the task was left up to local governments. In typical Pennsylvania fashion, some municipalities enacted building codes while others did not. This inconsistency led to a heightened concern about the safety of buildings in municipalities that had no code. After the passage of the UCC, municipalities that had previously enacted their own building codes were allowed to retain them as long as the standards in the code were at least equal to those in the UCC. Municipalities that had not adopted building codes could either adopt the UCC or develop their own codes that met or exceeded it.

All Pennsylvania municipalities now have a building code. Although these codes still vary in content, every municipality either directly or indirectly oversees building construction. However, a challenge remains in that the UCC exempts agricultural buildings from its regulations. Only municipalities that have developed a building code more restrictive than the UCC may require a permit for an agricultural building.

How it tackles the issue

Prior to starting a construction project, an individual or business must obtain a building permit from the municipality in which the project will be sited. This



process typically involves submitting an application and a fee to the municipality. If the construction project meets the guidelines in the building code, then a permit is issued.

Water-quality problems

The biggest risk to water quality during construction is loss of soil due to erosion. Recall that if certain areas of land are going to be disturbed during the construction process, the agricultural operation must minimize the risk of accelerated soil erosion and sedimentation by implementing BMPs. The agricultural operation may also have to obtain a general or individual NPDES Permit for Stormwater Discharges Associated with Construction Activities (page 16).

Opportunities for community involvement and public participation

Unfortunately, the building-permit approval process is not open to the public for input. Quite simply, any given project either does or does not meet building code requirements.

Nevertheless, citizens should be aware that a building permit must be obtained for construction, addition, alteration, and repair of an agricultural structure in some, but not all, municipalities. If a farmer has begun constructing a new barn or altering an existing one without a building permit, the project may be in violation of a municipal building code. To determine whether your municipality requires a building permit for agricultural construction, call the municipal codes enforcement officer. Contact and other information can be found at http://www.psats.org/subpage. php?pageid=findyourtownship2.

Zoning Ordinances and Permits

What the program addresses

Zoning is the mechanism that municipalities use to control the physical development of land. Zoning regulations establish where specific uses of land may occur. In addition to restricting the uses that can be made of the land and what may be built upon it, zoning regulations may also dictate the dimensions of lots and buildings and the density and setbacks for development.

It is important to note that not all Pennsylvania municipalities have zoning, nor is zoning required by state law. (There are many, mostly rural, areas of Pennsylvania where no zoning at all is in effect.) Where it exists, municipal zoning is usually initiated at the local level by adoption of an ordinance designed to protect the health, safety, and general welfare of the residents. However, a county can also adopt zoning regulations for the entire county. In that situation, the county ordinance applies where there is not already a municipal (township or borough) zoning ordinance.

A zoning ordinance divides all of the municipal land into districts, then details land-use regulations that apply generally to the municipality as well as specifically to each district.

The Pennsylvania Municipal Planning Code (MPC)⁴³ states that zoning ordinances must encourage the "viability of agricultural operations." The same section of the MPC further states that zoning ordinances may not restrict the development of agricultural operations in geographic areas where agriculture has historically been present, except when such an operation will present a threat to public health and safety.

How it tackles the issue

If a municipality or county has zoning, the process for obtaining a permit for construction activity is very similar to that for obtaining a building permit. A person seeking to construct an agricultural building must obtain a zoning permit. This process generally requires an application and a fee. How the application is handled depends upon how the proposed construction fits into the categories and restrictions of the relevant zoning ordinance. Depending on the zoning laws in a municipality, a person wanting to construct an agricultural building may need to comply with one of four kinds of zoning situations, some of which allow for significant public input.



- 1. The agricultural use may be permitted by the zoning ordinance *by right*. In that case, no public input is taken on the application and the applicant is granted the permit.
- 2. The agricultural building may be allowed under a *special exception* to the zoning ordinance. This means that the use is allowed in the zoning ordinance, but only if certain specifications, as detailed in the zoning ordinance, are met. Generally, a public hearing is held before the municipality's zoning hearing board to determine if these conditions have, in fact, been met.
- A conditional use zoning permit is similar to a special-exception zoning permit. Again, the use is allowed if certain conditions detailed in the zoning ordinance are met. In the case of a conditional-use zoning permit, the municipal governing body (township supervisors or borough council) holds a hearing to determine if the permit should be granted.



4. A variance is another type of zoning permit that may be encountered by a person attempting to construct an agricultural building. A variance is markedly different from both a special exception and a conditional-use permit because an applicant for a variance is seeking permission to do something that is forbidden by the zoning ordinance. An applicant for a variance generally has a hearing before the municipality's zoning hearing board; these hearings are open to the public. In order to be granted a variance, the applicant will generally have the burden of proving that an unnecessary hardship justifies the variance and granting such a variance will not be harmful to the public.

Water-quality problems

The local zoning-permitting process is the *only* forum where a farming operation's impact on public health, safety, and general welfare can be considered. As a result, citizens concerned about water-quality issues related to the proposed development can present testimony to the zoning hearing board and township government on topics such as water withdrawal, water contamination, odor issues, dust and air-quality concerns, pest-control issues, traffic concerns, and property-value depreciation.

Opportunities for community involvement and public participation

It is vital for citizens concerned about the construction of an agricultural operation in their community to get involved in the permit process if the proposed facility will need to obtain a special-exception zoning permit, conditional-use zoning permit, or variance. Zoning hearing boards and municipal governing bodies have the power to place conditions on their approval to minimize the impacts on the public; however, conditions are unlikely to be placed without public input. Thus, it is critical for citizens to participate in this process as early as possible.

It is also important for citizens to know the zoning requirements for a given facility so that they may evaluate whether these requirements have been met



and determine what rights they have to challenge or enforce the decision of the zoning hearing board or municipal governing body. Individuals and organizations that decide to get involved in this process may want to consult with legal counsel skilled in local land use or environmental law. Legal counsel will be able to ensure that relevant issues, which may be important in subsequent appeals, are raised during the zoning and township hearings. This process will also allow concerned individuals and organizations to provide direct testimony individually and through their own experts on the negative impacts that a large agricultural operation will have on the community, and to cross-examine the proponents of that operation.

Land Development/ Subdivision Ordinances

What the program addresses

In addition to building codes and zoning ordinances, a municipality may also have a subdivision and landdevelopment ordinance. Such an ordinance controls how a use or activity relates to the land on which it is located. As with zoning, not all municipalities have a subdivision and land-development ordinance, and a county may adopt and enforce county-wide subdivision and land development ordinances. These ordinances apply only if a municipality does not already have its own ordinance.

How it tackles the issue

A person wishing to develop or subdivide his/her land submits an application to the local planning commission or the local governing body, such as the township supervisors. The municipal engineer then reviews the application and determines its conformity with local ordinances and land surveys.

The governing body may hold a hearing on the application prior to approving or rejecting it, but the action taken is dependent on the language of the municipality's individual ordinance. The approval may be a one- or two-step process. Generally, it has two steps: the submission and approval of a preliminary plan, which provides general information, followed by





the submission and approval of a long-term development plan. The final plan is then prepared and submitted to meet any conditions that were placed on the approval of the preliminary plan. Once the final plan is approved, it must be recorded, after which development of the land may begin.

Water-quality problems

Land development and subdivision ordinances may incorporate stormwater-management provisions to address various soil types that are prone to erosion, steep slopes, vegetation, drainageways, and other ecological elements. These types of ordinances may require the landowner to develop an E&S Plan and to install and maintain BMPs to minimize the risk of accelerated soil erosion and sedimentation.

These ordinances may also attempt to ensure that adequate water resources and water quality exist to sustain the proposed building. Ordinances may also require the applicant to complete a study on potential waterresource impacts (typically performed by a hydrologist or other specialist) or to obtain a permit from a river basin commission for very large water withdrawals. Stormwater management may also be required.

Opportunities for community involvement and public participation

Land development and subdivision ordinances offer another process in which public input can help prevent soil erosion and protect water quality. Citizens can review the subdivision and development plans at their municipality's township office prior to the township supervisors or commissioners meeting. They may also comment both in writing and in person at the meeting where the plan will be reviewed and considered for approval.

Local Ordinances

What the program addresses

Townships and other municipalities are not required to have zoning to pass local ordinances regulating the use of land. Under their general "police power," they may adopt other kinds of ordinances to protect the public from possible harmful effects of large agricultural operations so long as state law does not preempt the authority of local governments to enact such ordinances.

How it tackles the issue

In accordance with state law, municipalities can regulate agricultural activities that do not deal with the storage, handling, or spreading of manure or the construction, location, or operation of facilities in which manure is stored. If municipalities want to adopt an ordinance that goes to the core of how manure is to be handled, Act 38 allows a municipality to adopt the nutrient management and odor management provisions of that law and its implementing regulations in their entirety. PennFuture has a model ordinance available for municipalities that are interested in adopting Act 38 and the nutrient management regulations promulgated under it (see page 44).

Water-quality problems

Enactment of local ordinances can help address waterquality issues in a municipality. As noted, municipalities are allowed to regulate activities to protect the health, safety, and welfare of residents, so long as they are not preempted by state law.

Opportunities for community involvement and public participation

Local ordinances are unique to each municipality and the opportunity for public participation may vary. To learn more about specific local ordinances related to agriculture, nutrient management and other related issues, please visit the PennFuture website at www.pennfuture.org.



Appendix A. List of Acronyms and Abbreviations Used in the Handbook

- ACRE Act 38 of 2005: the Agriculture, Communities, and Rural Environment Act
- AEU animal equivalent unit
- BMP best management practices
- **CAFO** Concentrated Animal Feeding Operation
- CAO Concentrated Animal Operation
- DEP Department of Environmental Protection (Pennsylvania)
- DMP Discharge Monitoring Plan
- DMR Discharge Monitoring Report
- E&S Plan Erosion and Sedimentation Plan
- EPA Environmental Protection Agency (federal)
- MPC Municipal Planning Code
- NBS Nutrient Balance Sheet
- NCT nutrient credit trading
- NMP Nutrient Management Plan
- NPDES National Pollution Discharge Elimination System
- **OSI** Odor Site Index
- PDA Pennsylvania Department of Agriculture
- **POTW** Publicly Owned Sewage Treatment Plant
- **SCC** State Conservation Commission
- TMDL Total Maximum Daily Load
- UCC Uniform Construction Code
- WIP Watershed Implementation Plan



Appendix B. ACRE Fact Sheet

Protecting the Health, Safety and Welfare of Citizens Opportunities for Local Governments to Regulate Agricultural Operations

Pennsylvania's rural and suburban local governments face many serious challenges, and one of the most difficult is handling conflicts caused by industrial-scale livestock operations. As more and more traditional farms convert to intensive methods, local communities are faced with the impact these farms have on public health and water resources. Coupled with the expansion of suburban development into farmland, this trend means that communities may be facing conflicts between neighbors and having difficulty dealing with odors, fly infestations, manure spreading, and destruction of water quality.

Fortunately, municipal officials have a tool in their legal toolbox to use in solving conflicts and protecting the health, safety and welfare of their residents: the Agriculture, Communities and Rural Environment law (ACRE).

What is ACRE?

The Agriculture, Communities and Rural Environment law, Act 38 of 2005, attempts to balance agricultural interests with local government's duty of protecting residents.

ACRE strives to:

- protect water quality by requiring Nutrient Management Plans that detail how manure will be handled and define manure application setbacks and buffers;
- identify which kind of agricultural operations must be regulated and define normal agricultural operations; and
- allow agri-business to challenge local ordinances and require the Attorney General to review those ordinances for their legality.

ACRE empowers municipalities to adopt and enforce local ordinances and regulations

According to Section 1 of ACRE, Act 38 of 2005, 3 P.S. §§ 501-522, municipalities are allowed to adopt ordinances or regulations that are consistent with and no more stringent than the requirements and regulations in the ACRE legislation. That right has been upheld by the Commonwealth Court of Pennsylvania.

Section 1 of ACRE, and the supporting regulations, may be adopted as a municipality's Nutrient Management Code. By so doing, municipalities are empowered to enforce the nutrient management regulations so they can protect citizens and resolve public nuisances. Because industrial livestock and nutrient and agricultural pollution are regulated primarily through Nutrient Management Plans in Pennsylvania, municipalities can make sure that agriculture is not contributing excess pollution to waterways.



Unless a local ordinance consistent with ACRE exists, the best a municipal official can do in response to complaints from residents is to recommend they call the county conservation district or Department of Environmental Conservation. County conservation districts both enforce regulations and provide technical and educational assistance to agricultural operations. Because of this dual role, many conservation districts are hesitant to take a vigorous enforcement role. DEP is understaffed and often slow to follow up on complaints and suspected violations, leaving citizens' concerns unanswered.

Benefits of a Nutrient Management Code

Local governments that adopt ordinances consistent with ACRE can ensure that agricultural operations do not negatively impact the health, safety and welfare of their citizens.

A local Nutrient Management Code can guarantee that:

- certified Nutrient Management Plans are followed by industrial livestock operations (CAOs and CAFOs);
- livestock operations that produce or import manure keep accurate records, including:
 - signed broker agreements, and
 - Nutrient Balance Sheets (documenting manure application rates on farm fields);
- operators observe manure setbacks and buffers:
 - CAOs and CAFOs must have a 100-foot setback or 35-foot vegetative buffer from all surface waters when applying manure;
- livestock facilities establish odor management plans for new or expanding facilities;
- municipalities can assess fines for violations;
- excess nutrients from livestock manure, poultry litter and pesticides are not running into our waterways and flowing downstream; and
- Iocal government can respond appropriately to the concerns of residents.

A word of caution about ACRE and local ordinances

Municipalities can adopt and enforce only those ordinances that are consistent with ACRE. A number of municipalities have adopted local ordinances attempting to restrict or regulate industrial livestock operations that have been challenged by agri-business. The Office of the Attorney General has reviewed contested ordinances and some municipalities have been notified that their ordinances are invalid or have legal deficits. The Attorney General has brought five legal actions against municipalities for adopting illegal ordinances.

For more information or assistance in adopting a local ordinance, contact PennFuture by phone at 717-214-7920, by email at info@pennfuture.org, or through our website at www.pennfuture.org.



Appendix C. PennFuture Model Nutrient Management Ordinance

AN ORDINANCE ELECTING TO ADMINISTER AND ENFORCE SECTION 1 OF ACT 38 AND ADOPTING THE NUTRIENT MANAGEMENT REGULATIONS AS _____TOWNSHIP'S NUTRIENT MANAGEMENT CODE

WHEREAS, the purpose of this ordinance is to promote the general health, safety and welfare of the citizens of this Municipality and to conform to the requirements of Section 1 of Act 38 of 2005 and the implementing regulations promulgated by the State Conservation Commission codified at 25 Pa. Code Chapter 83.201 et seq. (hereinafter sometimes collectively referred to as "Act 38" or "ACRE"); and

WHEREAS, ACRE allows the enactment of an appropriate ordinance by municipalities electing to administer and enforce the nutrient management provisions of Section 1 of ACRE.

NOW, THEREFORE, it is hereby enacted and ordained as follows:

- This Municipality hereby elects to administer and enforce Section 1 of ACRE, Act 38 of 2005, 3 P.S. §§ 501-522, as amended from time to time and its implementing regulations.
- The nutrient management regulations, contained in 25 Pa. Code § 83.201 et seq., as amended from time to time, are hereby adopted and incorporated herein by reference as the Nutrient Management Code of this Municipality.
- 3. Administration and enforcement of the Nutrient Management Code within this Municipality shall be undertaken in any of the following ways:
 - By the designation of an employee of the Municipality to serve as the municipal
 Nutrient Management Code official to act on behalf of the Municipality;
 - b. By the retention of one or more certified nutrient management planners or third-party agents to act on behalf of the Municipality;



- c. By agreement with one or more other municipalities for the joint administration and enforcement of the Nutrient Management Code through inter-municipal agreement; or,
- d. By entering into a contract with another municipality for the administration and enforcement of the Nutrient Management Code on behalf of this Municipality.
- 4. Violations of the Nutrient Management Code may result in penalties and remedies as described in Section 1 of ACRE, 3 P.S. §§ 501-522, as amended from time to time, and its implementing regulations. In accordance with Section 1 of ACRE, 3 P.S. § 519(d), this Municipality will not collect penalties for any violation or unlawful conduct for which a penalty has been assessed under Section 1 of ACRE, 3 P.S. §§ 501-522, as amended from time to time, and its implementing regulations.
- 5. This ordinance shall be effective <u>days after the date of passage of this ordinance</u>.
- 6. If any section, subsection, sentence, or clause of this ordinance is held, for any reason, to be invalid, such decision or decisions shall not affect the validity of the remaining portions of this ordinance.

 DULY ENACTED AND ORDAINED this _____ day of _____, 200___ by the Board of Supervisors of

 ______ Township, ______ County, Pennsylvania in public session duly assembled.



Notes

- 1 33 U.S.C. § 1432(b).
- 2 In accordance with 25 Pa. Code §93.4b(a), a surface water that meets one or more certain conditions qualifies as a high quality waterway, as detailed here: http:// www.pacode.com/secure/data/025/chapter93/s93.4b. html.
- 3 In accordance with 25 Pa. Code §93.4b(b), a surface water that meets one or more certain conditions qualifies as an exceptional value waterway, as detailed here: http://www.pacode.com/secure/data/025/chapter93/ s93.4b.html.
- 4 The federal CAFO program has undergone changes due to recent litigation. Formerly, it operated under the assumption that all CAFOs have the potential to pollute, and are therefore subject to regulation and permitting requirements. This assumption was litigated in federal court; the court held that EPA could only regulate facilities that actually cause pollution. This ruling leaves EPA with the burden of proving that a facility will actually cause water pollution before the facility must obtain an NPDES CAFO permit under federal law. However, this litigation has caused no actual change in how the Pennsylvania CAFO program is operated, given that the state program is also operated under the state Clean Streams Law, which allows DEP to regulate facilities that have the *potential* to pollute.
- 5 The nutrient-management regulations, 25 Pa. Code 83.201, define a CAO as an agricultural operation with eight or more animal equivalent units (AEUs) where the animal density exceeds 2 AEUs per acre on an annualized basis.
- 6 Facilities that exceed 2 AEUs per acre of cropland or other land suitable for manure application.
- 7 The P Source Coefficient estimates the amount of soluable phosphorus that dissolves into water from a manure sample, given a set quantity of manure in a set volume of water for a set period of time.
- 8 The regulations define pastures as crop areas managed for forage production that are harvested by livestock, or by a combination of livestock and mechanical harvesting.
- 9 The regulations define animal concentration areas as barnyards, feedlots, loafing areas, exercise lots or other similar areas that will not maintain a growing crop, or where deposited manure nitrogen is in excess of crop needs.
- 10 25 Pa. Code § 92.5a(e)(1)(ii).
- 11 Manure storage facilities built after October 1, 1997 require a 200-foot setback from property lines. The setback for these facilities jumps to 300 feet if the manurestorage facility sits on a slope exceeding 8 percent or if the facility has a capacity of 1.5 million gallons or more.

- 12 Facilities that existed as of October 1, 2006 were not required to obtain this verification until October 1, 2009.
- 13 Year One is the year in which manure is applied to the field. If manure is applied to a field for consecutive years, Year One is the first year in which that specific manure type was applied to the field.
- 14 Blankenship, Karl. "No clear solution for sediment buildup at Susquehanna dams." *Chesapeake Bay Journal.* January/February 2001. Available at http://www. bayjournal.com/article.cfm?article=839.
- 15 Ibid.
- 16 The regulations were previously based upon the AEUs of the farming operation. Some operators were oversizing their manure storages so that in the event of an expansion they could avoid the manure-storage regulations and the necessity of obtaining a permit.
- 17 Surface water, as defined in the regulations, is a perennial or intermittent stream with a defined bed and bank, a lake, or a pond. This definition of surface water is not as complete as definitions used in other water-quality-related regulations, particularly the CAFO regulations.
- 18 The setback provision applies to CAOs, agricultural operations that import manure from a CAO, and agricultural operations that import manure from a CAFO. The setback for CAFOs is outlined in the regulations directly pertaining to those facilities, but the requirement is also 100 feet or a 35-foot vegetated buffer. 25 Pa. Code § 92.5a(e)(1)(i).
- 19 Those earth-disturbance activities other than agricultural plowing or tilling that impact 5,000 or more square feet of land must also develop an E&S Plan similar to that required for agricultural plowing and tilling, although in this case whoever prepares the plan must be trained and experienced in erosion and sedimentcontrol procedures and techniques. In addition, this plan must include a description of the existing topography of the site, the topography of the surrounding area, the soils, the disturbance activity, and the amount of runoff from the project site and its upstream watershed area, among other requirements. The plan should be designed to limit the degree and duration of the disturbance.
- 20 Chesapeake Bay Program Facts & Figures: http:// www.chesapeakebay.net/factsandfigures. aspx?menuitem=14582.
- 21 http://www.epa.gov/reg3wapd/tmdl/303list.html
- 22 25 Pa. Code § 96.8.
- 23 http://pa.gov/portal/server.pt/community/ chesapeake_bay_program/10513



- 24 National Pollutant Discharge Elimination System permits, which are discussed at length earlier in this handbook
- 25 Chesapeake Bay Tributary Strategy Compliance Cost Study. Prepared for the Legislative Budget and Finance Committee. Metcalf & Eddy/AECOM. November 2008.
- 26 2010 Report Card for Pennsylvania's Infrastructure. American Society for Civil Engineers. May 2006. Available at http://www.pareportcard.org/.
- 27 http://www.pacode.com/secure/data/025/chapter91/ s91.36.html.
- 28 No runoff or discharges from a 25 year/24 hour storm event for nutrient management practices. No runoff or discharges from a 10 year/24 hour storm event for in-field erosion and sedimentation and nutrient applications.
- 29 High temperatures can speed up the decomposition of manure, in turn increasing odor emissions.
- 30 High humidity and moisture levels can speed up the decomposition of manure, resulting in increased odors.
- 31 The longer manure is allowed to accumulate, the more odors will be generated.
- 32 Ventilation systems may reduce odor levels inside a structure, but they then transfer the problem to the outdoors, where dust, a mechanism for carrying odors and gases, can transport and distribute the odors over a farther distance.

- 33 Weather conditions can affect the spread of odors.
- 34 Dust and particulate matter absorbs odors, thereby serving as a transport mechanism for these odors.
- 35 CAOs are defined under the nutrient-management regulations promulgated under Act 38 of 2005 (formerly under Act 6). The definition of a CAO can be found in the nutrient management section of this handbook (page 8).
- 36 3 Pa. C.S. § 2301 et seq.
- 37 3 Pa. C.S. § 2352(a)(2).
- 38 3 Pa. C.S. § 2352(a)(2).
- 39 3 Pa. C.S. § 2352(a)(3).
- 40 Homemade units or open burning are considered unsatisfactory by PDA, as they may result in air pollution or unpleasant odors.
- 41 Margaret Mellon, C. Benbrook, and K. L. Benbrook, Hogging It! Estimates of Antimicrobial Abuse in Livestock (Cambridge, MA: Union of Concerned Scientists, 2001). See http://www.ucsusa.org/food_and_ agriculture/science_and_impacts/impacts_industrial_ agriculture/hogging-it-estimates-of.html.
- 42 Act 45 of 1999.
- 43 53 P.S. § 10603(h).v



610 North Third Street Harrisburg, PA 17101 (717) 214-7920 www.pennfuture.org