Cooks Creek

Watershed Assessment Report

June 2015

Prepared By:

United States Environmental Protection Agency, Region III
Water Protection Division
1650 Arch Street
Philadelphia, PA 19103

Acknowledgement

A special thanks to the farmers for their time to participate in this project and their environmental stewardship. We also thank the Virginia Department of Environmental Quality (DEQ) and the Virginia Department of Agriculture and Consumer Services (VDACS) for their participation.

Gary Flory (DEQ)
Bob Peer (DEQ)
Greg Barts (VDACS)
Tim Higgs (VDACS)
Darrell Marshall (VDACS)

This project was conducted by the United States Environmental Protection Agency, Region III's (EPA) CAFO Team with technical support from EPA's contractor, Tetra Tech.

Kyle Zieba (EPA)
Mark Zolandz (EPA)

Table of Contents

List of Abbreviations

AFO	Animal Feeding Operation
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operation
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
EPA	United States Environmental Protection Agency, Region III
NMP	Nutrient Management Plan
NPDES	National Pollutant Discharge Elimination System
TMDL	Total Maximum Daily Load
VDACS	Virginia Department of Agriculture and Consumer Services
VPA	Virginia Pollution Abatement
VPDES	Virginia Pollutant Discharge Elimination System
WIP	Watershed Implementation Plan

I. Executive Summary

The United States Environmental Protection Agency, Region III (EPA) visited five farms in the Cooks Creek watershed in an effort to assess how effective the state's agricultural programs are in protecting local waterways from runoff from animal feeding operations (AFOs). This watershed-based AFO assessment looked at 1) on the ground effectiveness of and compliance with state or federal requirements for reducing nitrogen, phosphorus, and sediment, and 2) the implementation of various best management practices (BMPs) relevant to improving water quality at the farm level. Virginia has identified Cooks Creek as impaired and not meeting water quality standards set by Virginia for fecal coliform bacteria and the General Standard (Benthics). EPA has approved a Total Maximum Daily Load (TMDL) for fecal coliform, sediment, and total phosphorus. Cooks Creek is in the Potomac River Basin which drains to the Chesapeake Bay.

Protection of local waterways depends on local farmers implementing BMPs, whether required or voluntary. Virginia has two regulatory programs that impact animal feeding operations, the Virginia Pollutant Abatement (VPA) permit program and the Virginia Pollutant Discharge Elimination System (VPDES) permit program. Virginia also has various programs to provide technical and financial assistance to farmers to enhance environmental stewardship, such as the Virginia Agricultural Cost-Share Program and the Virginia Nutrient Management Program. In addition, farmers can participate in federal conservation programs administered by the United States Department of Agriculture. These programs, along with others, are vital to the success of protecting and restoring local waterways and ultimately the Chesapeake Bay.

EPA pursued a watershed-based approach in order to assess multiple AFOs where many Virginia programs intersect to drive and support BMP implementation on farms in a watershed in need of restoration. In September 2014, EPA visited five AFOs in the Cooks Creek watershed. This allowed EPA to evaluate how the state programs, tools and resources translate to implementation of on-the-ground practices to protect water quality. Water quality improvements are not solely the result of state actions, but they rely on the individual farmers who ultimately make the decisions on a day-to-day basis to implement these practices, even without technical and financial assistance.

Based on the watershed assessment, EPA found that the Virginia's VPA permit program for poultry operations requires a nutrient management plan and appears to comprehensively address the areas of a VPA-permitted AFO where poultry manure is generated, stored and land-applied. However, a shortcoming of the VPA permit program is that it does not have a similar nutrient management plan requirement for dairy and cattle operations that may be co-located on a VPA-permitted poultry operation.

For those farms that are not permitted under the VPDES or VPA permit programs, EPA found that there are no regulatory requirements for these farms. Farms that are not covered under the VPDES or VPA permit programs are not required to implement a nutrient management plan or other agricultural conservation practices. Even though four out of the five unpermitted farms did not voluntarily develop and implement a nutrient management plan, they were voluntarily implementing other agricultural conservation practices to varying degrees, such as cover crops, conservation tillage, and livestock stream exclusion. Virginia developed a water quality implementation plan in place for Cooks Creek to address the environmental resource concerns

causing impairment to Cooks Creek. This plan relies on convincing farmers to voluntarily implement agricultural conservation practices by providing technical and financial assistance through the Virginia Agricultural BMP Cost-share Program and other sources.

General observations made during the assessments include the following:

- All medium and large AFOs in Virginia are covered by either a VPDES permit or a VPA permit. These permits require the AFOs to implement a DCR-approved nutrient management plan and to meet additional permit requirements. None of the five AFOs visited were required to have a VPDES permit. Two of the five AFOs visited were required to have a VPA permit.
- Virginia's VPA permit program appears to be comprehensive in addressing the areas of a permitted AFO where manure is generated, stored and land-applied. Both VPA-permitted poultry operations were generally in compliance with the VPA permit requirements.
- Unlike the VPDES permit program, Virginia's VPA permit program does not address all livestock and manure types on farms with several different types of livestock. The two poultry operations had a VPA permit for poultry and were required to implement nutrient management plans for the poultry side of the operation, but the nutrient management plans were not required to include the other livestock (dairy or cattle) raised at the farm.
- There are no regulatory requirements for small farms in Virginia that are not covered under the VPDES or VPA permit programs. No dairies are covered under the VPDES permit program and only 13% of all dairy AFOs (representing approximately 40% of the total dairy animal population) in Virginia are covered under the VPA permit program. All five of the dairy and cattle operations visited were small farms that were not regulated under the VPDES or VPA permit programs and did not have any regulatory requirements for the dairy or cattle operations. Only one of the five small dairy and cattle operations visited had voluntarily developed a nutrient management plan for the dairy and cattle operation.
- Nutrient management plans are a key part of the VPA and VPDES permit programs. Expanding nutrient management plans (whether through regulatory programs or voluntary, incentive based programs) to those small AFOs and non-AFOs (ex. pasture-based livestock operations and row crop operations) not covered under the VPA and VPDES program would help in achieving pollutant reductions and improving local water quality.
- Overall, the five farms visited were voluntarily implementing agricultural conservation practices to varying degrees that are effective at reducing nutrient and sediment pollution to surface waters, such as cover crops, conservation tillage and livestock stream exclusion.
- Although the five farms visited had many agricultural conservation practices in place, each farm had areas that could be improved upon such as:
    - Ensuring nutrient management plans include generation and land application rates for all manure sources.
    - Increasing manure storage to avoid the need for winter spreading.

II. Background

This watershed assessment is part of the U.S. Environmental Protection Agency's (EPA's) broader activities working with states to strengthen their animal agricultural programs to improve local water quality, and ultimately the restoration and protection efforts of the Chesapeake Bay (Bay). EPA has oversight of the National Pollutant Elimination Discharge System (NPDES) Program which regulates concentrated animal feeding operations (CAFOs). EPA also has oversight of the Chesapeake Bay Total Maximum Daily Load (TMDL) which addresses impairments due to excess nitrogen, phosphorus and sediment. The TMDL is supported by state Watershed Implementation Plans (WIPs) that set forth the pollution control measures needed to fully restore the Chesapeake Bay and its tidal rivers for various sectors including agriculture.

Virginia's Phase I and Phase II WIPs promote implementation of both regulatory and voluntary programs that implement a broad suite of agricultural conservation practices to reduce nutrient and sediment loads from agricultural cropland and animal production operations. Key practices include animal waste storage facilities, barnyard runoff controls, cover crops, nutrient management, land retirement, and soil conservation plans.

CAFOs are a subset of animal feeding operations (AFOs). Both AFOs and CAFOs fall within the agricultural sector. The agricultural sector also encompasses pastures, cropland, and nurseries. According to the Chesapeake Bay Program Partnership Watershed Model 2013 Progress scenario, agricultural lands account for 22 percent of the watershed, making agriculture one of the largest land uses in the area, second only to forested and open wooded areas (64 percent). The Chesapeake Bay watershed has more than 87,000 farm operations and 6.7 million acres of cropland. Agriculture is the largest single source of nitrogen, phosphorus, and sediment loading to the Bay through applying fertilizers, tilling croplands, and applying animal manure. Agricultural activities are responsible for approximately 44 percent of nitrogen loads delivered to the Bay and about 58 percent of phosphorus and sediment loads delivered to the Bay (Chesapeake Bay Program Watershed Model 2013 Progress scenario).

Of the agricultural nutrient and sediment loadings to the Bay from all Bay jurisdictions, Virginia's agricultural sector accounts for an estimated 18% of the total nitrogen and 45% of the total phosphorus, and 45% of the total sediment delivered to the Bay (Chesapeake Bay Program Watershed Model 2013 Progress scenario). Amongst all the Jurisdiction's agricultural sectors, Virginia's agricultural sector ranks first in phosphorus and sediment loadings to the Bay and ranks second in nitrogen loadings to the Bay, following Pennsylvania. Agriculture is the largest sector in Virginia of nitrogen, phosphorus and sediment loading to the Bay.

EPA has authority to oversee and evaluate state NPDES permit programs to ensure compliance with the Clean Water Act, including whether CAFO regulations are implemented appropriately in the state. That evaluation may include assessments of animal agriculture operations to see whether those facilities may meet the federal regulatory thresholds to qualify as CAFOs. In addition, EPA has authority to determine if AFO operations should be designated as CAFOs due to their impact on receiving waters. These AFO reviews are part of EPA's ongoing regulatory oversight activities to ensure compliance with the Clean Water Act and to assess the effectiveness of state programs

in addressing agricultural impacts upon receiving waters. This subwatershed assessment is being conducted as part of EPA's oversight responsibilities under the Chesapeake Bay TMDL to oversee Virginia's progress towards achieving its animal agriculture WIP commitments to reduce nitrogen, phosphorus, and sediment consistent with the Chesapeake Bay TMDL allocations. Consistent with those regulatory oversight activities, in a May 29, 2013 modification to the EPA-CBF Settlement Agreement, EPA agreed to undertake AFO reviews in four sub-watersheds throughout the Chesapeake Bay basin over the next four years, starting in 2013. The Cooks Creek watershed is the second of these four subwatershed assessments.

Purpose of AFO Watershed Assessments

The purpose of the AFO watershed assessment is to assess compliance of farms with applicable legal requirements for reducing nitrogen, phosphorus, and sediment; document the implementation of agricultural conservation practices by farmers; assess the effectiveness of state programs in addressing water quality impacts; and evaluate how well the Virginia Department of Environmental Quality (DEQ) and the Virginia Department of Agriculture and Consumer Services (VDACS) are providing oversight and outreach to these farms. The farm visits provided EPA with insight into what types of programs Virginia is implementing and how informed farmers are of the regulatory requirements. Virginia's animal agricultural programs include, but are not limited to, the Virginia Pollutant Abatement (VPA) permit program and the Virginia Pollutant Discharge Elimination System (VPDES) CAFO permit program. The effective implementation of these programs is the main focus for this assessment.

Virginia's State Water Control Law states that it is unlawful for any person to discharge wastes into state waters except where permitted by DEQ (§ 62.1-44.5). DEQ enforces the State Water Control Law through two different permit programs: Virginia Pollutant Abatement (VPA) permits and the Virginia Pollutant Discharge Elimination System (VPDES) permits.

Virginia AFOs that confine more than 300 animal units of livestock and utilize a liquid manure collection and storage system, or confine more than 20,000 chickens or 11,000 turkeys are required to obtain coverage under a VPA general or individual permit. DEQ has issued a VPA general permit for AFOs and animal waste management and a VPA general permit for poultry waste management. DEQ has also issued several VPA individual permits to AFOs. Under a VPA permit, an AFO is required among other things to implement a nutrient management plan (NMP) that requires proper storage, treatment, and management of animal and poultry waste and limits accumulation of excess nutrients in soils and leaching or discharge of nutrients into state waters.

Virginia AFOs that meet the definition of CAFOs are point sources that require VPDES CAFO permits for discharges. An AFO with 700 or more mature dairy cows or 1,000 or more cattle (including heifers) is considered a Large CAFO and needs a VPDES CAFO permit if it discharges manure, litter, or process wastewater. An AFO with 200-699 mature dairy cows or 300-999 cattle (including heifers) is considered a Medium CAFO and needs a VPDES CAFO permit if it discharges through a manmade ditch, flushing system, or other similar manmade device or if there is direct contact between surface waters and animals confined in the operation. Under a VPDES CAFO permit, an AFO is required among other things to implement an NMP that addresses appropriate application of nutrients to crops while minimizing nitrogen and phosphorus loss to ground and surface waters, as well as submit an Annual Report to DEQ each year.

The NMPs that are required by VPA permits and VPDES CAFO permits must be developed by a certified nutrient management planner in accordance with Virginia Code § 10.1-104.2 and approved by the Virginia Department of Conservation and Recreation (DCR). For unpermitted farms, NMPs are not required by Virginia regulations. Unpermitted farms may be required to develop NMPs if they choose to participate in some Virginia or federal cost-share programs. Unpermitted farms may also voluntarily develop and implement an NMP.

DEQ is "the state's lead agency for developing and implementing statewide nonpoint source pollution control programs and services to prevent degradation of the Commonwealth's water quality and quantity. As Virginia's designated lead for nonpoint source pollution, the agency acquires and disburses various federal, state and nonprofit grant funds."[1] The Code of Virginia (§10.1-2124.B) requires DEQ to assist local governments, soil and water conservation districts, and individuals in the control of nonpoint source pollution through technical and financial assistance made available through grants provided from the Virginia Water Quality Improvement Fund in order to restore, protect, and improve water quality. Nonpoint source grant programs include EPA Clean Water Act (CWA) Section 319 grants, EPA CWA Section 117 Chesapeake Bay Implementation Grant (CBIG) program, EPA CWA Section 117 Chesapeake Bay Regulatory and Accountability Program (CBRAP), and DCR's Virginia Agricultural Cost-Share (VACS) program. Virginia's WIP summarizes other programs available to Virginia farmers that provide financial assistance for BMP implementation such as: Agricultural BMP Tax Credit Program, Precision Nutrient and Pesticide Application Equipment Tax Credit, and Virginia Revolving Loan Fund.[2] In addition, there are several federal programs administered through USDA to help provide financial assistance for BMP implementation such as: Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP), and Conservation Stewardship Program (CSP).

The Virginia Department of Agriculture and Consumer Services (VDACS) also administers the complaint based Agricultural Stewardship Act which addresses demonstrated water quality degradation from agricultural operations. VDACS and DEQ are also operating under a memorandum of agreement to evaluation small AFOs in order to provide information and assistance. In addition, the Department of Conservation and Recreation is embarking on a program to assist small animal operations with nutrient management planning. Two full time positions have been added for this purpose.

a. Watershed and AFO Selection Process

In the Chesapeake Bay watershed, there are several geographic areas that have large numbers of livestock operations. EPA decided to focus primarily on dairies and cattle for the four AFO subwatershed assessments. Dairies and cattle were selected since most dairy and cattle operations in the Chesapeake Bay watershed are not subject to permitting under the federal NPDES CAFO program due to size and design. The geographic areas with the largest numbers of dairy cattle are southern New York, south-central Pennsylvania, western Maryland, and the Shenandoah Valley.

[1] http://www.deq.state.va.us/Programs/Water/CleanWaterFinancingAssistance/NonpointSourceFunding.aspx
[2] http://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/Baywip/vatmdlwipphase1.pdf

In 2014, EPA chose to conduct the AFO watershed review in the Shenandoah Valley, which includes Augusta, Clarke, Frederick, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties. In Virginia, the county with the largest numbers of dairy cows is Rockingham County (236 farms and 25,139 milk cows) (USDA 2012 Ag Census). Together, the Shenandoah Valley counties account for approximately 32% of the dairy farms and approximately 40% of the dairy cows in Virginia (USDA 2012 Ag Census). Therefore, EPA decided to select a watershed in one of these eight counties.

EPA identified all 12-digit HUC watersheds in the eight counties in the Shenandoah Valley. Starting with this list of 132 watersheds, EPA identified those watersheds that had at least four AFOs, whose surface waters were identified as impaired on Virginia's 303(d) list with a TMDL developed, with a headwater stream, and located entirely in Virginia. These criteria narrowed the list of potential watersheds to 21. Of those 21 watersheds, EPA identified those watersheds whose surface waters were impaired for sediment, fecal bacteria, and nutrients and were listed as a "priority agriculture watersheds" by USDA for funding through the Chesapeake Bay Watershed Initiative.

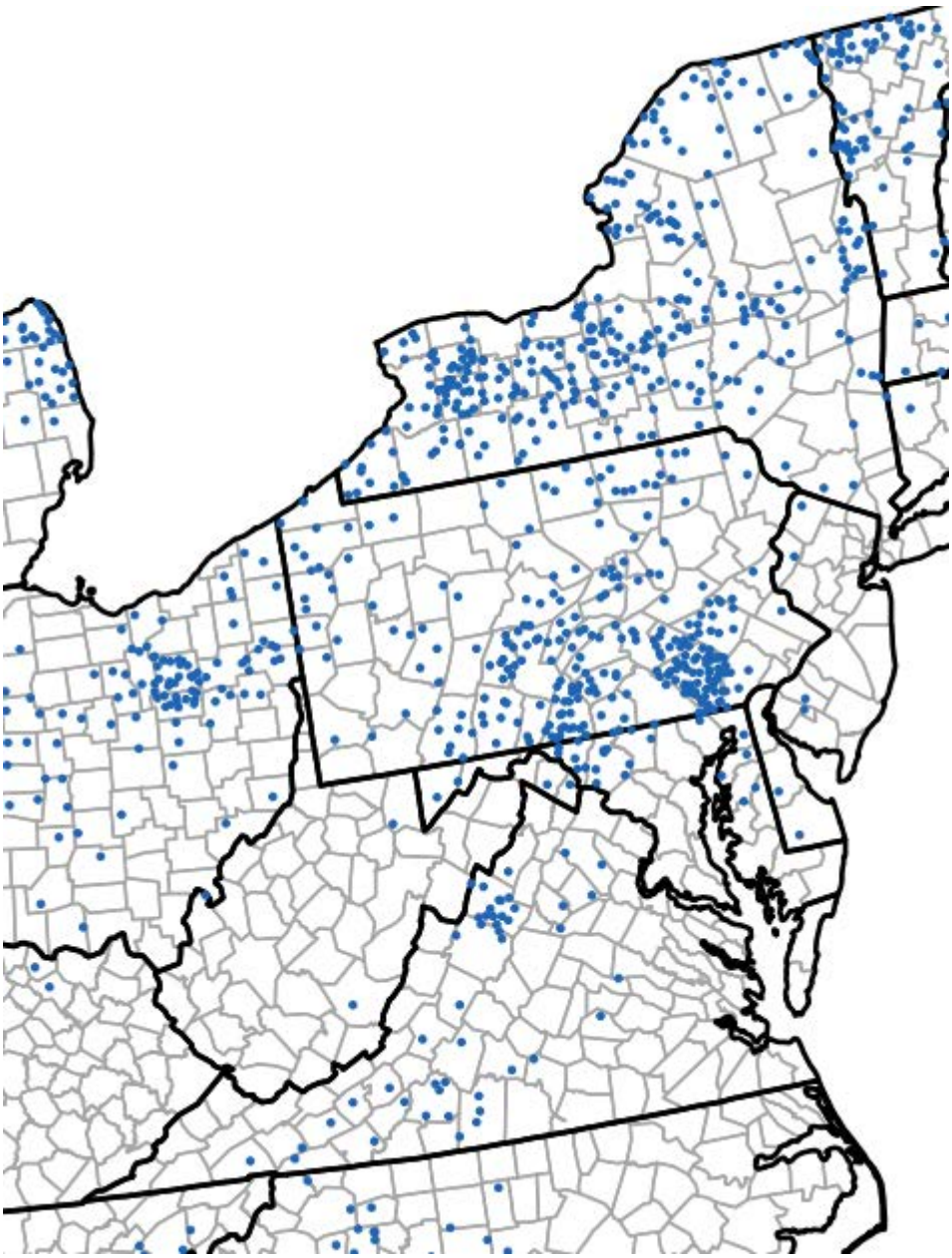

Figure 1: Milk cow inventories, 2012 (1 dot = 2,000 cows). Source: USDA2012 Ag Census

The Cooks Creek watershed was chosen for the assessment because (1) it is an impaired water body with a TMDL, (2) it has a significant number of AFOs (and therefore manure generation) located close to surface waters with the potential for having a water quality-related impact, and (3) it is fully in the boundaries of the Commonwealth. The AFOs in the watershed included a mix of cattle (e.g. dairy, heifer, or beef cattle) and poultry (e.g. broiler, turkey) operations. EPA selected individual AFOs to assess that were located near streams or other surface waters. EPA focused on these AFOs because, due to their location, they may have a larger impact on water quality than farms farther away.

III. Cooks Creek Watershed

The Cooks Creek watershed (HUC-12 Code: 020700050603) is located entirely in Virginia west of Harrisonburg, Virginia in southern Rockingham County, Virginia near its border with Augusta County, Virginia. Cooks Creek is approximately 13 miles long, with the Cooks Creek watershed covering approximately 25 square miles (15,919 acres).[3] Cooks Creek has three named tributaries (Silver Creek, Sunset Heights Branch, and Blacks Run) and several unnamed tributaries. Cooks Creek and its tributaries generally flow from north to south, starting north and northwest of Harrisonburg, Virginia and flowing south toward Mount Crawford, Virginia where it empties into the North River.

Land use in the Cooks Creek watershed is dominated by agriculture, with approximately 67% of land in the watershed involved in agriculture (see Table 1). Agricultural land use consists of cropland (primarily corn production), hayland, pasture, and livestock operations. Livestock in the watershed include dairy and beef cattle, hogs, sheep, chickens, and turkeys. Approximately 26% of land area is urban/suburban, including Mount Crawford, Dale Enterprise, the Town of Dayton, and the City of Harrisonburg. Only 7% of the watershed remains in forest.[4]

Table 1: Land use in the Cooks Creek watershed.

Land Use Type	Land Use Percent
Cropland	41%
Pasture/Hayland	26%
Forest	7%
Urban/Suburban	26%

Cooks Creek has been identified as impaired and not meeting water quality standards set by Virginia. Cooks Creek was listed as impaired on Virginia's 1996 303(d) list due to violations of Virginia's water quality standards for fecal coliform bacteria and violations of the General Standard (Benthics). EPA approved the Cooks Creek watershed TMDL for fecal coliform on June 5, 2002 and the Cooks Creek and Blacks Run watersheds TMDL for sediment and total phosphorus on June 5, 2002. Cooks Creek was also listed on Virginia's 2004 303(d) list as impaired for *Escherichia coli* bacteria.

Virginia's 1997 Water Quality Monitoring, Information and Restoration Act requires DEQ to "develop and implement a plan to achieve fully supporting status for impaired waters" (§62.1-44.19:7). DCR and DEQ developed a TMDL implementation plan for Cooks Creek entitled "Water Quality Implementation Plan for Blacks Run and Cooks Creek (Fecal Coliform and Aquatic Life TMDLs)" (the "Plan") dated May 25, 2006. The Plan "provides a detailed outline of suitable best management practices (BMPs) and a strategy that may be implemented in order to meet water quality standards." The Plan also identifies funding sources that can help pay for the necessary BMPs. These funding sources include state funding sources such as Virginia Agricultural BMP cost-share and tax credit programs and Virginia Water Quality Improvement Fund (WQIP), as well as federal funding sources such as EPA 319 grant funds, National Resource

[3] http://www.deq.virginia.gov/portals/0/deq/water/tmdl/implementationplans/ccbrip.pdf
[4] http://www.deq.virginia.gov/portals/0/DEQ/Water/TMDL/apptmdls/shenrvr/cooksbd2.pdf

Conservation Service (NRCS) Conservation Reserve Enhancement Program (CREP), NRCS Environmental Quality Incentives Program (EQIP), and National Fish and Wildlife Foundation (NFWF) grants. EPA has provided 319 grant funds through Virginia to support many non-point source projects throughout the Cooks Creek watershed (see **Appendix A**). Many of these projects focus on implementation of agricultural conservation practices. In total, approximately $719,000 in 319h funds was committed to the Cooks Creek watershed to support BMP implementation between 2005 and 2010, including approximately $503,000 to support agricultural conservation practices. DCR and the Shenandoah Valley Soil and Water Conservation District continue to fund and implement projects to improve water quality in the Cooks Creek watershed.

IV. Collaboration with State and Local Partners

Both DEQ and VDACS provided valuable support for EPA's watershed assessment. DEQ and VDACS provided guidance while at each farm about how Virginia's state requirements applied to that particular farm. DEQ and VDACS also provided compliance assistance to the farmers while on site about things that the farmers could do to help improve their operations.

V. Findings

For this AFO assessment, EPA collected information from on-site visits to five AFOs within the Cooks Creek watershed and public documents pertaining to the impairments and TMDL implementation plan for Cooks Creek. The five AFOs included three dairy operations, one broiler-dairy operation, and one broiler-beef cattle operation.

Between September 23, 2014 and September 26, 2014, EPA visited five AFOs in the Cooks Creek watershed. The farm visits were scheduled with the owners in advance. A check list was utilized to ensure that similar information was collected at each of the farms. This information was used to determine whether farms were in compliance with applicable legal requirements related to nitrogen, phosphorus, and sediment. A sample AFO farm visit checklist is included in **Appendix B**.

The following are the major findings from this assessment:

Finding #1: All medium and large AFOs in Virginia are covered by either a VPDES permit or a VPA permit. These permits require AFOs to implement a DCR-approved nutrient management plan and to meet additional permit requirements. None of the five AFOs visited were required to have a VPDES permit. Two of the five AFOs were required to have a VPA permit.

Finding #2: The VPA permit program appears to be comprehensive in addressing the areas of a permitted AFO where manure is generated, stored and land-applied. Both VPA permitted poultry operations were generally in compliance with the VPA permit requirements.

Finding #3: Unlike the VPDES program, Virginia's VPA program does not address all livestock and manure types on farms with several different types of livestock. The two poultry operations assessed had a VPA permit for poultry and were required to implement nutrient management plans for the poultry, but the nutrient management plans were not required to include the other livestock (dairy or cattle) raised on the farm.

Finding #4: There are no regulatory requirements for small farms in Virginia that are not covered under the VPDES or VPA permit programs. No dairies are covered under the VPDES permit program and only 13% of all dairy AFOs in Virginia are covered under the VPA permit program. All five of the dairy and cattle operations visited were small farms that were not regulated under the VPDES or VPA programs and did not have any regulatory requirements for the dairy or cattle operations. While all five dairy and cattle operations were conducting some type of soil testing, only one of the five small dairy and cattle operations visited was taking regular manure tests and had voluntarily developed a nutrient management plan for the dairy operation.

Finding #5: Nutrient management plans are a key part of the VPA and VPDES permit programs, and getting fully-implemented nutrient management plans on small AFOs and non-

AFOs (ex. pasture-based livestock operations and row crop operations) would help in achieving pollutant reductions and improving local water quality.

Finding #6: The majority of the five AFOs visited were voluntarily implementing many high priority agricultural conservation practices such as conservation tillage, cover crops, and livestock stream exclusion.

The following is a more detailed description of how well the AFOs complied with Virginia program requirements.

a. Virginia's VPDES CAFO Permit program

Requirement: Virginia regulations require that all large and medium AFOs that discharge to waters of the State must be covered as CAFOs under a VPDES CAFO individual permit.[5] Large AFOs include farms with 700 or greater dairy cattle, 1,000 or more cattle including heifers, or 125,000 or more broilers. Medium AFOs include farms with between 200 and 699 dairy cattle, between 300 and 999 cattle including heifers, and between 37,500 and 124,999 broilers. Under certain circumstances, a small AFO may be designated a CAFO by DEQ or EPA and be required to obtain a VPDES CAFO individual permit.

Observation: At the time of EPA's farm visit, the four dairy operations had fewer than 200 dairy cattle and did not require coverage as a CAFO under a VPDES CAFO permit. The number of dairy cattle at each farm ranged from 58 to 150 head, with an average of around 104 mature dairy cows. The number of cattle (other than mature dairy cows) including heifers at each farm ranged from 52 to 156 head, with an average of around 102 head. Average total herd size at each of the four dairy operations was around 206 head. Neither EPA nor DEQ has designated any small AFOs as CAFOs in Virginia.

At the time of EPA's farm visit, the one beef cattle operation had fewer than 300 cattle and did not require coverage as a CAFO under a VPDES CAFO permit. The total herd size at the beef cattle operation was 15 head. Neither EPA nor DEQ has designated any small AFOs as CAFOs in Virginia.

At the time of EPA's farm visit, the first poultry operation had fewer than 37,500 broilers and did not require coverage as a CAFO under a VPDES CAFO permit. The flock size at the first poultry operation was 19,200 broilers. At the time of EPA's farm visits, the second poultry operation had greater than 37,500 and met the size threshold for a Medium CAFO. The flock size at the second poultry operation was 74,000 broilers. However, at the time of the farm visit, there was no discharge observed from this poultry operation that would require a VPDES CAFO permit. Neither EPA nor DEQ has designated any small or medium AFOs as CAFOs in Virginia.

---

5 http://www.deq.virginia.gov/Portals/0/DEQ/Water/VirginiaPollutionAbatement/AFOdocuments/AFO_CAFO_Decision_Tree20130318.pdf

b. Virginia's VPA Permit Program

Requirement: Virginia regulations require that AFOs that confine more than 300 animal units of livestock and utilize a liquid manure collection and storage system, but do not discharge, must obtain permit coverage under the VPA general permit for AFOs and animal waste management.[6] Virginia regulations require that AFOs that confine more than 20,000 chickens, or more than 11,000 turkeys, but do not discharge, must obtain permit coverage under the VPA general permit for poultry waste management.[7] Under certain circumstances, a small AFO may be designated a CAFO by DEQ and be required to obtain VPA permit coverage.

Observation: At the time of EPA's farm visits, the four dairy operations did not confine more than 300 animal units of livestock and therefore did not require coverage under the VPA general permit for AFOs and animal waste management. The number of dairy cattle at each farm ranged from 58 to 150 head, with an average of around 104 mature dairy cows. The number of cattle (other than mature dairy cows) including heifers at each farm ranged from 52 to 156 head, with an average of around 102 head. Average total herd size at each of the four dairy operations was around 206 head.

At the time of EPA's farm visits, the one beef cattle operation did not confine more than 300 animal units of livestock and therefore did not require coverage under the VPA general permit for AFOs and animal waste management. The total herd size at the beef cattle operation was 15 head.

At the time of EPA's farm visits, the first poultry operation did not confine more than 20,000 chickens and therefore did not require coverage under the VPA general permit for poultry waste management. The first poultry operation had applied for VPA permit coverage and indicated on its registration statement that it would confine 20,200 chickens and therefore would require coverage under the VPA general permit for poultry waste management. The first poultry operation had permit coverage under the VPA general permit for poultry waste management.

At the time of EPA's farm visits, the second poultry operation did confine more than 20,000 chickens and did require coverage under the VPA general permit for poultry waste management. The second poultry operation had permit coverage under the VPA general permit for poultry waste management.

Requirement: Part I.A.2 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that if poultry waste is land applied, it shall be applied at the rates specified in the facility's approved NMP.

Observation: Both poultry growers appeared to be applying poultry waste at rates up to those rates specified in their NMPs. One poultry grower's NMP called for poultry waste to be applied

---

6 http://www.deq.virginia.gov/Portals/0/DEQ/Water/VirginiaPollutionAbatement/AFOdocuments/AmendedGP/VPA%20AFO%20GP%20Regulation.pdf

7 http://lis.virginia.gov/000/reg/TOC09025.HTM#C0630

at a rate of 3 tons/acre on cropland and 1 ton/acre on pasture. This poultry grower was applying poultry waste at rates of 1 ton/acre to 2.5 tons/acre on cropland. The other poultry grower's NMP called for poultry waste to be applied at rates of 1.5 tons/acre to 2 tons/acre. This poultry grower was applying poultry waste at rates of 1.4 tons/acre to 1.9 tons/acre.

Requirement: Part I.A.3 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that soils at the land application sites shall be monitored once every three years.

Observation: Both poultry growers stated that they take regular soil tests every three years. One poultry grower last took soil tests in December 2011, which is within the past three years of EPA's farm visit. The other poultry grower last took soil tests in February 2013, which is within the past three years of EPA's farm visit.

Requirement: Part I.A.4 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry waste shall be monitored once every three years.

Observation: One poultry grower stated that poultry wastes are tested every three years. This poultry grower last took poultry waste tests in February 2013, which is within the past three years of EPA's farm visit. The other poultry grower did not state how often poultry wastes are monitored, and the poultry grower's NMP included poultry waste tests from May 2010, which is over three years old.

Requirement: Part I.A.6 and Part II.B.2 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that all soils and waste monitoring data shall be maintained on site for at least three years.

Observation: Both poultry growers had over three years of land application records; one poultry grower maintained land application records on site since 2003, while the other poultry grower maintained land application records on site since 2007. Both poultry growers had soil monitoring data (i.e. soil test results) and waste monitoring data (i.e. manure test results) on site and available for review as part of their NMP that had been developed within the past three years.

Requirement: Part I.B.1 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the operation shall be designed and operated to i) prevent point source discharges of pollutants to state waters except in the case of a storm event greater than the 25-year, 24-hour storm and ii) provide adequate waste storage capacity to accommodate periods when the ground is ice covered, snow covered or saturated, periods when land application of nutrients should not occur due to limited or nonexistent crop nutrient uptake, and periods when physical limitations prohibit the land application of waste.

Observation: At the time of the farm visits, there was no discharge observed from the poultry operations to surface waters. Both poultry operations had litter sheds to provide waste storage. The litter sheds had a storage capacity of 100-250 tons to accommodate periods when the ground is ice covered or snow covered. Both poultry operations land apply poultry waste once per year in the spring when crops are growing.

Requirement: Part I.B.2 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry waste shall be stored in a manner that prevents contact with surface water and ground water. Part I.B.2 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry waste that is stockpiled outside of the growing house for more than 14 days shall be kept in a facility or at a site that provides adequate storage. Adequate storage includes that poultry waste shall be covered to protect it from precipitation and wind, and storm water shall not run onto or under the stored poultry waste.

Observation: Both poultry operations store poultry waste inside a roofed litter shed. The poultry waste does not come in contact with surface water or ground water. The litter shed protects the poultry waste from precipitation and wind and prevents storm water from coming in contact with the poultry waste.

Requirement: Part I.B.3 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that new, expanded or replacement poultry growing houses and poultry waste storage facilities constructed after December 1, 2000, shall not be located within a 100-year floodplain unless they are constructed so that the poultry litter and poultry waste are above the 100-year flood elevation or otherwise protected from floodwaters through the construction of berms or similar best management flood control structures.

Observation: The poultry houses at one poultry operation are not located within the 100-year floodplain. The poultry houses at the other poultry operation are located within the 100-year floodplain, however they were built prior to December 1, 2000. The litter sheds at both poultry operations are not located within the 100-year floodplain, however.

Requirement: Part I.B.4 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry waste may be transferred from a permitted poultry grower to another person without identifying the fields where the waste will be utilized in the permitted poultry grower's approved NMP if several conditions are met, such as providing the other person a copy of the most recent nutrient analysis of the poultry waste.

Observation: One poultry grower does not transfer any poultry waste to another person; all poultry waste is land-applied by the owner of the poultry operation. The other poultry grower transfers approximately 75 tons of poultry waste annually. EPA was unable to determine whether or not the poultry grower provided the required documentation to the individual to whom the poultry waste was transferred.

Requirement: Part I.B.5 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry operations that use disposal pits for routine disposal of daily mortalities shall not be covered under this permit.

Observation: Neither poultry operation uses disposal pits. Both poultry operations use composting inside the operation's litter shed for routine disposal of daily mortalities.

Requirement: Part I.B.6 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the poultry grower shall implement an NMP developed by a certified nutrient management planner and approved by DCR.

Observation: Both poultry operations were implementing an NMP that had been developed by a certified nutrient management planner and approved by DCR.

Requirement: Part I.B.6.a of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain a site map indicating the location of the waste storage facilities and the fields where waste generated by this facility will be applied by the poultry grower.

Observation: Both poultry operations were implementing an NMP that contained a site map of the fields where waste generated by the facility will be applied by the poultry grower. One poultry operation's NMP contained a site map indicating the location of the waste storage facilities, while the second poultry operation's NMP did not contain a site map indicating the location of the waste storage facilities.

Requirement: Part I.B.6.b of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain a site evaluation and assessment of soil types and potential productivities.

Observation: Both poultry operations were implementing an NMP that identified the soil types for each field, as well as the field productivities and yield ranges for different major crops.

Requirement: Part I.B.6.c of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain nutrient management sampling including soil and waste monitoring.

Observation: Both poultry operations were implementing an NMP that contained soil monitoring data (i.e. soil test results) for all fields covered by the NMP. Both poultry operations were implementing an NMP that contained waste monitoring data (i.e. manure test results) for poultry manure. One poultry operation NMP also included manure test results for liquid and solid dairy wastes. The other poultry operation NMP did not include manure test results for beef cattle wastes

that are collected and land applied by the operation. However, monitoring wastes that are not part of the poultry operation is not a requirement of the General Permit for Poultry Waste Management.

Requirement: Part I.B.6.d of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain storage and land area requirements for the grower's poultry waste management activities.

Observation: Both poultry operations were implementing an NMP that contained storage and land area requirements for the grower's poultry waste management activities, including storage site requirements, land application setback requirements, land application prohibition on saturated or ice-/snow-covered ground, and poultry litter spreading schedules when poultry litter can and cannot be land applied depending on the crop being grown.

Requirement: Part I.B.6.e of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain calculation of waste application rates.

Observation: Both poultry farmers were implementing an NMP that contained NMP balance sheets calculating the waste application rates based on crop nutrient needs, residual nutrients in the soil, manure nutrients applied, and commercial nutrients applied.

Requirement: Part I.B.6.f of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the NMP contain waste application schedules.

Observation: Both poultry operations were implementing an NMP that included both an application summary (which included manure and commercial application schedules) and manure spreading summary (which included manure application schedules).

Requirement: Part I.B.8 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that nitrogen application rates contained in the NMP shall be established in accordance with 4VAC5-15-150(A)(2).

Observation: Both poultry operations were implementing an NMP that had been approved by DCR as meeting the requirements of 4VAC5-15-150(A)(2).

Requirement: Part I.B.9 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that phosphorus application rates contained in the NMP shall be established in accordance with 4VAC5-15-150(A)(2).

Observation: Both poultry operations were implementing an NMP that had been approved by DCR as meeting the requirements of 4VAC5-15-150(A)(2).

Requirement: Part I.B.10 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that no poultry waste may be applied to ice covered or snow covered ground or to soils that are saturated.

Observation: Neither poultry operation spreads poultry waste during the winter when the ground may be ice covered or snow covered.

Requirement: Part I.B.11 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that poultry waste shall not be land applied within buffer zones.

Observation: Both poultry operations were implementing an NMP that prohibited spreading poultry waste within 35 feet of surface waters if a vegetated buffer is present or within 100 feet of surface waters if no vegetated buffer is present. EPA was unable to determine whether or not the buffer zones were being implemented since there was no land application of poultry waste at the time of the farm visits.

Requirement: Part I.B.12 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that the grower maintains record of the land application field sites where the poultry waste is utilized or stored, the application rate, the application dates, and what crops have been planted. Part I.B.12 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that these records shall be maintained on site for a period of three years after recorded application is made.

Observation: One poultry grower maintained records of field sites, application rates, application dates, and crops grown since 2003, more than three years after application. The other poultry grower maintained records since 2007, more than three years after application.

Requirement: Part I.B.13 of the VPA General Permit for Poultry Waste Management [9VAC25-630-50] requires that each poultry grower covered by the general permit shall complete a training program at least once every five years.

Observation: Both poultry growers completed a training program within the past five years of EPA's farm visits (12/13/2010 and 10/13/2011).

c. Cooks Creek Water Quality Implementation Plan

i. Background

DCR and DEQ developed a TMDL implementation plan for Cooks Creek entitled "Water Quality Implementation Plan for Blacks Run and Cooks Creek (Fecal Coliform and Aquatic Life TMDLs)"

(the "Plan") dated May 25, 2006.[8] The goal of the Plan is to provide a detailed outline of suitable best management practices (BMPs) and a strategy that may be implemented in order to meet water quality standards. The Plan does not require any particular farm to implement any particular BMP. Rather, the plan serves as a guidance document to provide a roadmap for implementing BMPs in two stages (Stage I running from 2006-2011, and Phase II proposed from 2011-2021) that will meet the TMDL allocations for the local TMDLs. Agriculture is one of the sectors that the Plan focuses on for addressing fecal coliform, sediment, and phosphorus reductions. One of EPA's goals in conducting the AFO watershed assessment was to observe how well DEQ and VDACS are providing oversight and outreach to these farms.

The Plan pre-dates the Chesapeake Bay TMDL, which was finalized on December 29, 2010. The Plan identifies implementation goals for the following agricultural BMPs necessary to meet the local TMDL allocations for bacteria, sediment, and phosphorus:

- Grazing Land Protection Systems (SL-6) [includes streamside fencing, cross fencing, alternative watering system, and a 35-ft buffer from the stream];
- Stream Protection Systems (WP-2T) [includes streamside fencing, hardened crossings, and a 35-ft buffer from the stream];
- Voluntary Exclusion Systems
- Fence Maintenance
- Waste Storage – Poultry;
- Waste Storage – Livestock;
- Improved Pasture Management;
- Conservation Tillage;
- Retention Ponds;
- Bioretention Filters;
- Vegetated Buffer; and
- Nutrient Management.

ii. Observations

Some of these BMPs are required under Virginia's VPA permit program, such as nutrient management planning. In addition, some of these BMPs were being voluntarily implemented at the five farms that EPA visited. For example, all five farms visited were implementing conservation tillage practices on approximately 80% to 100% of crop acreage and cover crops on approximately 75% to 100% of crop acreage. In addition, all five farms visited had livestock stream exclusion systems in place to some degree, although the size of the vegetated buffer and effectiveness of the stream exclusion system varied.

The farm visits demonstrated that farmers have done much to implement both required and voluntary BMPs, but additional BMPs are still needed to meet both the local TMDL and Chesapeake Bay TMDL. The farm visits support concerns about the types of activities that contribute to the nonpoint source pollution within the watershed, such as uncontrolled runoff from barnyards, livestock access to streams, and lack of year round vegetation. However, EPA did find

[8] http://www.deq.virginia.gov/portals/0/deq/water/tmdl/implementationplans/ccbrip.pdf

that the majority of the five AFOs visited were voluntarily implementing many agricultural conservation practices such as conservation tillage, cover crops, and livestock stream exclusion whether or not they had a VPA permit or formal NMP.

The Plan calls for an increase in BMP implementation in order to help Cooks Creek meet its water quality goals. The Plan calls for an increase in the implementation of agricultural BMPs such as livestock stream exclusion, vegetated buffers, animal waste management systems, improved pasture management, conservation tillage, and nutrient management. Table 2 identifies which of the BMPs recommended by the Plan were observed at the five farms and where BMP implementation could be increased at the five farms visited.

Table 2: Implementation of BMPs that are recommended by the Plan at five farms visited.

Practice	**# of farms implementing BMP**	**Potential to increase BMP implementation at five farms visited**
Livestock Exclusion Systems (including streamside fencing)	Five farms	One farm had approximately 10 feet of stream unfenced adjacent to a cattle crossing that allowed uncontrolled access to Cooks Creek.
Livestock/Poultry Waste Storage Systems	Five farms	Two of the four dairies had at least six months storage for liquid manure. The third dairy had two months of storage for liquid manure, and the fourth dairy had 6-8 weeks of storage for liquid manure. These two dairies could increase liquid manure storage capacity. Two dairies also land applied bedded pack manure during the winter and could increase storage capacity for solid manure. Two poultry operations had litter sheds with 12 months of storage.
Improved Pasture Management	Zero farms	All five farms had dairy cows or cattle on pasture, but none of the farms were implementing a rotational grazing system along with nutrient management of pastureland.
Conservation Tillage	Five AFOs	Two farms were implementing conservation tillage at less than 100% and could increase implementation levels.
Retention Ponds	Not assessed	Unknown
Bioretention Filters	Zero farms	All five farms could consider this practice.
Vegetated buffers	Four farms	One farm had flexible fencing without any vegetated buffer. Four farms had vegetated buffers established, although the width of the buffer ranged from 0 feet to approximately 50 feet and could be increased in several cases to improve the efficiency of the vegetated buffer.

Nutrient Management Planning	Two farms	One farm's NMP does not account for all sources of manure and could be updated. Three farms could voluntarily obtain nutrient management plans. Both farms with NMPs will need to maintain current NMPs as required by their VPA permits.

Virginia has done a good job in the Plan identifying the type of BMPs that are needed and the general framework of how to fund the needed BMPs. As discussed in Section III, approximately $719,000 in 319h funds was committed to the Cooks Creek watershed to support BMP implementation between 2005 and 2010, including approximately $503,000 to support agricultural conservation practices (see **Appendix A**). The Plan identified additional funding sources to help meet those needs, but there is no discussion as to the reasonable expectations of what might be acquired through those sources.

Many of the above practices called for in the Plan are consistent with the high priority animal agriculture practices in the Virginia WIP for the Chesapeake Bay TMDL that, when implemented, would achieve a significant portion of VA's nutrient and sediment reduction goals for animal agriculture such as (1) nutrient management, (2) animal waste management systems, (3) conservation plans, (4) barnyard runoff control systems, (5) stream fencing on pastures, and (6) vegetated buffers on pastures. Table 3 identifies how many of the five farms visited were implementing these selected WIP priority animal agriculture practices.

Table 3: WIP priority animal agriculture practice implementation at five farms visited.

WIP priority practice	**# of farms implementing WIP priority practice**
Nutrient management	2 out of 5 farms (40%) to varying degrees; One farm's NMP does not include all livestock sources of manure
Animal waste management systems	5 out of 5 farms (100%) to varying degrees; Storage capacity ranged from 6 weeks to 6 months
Conservation plans	0 out of 5 farms (0%)
Barnyard runoff control systems	4 out of 5 farms (80%) to varying degrees; Not all buildings had gutters at all farms
Stream fencing on pastures	4 out of 5 farms (80%) to varying degrees; Not all farms had entire stream fenced out and not all farms had permanent fencing
Vegetated buffers on pastures	4 out of 5 farms (80%) to varying degrees; Vegetated buffer width ranged from 0 feet to ~50 feet

VI. Conclusions

All medium and large AFOs in Virginia are covered by either a VPDES permit or a VPA permit, depending upon whether or not the AFO has a discharge. The VPA general permit for poultry waste management also covers some small AFOs. The VPDES and VPA permits require farms to implement a DCR-approved NMP and to meet additional permit requirements. None of the five AFOs visited were required to have a VPDES permit. Two of the five AFOs were required to have a VPA permit.

Based on the farm visits, the VPA permit program appears to be fairly comprehensive in addressing the areas of a permitted AFO where manure is generated, stored and land-applied. Both VPA permitted poultry operations were generally in compliance with the VPA permit requirements.

However, the VPA permit only addresses the poultry or livestock type that exceeds the VPA threshold and does not mandate inclusion of other confined livestock and manure types on the farm which may be below the permitting threshold. The VPA general permit requirements specify that the NMP for a VPA poultry or livestock operation must include all manure types land applied on fields receiving manure from the animal type exceeding the permit threshold, but would exclude confinement area management or NMP requirements for fields receiving manure only from animal types below the permitting threshold. At the poultry-dairy operations, only the poultry was covered by the VPA permit although the farmer did voluntarily include the dairy operation in the farm's NMP. EPA observed this same issue at previous farm visits in Virginia; for example, at another operation with both poultry and confined heifers, the poultry exceeded the VPA threshold and was covered by the VPA permit and included in the NMP, while the heifers did not exceed the VPA threshold and was not covered by the VPA permit or included in the NMP. As a result, only part of the farm operation is required to meet the state requirements for nutrient management planning as well as any other VPA permit requirements.

This lack of comprehensive production area and nutrient management requirements that apply to the whole operation, regardless of the mix of animal types, is a shortcoming of the VPA permit program that is partially addressed in the VPDES permit program. The VPDES permit program regulations explicitly state that "Once an operation is defined as a CAFO, the VPDES requirements for CAFOs apply with respect to all animals in confinement at the operation and all manure, litter and process wastewater generated by those animals or the production of those animals, regardless of the type of animal" (9VAC25-31-130.A.1).Therefore, if a poultry operation were permitted under the VPDES CAFO program, the permit would also mandate production area management and NMP requirements for any other confined livestock (such as a dairy or confined heifers) at the farm.

However, neither the VPA nor VPDES permit program would mandate inclusion of other poultry or livestock that is unconfined. For example, at the poultry-beef cattle operation, the poultry operation was covered by the VPA permit and included in the NMP but the beef cattle operation was not included in the NMP or required to meet any VPA permit requirements. This would also be the case with a VPDES permit unless the beef cattle operation met the definition of an AFO. In the Shenandoah Valley, there are many farms that have several different types of livestock, so

DEQ may need to address this issue in order to ensure that all livestock at VPA-permitted farms are meeting Virginia's expectations for nutrient management planning.

While the VPA permit program appears to be fairly comprehensive in addressing many potential water quality concerns at medium and large AFOs, there are no regulatory requirements for small AFOs in Virginia that are not covered under the VPDES or the VPA permit programs. Currently, no dairies are covered under the VPDES permit program and only 13% of all dairy AFOs in Virginia are covered under the VPA permit program. Virginia does not have a comprehensive nutrient management program like Delaware or Maryland that requires NMPs at many small AFOs and non-AFOs that are unpermitted. Unpermitted farms may be required to develop NMPs if they choose to participate in some Virginia or federal cost-share programs, and unpermitted AFOs may also voluntarily develop and implement an NMP. However, there are no regulatory requirements that must be met by small AFOs and non-AFOs (ex. pasture-based livestock operations and row crop operations) in Virginia. All of the five dairy/cattle operations were small AFOs that were not regulated under the VPDES or VPA permit programs and did not have any regulatory requirements for the dairy or cattle operations. Only one of the five small dairy/cattle operations had voluntarily developed a nutrient management plan for the dairy/cattle operation.

NMPs are a key part of the VPA and VPDES permit programs. NMPs help to "minimize adverse environmental effects of nutrient applications by maximizing the efficient use of those nutrients by crops."[9] EPA believes that up-to-date, fully implemented NMPs are excellent tools for water quality protection and restoration, and getting fully-implemented nutrient management plans on small AFOs and non-AFOs (ex. pasture-based livestock operations and row crop operations) would help in achieving pollutant reductions and improving local water quality.

The majority of the farms visited were voluntarily implementing many high priority agricultural conservation practices such as conservation tillage, cover crops, and livestock stream exclusion.

[9] http://www.dcr.virginia.gov/soil_and_water/documents/nmbroset.pdf

Appendix A

EPA non-point source funding for projects in the Cooks Creek Watershed as documented in Grants Reporting and Tracking System (GRTS)

Project Title	Start date	319h Funds	% to Ag BMPs	Agricultural Outcomes
TMDL Implementation – Cooks Creek and Blacks Run plus North River	2005	$266,349	70%	1 controlled livestock lounging area, 660 acres cover crops, 3 acres critical area planting, 1,290 feet fence
TMDL Implementation – Cooks Creek and Blacks Run	2007	$260,232	70%	1 controlled livestock lounging area, 987 acres cover crops, 3,150 feet fence, 1 graving planned system, 2.53 acres riparian buffers - vegetative
TMDL Implementation – Cooks Creek and Blacks Run	2010	$192,255	70%	250 acres cover crops, 1,200 units riparian buffers – vegetative, 3,150 feet riparian buffers – vegetative, 1 stream exclusion with grazing land management, 1 waste storage facility, 1 watershed management plan

Source: http://ofmpub.epa.gov/apex/grts/f?p=110:87:0::NO:::.

Appendix B

Samples AFO farm visit checklist

VIRGINIA AFO ON-SITE ASSESSMENT FORM

Form to be completed by EPA personnel

Date: _____ Time In: _____ (*AM PM*) Time Out: _____ (*AM PM*)

Weather: _____

Were Biosecurity Measures Implemented in Addition to EPA Protocols? *Yes No*

Additional Measures Taken: _____

Photos Taken: *Yes* (see Photo Log) *No*

Samples Taken: *Yes* (see Lab Results) *No*

EPA Inspector(s): _____

Contractor(s): _____

VADEQ Staff: _____

VDACS Staff: _____

SWCD Staff: _____

Other Participants: _____

Person(s) Interviewed: _____

Farm Name (if any): _____

Farm Address _____

GPS coordinates (entrance) Latitude: _____ Longitude: _____

Owner/Operator Information

Owner(s) Name: _____

Operator(s): _____

Phone: _____ *home work cell fax na*

Phone: _____ *home work cell fax na*

Email Address: _____

Owner Address: _____

Operator Address: _____

Mailing Address: _____

Farm History

Yes No Has the farm been visited by VADEQ previously? Date:_____

Yes No Has the farm been visited by VDACS previously? Date:_____

Yes No Has the farm been assessed under Virginia's Small AFO Assessment Strategy? Date:_____

Animal Inventory

Animal Type	Current No.	Weight	Animal Type	Current No.	Weight
Milking Cows			Beef Cattle		
Dry Cows			Swine		
Heifers >1 yr			Horses		
Heifers <1 yr			Mules		
Calves <2 mos			Broilers/Layers		
Bulls			Other		

Overview of Business Information

Livestock Type: □ Dairy □ Beef □ Swine □ Layer □ Broilers □ Turkey □ Other: _____

Integrator/Company: _____

Production Level (i.e. gals/day of milk, flocks/year): _____

CAFO/AFO Status

□ Concentrated Animal Feeding Operation (CAFO)
□ Animal Feeding Operation (AFO)
□ Neither

Farm Management Documents and Plans

□ VPDES CAFO Permit Coverage (Permit No. _____)

□ VPDES registration statement submitted (Date _____)

□ VPA Permit Coverage (Permit No._____, Date _____)

□ Resource Management Plan (RMP)
(Date _____, Author _____)

□ Nutrient Management Plan (NMP)
(Date _____, Author _____)
□ Private Certified Nutrient Management Planner
□ DCR
□ Soil & Water Conservation District
□ Virginia Cooperative Extension
□ Other: _____

□ NRCS Comprehensive Nutrient Management Plan (CNMP)
(Date _____, Author _____)

□ NRCS Conservation Plan
(Date _____, Author _____)

□ Other Farm Management Plan(s) _____

If the farmer has an NMP, why was it obtained?
□ VPA Permit requirement
□ Cost-share funding requirement
□ Other: _____

Notes:_____
_____

Cropland/Pasture/Field Management

Own: Total_____ac Crops: _____ ac Pasture: _____ ac Production Area: _____ac

Rented: Total_____ac Crops: _____ ac Pasture: _____ ac
Rented From: _____

Crops Grown:
- □ Corn _____ac Receive manure? *Yes* *No*
- □ Soybean _____ac Receive manure? *Yes* *No*
- □ Alfalfa _____ac Receive manure? *Yes* *No*
- □ Other(s) (_____) _____ac Receive manure? *Yes* *No*

Crop Rotation: _____

Regular Soils Tests: *Yes* *No* Each field tested once every □ 1 □ 2 □ 3 □ 4 □ 5 yrs

Date of last soil test: _____ Laboratory results available for onsite review: *Yes* *No*

Notes:_____
_____
_____
_____
_____

Nutrient Sources

Yes ***No*** Does the farm's NMP account for all sources of manure?

Yes ***No*** Does the farm export manure?
Annual amount of exported manure: _____ %/gal/tons

Yes ***No*** Does the farm import manure?
Annual amount of imported manure: _____ %/gal/tons
Source of imported manure? _____

Yes ***No*** Does the farm use inorganic Fertilizer?
Type/Product: _____

Yes ***No*** Does the farm use biosolids?
Source: _____
Annual amount of biosolids used: _____

Yes ***No*** Does the farm use irrigation?

Yes ***No*** Is manure spread on pastures?
Pasture acres receiving manure: _____ acres

Yes ***No*** Does the farm spreads manure during the winter?
If yes, when was the last time: _____
If yes, which crops receive manure: _____
If yes, which fields receive manure: _____
Why does winter application of manure occur? _____

Notes:_____
_____
_____
_____

Raw Materials Management

Type of feed produced on farm: _____

Type of feed imported to farm: _____

Type of feed storage: _____

Yes ***No*** Is feed formulation managed to reduce nutrient content in manure?

Yes ***No*** Is stored feed exposed to precipitation?

Yes ***No*** Is silage Leachate present?

Yes ***No*** Is bedding material exposed to precipitation?

Wastewater Management

How is milk house/parlor washwater handled?

_____

Mortality Management

Method of Disposal (select all that apply)	Routine Mortality	Catastrophic Mortality	Comments
Compost in compost shed	☐	☐	
Compost in manure shed	☐	☐	
Outdoor composting	☐	☐	
Burial	☐	☐	
Incineration	☐	☐	
Rendering	☐	☐	
Other (describe):	☐	☐	

Surface Water and Stormwater Management (use Site Maps to identify location)

Yes ***No*** Is surface water present on the farm? Name: _____
Location: _____

Yes ***No*** Are man-made ditches, flushing systems, or other similar man-made devices present?
Location: _____

Yes ***No*** Does stormwater come into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs or bedding?
Location: _____

Yes ***No*** Does stormwater come into direct contact with the animals confined in the operation?
Location: _____

Notes: _____
_____
_____
_____
_____

Best Management Practices

Yes ***No*** Does the farm implement conservation tillage (No-Till/Low Till)?
Type: _____
Implementation Level: _____ac / %

Yes ***No*** Does the farm plant cover crops?
Current year implementation level: _____ ac
Typical year implementation level: _____ ac
Type of cover crop: _____
Does cover crop receive manure? *Yes* *No*
Amount of manure applied to cover crops: _____ gal/tons

Yes ***No*** Does the farm implement livestock stream exclusion practices? (if applicable)
Implementation Level: _____ ft
Are stream banks are fenced on both sides of stream? *Yes* *No*
Is the farmer aware of Virginia's 100% cost-share funding for livestock exclusion? *Yes* *No*
Has the farmer applied for cost-share funding for livestock exclusion? *Yes* *No*
Would the farmer consider applying for cost-share funding for livestock exclusion? *Yes* *No*

Yes ***No*** Does the farm implement vegetated buffers <u>on cropland</u>? (if applicable)
Implementation Level: _____ ft
Average width of buffer: _____ ft
Minimum width of buffer: _____ ft *Maximum* width of buffer: _____ ft

Yes ***No*** Does the farm implement vegetated buffers <u>on pasture</u>? (if applicable)
Implementation Level: _____ ft
Average width of buffer: _____ ft
Minimum width of buffer: _____ ft *Maximum* width of buffer: _____ ft

Yes ***No*** Do buildings/structures around the barnyard have operational gutters and downspouts?

Yes ***No*** Does the farm implement a resource management plan?
Is the farmer aware of the resource management program? *Yes* *No*
Would the farmer consider developing a resource management plan? *Yes* *No*

Yes ***No*** Is the farm in any preservation program?
Name: _____
Acres in Program: _____

Notes:_____

_____

_____

_____

_____

_____

_____

_____

_____

Manure Storage(s)

Storage 1: _____

Type (ex. earthen, HDPE-lined earthen, concrete): _____

Dimensions: _____ Capacity: _____ gals _____ *months* or *da*ys

Age/Date Built: _____

Freeboard maintained (inches): _____ Lining: _____

Did farm use any government cost-share funding? *Yes No* Program: _____

Input Sources (manure, washwater, rainwater): _____

How often is manure tested? □ Never □ Once every 1 2 3 4 5 years □ Not Routinely

Date of last manure test: _____

Storage 2: _____

Type (ex. earthen, HDPE-lined earthen, concrete): _____

Dimensions: _____ Capacity: _____ gals _____ *months* or *da*ys

Age/Date Built: _____

Freeboard maintained (inches): _____ Lining: _____

Did farm use any government cost-share funding? *Yes No* Program: _____

Input Sources (manure, washwater, rainwater): _____

How often is manure tested? □ Never □ Once every 1 2 3 4 5 years □ Not Routinely

Date of last manure test: _____

Storage 3: _____

Type (ex. earthen, HDPE-lined earthen, concrete): _____

Dimensions: _____ Capacity: _____ gals _____ *months* or *da*ys

Age/Date Built: _____ Freeboard maintained (inches): _____

Did farm use any government cost-share funding? *Yes No* Program: _____

Input Sources (manure, washwater, rainwater): _____

How often is manure tested? □ Never □ Once every 1 2 3 4 5 years □ Not Routinely

Date of last manure test: _____

Notes:_____

_____

_____

_____

_____

_____

_____

_____

Animal Confinement Area Worksheet

Animal Confinement Area *(Barn, Freestall Barn, Lot, Loafing Area, Parlor, Pasture)*	**Livestock Description**	**Materials Entering Area**	**Materials Leaving Area**
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream □ *Yes* □ *No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored ________
Covered □ *Yes* □ *Partially* □ *No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater ________
Impervious Surface □ *Yes* □ *Partially* □ *No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream □ *Yes* □ *No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored ________
Covered □ *Yes* □ *Partially* □ *No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater ________
Impervious Surface □ *Yes* □ *Partially* □ *No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream □ *Yes* □ *No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored ________
Covered □ *Yes* □ *Partially* □ *No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater ________
Impervious Surface □ *Yes* □ *Partially* □ *No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream □ *Yes* □ *No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored ________
Covered □ *Yes* □ *Partially* □ *No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater ________
Impervious Surface □ *Yes* □ *Partially* □ *No*	Present _____ months / year	□ Other (________)	□ Other (________)

Animal Confinement Area *(Barn, Freestall Barn, Lot, Loafing Area, Parlor, Pasture)*	**Livestock Description**	**Materials Entering Area**	**Materials Leaving Area**
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream *□ Yes □ No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored
Covered *□ Yes □ Partially □ No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater
Impervious Surface *□ Yes □ Partially □ No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream *□ Yes □ No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored
Covered *□ Yes □ Partially □ No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater
Impervious Surface *□ Yes □ Partially □ No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream *□ Yes □ No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored
Covered *□ Yes □ Partially □ No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater
Impervious Surface *□ Yes □ Partially □ No*	Present _____ months / year	□ Other (________)	□ Other (________)
Location: ________	Livestock present: ________	□ Manure	□ No materials collected/stored
Access To Stream *□ Yes □ No*	Capacity: Current:	□ Bedding (Type ________)	□ Manure scraped/stacked/stored
Covered *□ Yes □ Partially □ No*	Present _____ hrs / day	□ Rainwater	□ Runoff/ Process wastewater
Impervious Surface *□ Yes □ Partially □ No*	Present _____ months / year	□ Other (________)	□ Other (________)