# COMMONWEALTH of VIRGINIA

## Standard Operating Procedures for Managing and Reporting Agricultural Non-Point Source Data to Virginia DEQ

## Standard Operating Procedures for Soil and Manure Testing for Nutrient Management Plan Development

# QUALITY ASSURANCE PROJECT PLAN for the 2018 BMP Data Submission

**June 2017**

Department of Conservation and Recreation
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Virginia Department of Conservation & Recreation

Department of Conservation and Recreation
Quality Assurance Project Plan

Group A – Project Management
A1 – Title and Approval Sheet

**Plan Coverage:** This *Quality Assurance Project Plan: Standard Operating Procedures for Managing and Reporting Non-Point Source BMP Data to the U.S. EPA – Chesapeake Bay Program Office* in combination with the *Quality Management Plan: Virginia Nonpoint Source Pollution Management Program* (Virginia DEQ, 2014) reflects the overall Quality Assurance Program framework and management systems necessary to assure that data generated by the Virginia Department of Conservation and Recreation's Division of Soil and Water Conservation (DCR-DSWC) are of acceptable quality to meet the needs of the United States Environmental Protection Agency's Chesapeake Bay Program Office (EPA-CBPO).

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## A3 – Distribution List

This document is being provided to the following:

- Katherine Antos, EPA-CBPO, Project Officer
- Mary Ellen Ley, USGS / EPA-CBPO, Quality Assurance Coordinator
- Susan Hale, DCR-DSWC, Grant Manager
- James Davis-Martin, DEQ, Chesapeake Bay Program Coordinator
- William Keeling, DEQ-WD, NPS Modeling & Data Coordinator
- Larry Fender, DEQ-WD, Data Management Analyst
- Gary Moore, DCR-DSWC, Agricultural Incentives Program Manager
- Timothy Sexton, DCR-DSWC, Nutrient Management Program Manager
- James Martin, DCR-DSWC, Conservation Data Specialist

## A4 – Project / Task Organization

Nonpoint source (NPS) pollution reduction tracking data is generated by a coordinated effort of DEQ and other agencies staff. The DCR Conservation Data Specialist is responsible for administration of the Agricultural Cost Share database and quality assurance (QA) of the cost share data and the Conservation Data Manager is responsible for directing computer code development and modification.. The DCR regional conservation district coordinators (CDCs) provide quality assurance functions by reviewing the data generated by the soil and water conservation districts (districts or SWCD's) they work with and by going on spot checks of installed BMPs.

The DCR Conservation Programs Data Manager serves as the quality assurance officer and is in an independent unit from those generating the data. The Conservation Programs Data Manager and staff in the grants section of the DCR-DSWC are responsible for maintaining the

official approved Quality Assurance Project Plan. Organization charts showing lines of authority and reporting responsibilities are provided in the Appendix #1.

**A5 – Problem Definition and Background**

The project objectives are to fulfill the reporting requirements of the EPA-CBPO for the Virginia Chesapeake Bay Implementation Grant, the Chesapeake Bay Regulatory and Accountability Program grant and the EPA Section 319(h) funding by supplying annual NPS BMP implementation data. This data is provided to EPA-CBPO for inclusion in the annual watershed model progress evaluations as stipulated in the grant documents. Professionally trained SWCD conservation technicians work directly with landowners and operators to implement NPS BMPs designed and located to reduce and/or treat agricultural runoff. One hundred percent of BMPs implemented are certified as installed to specifications before Virginia Agricultural BMP Cost Share (VACS) payments are made. A robust spot check program involving both SWCD and DCR staff is performed annually. Based on these inspections, Virginia is confident that BMPs reported to the NEIEN are correctly located, installed, functioning as designed and reported with a high degree of accuracy. The EPA-CBPO requested this document for their understanding of the various sources of NPS BMP data within and among jurisdictions as well as any analysis done by the jurisdictions prior to submission to EPA-CBPO.

The VACS Program's goal is to improve water quality in the state's streams, rivers, and the Chesapeake Bay. VACS offers cost-share assistance as an incentive to carry out construction or implementation of selected BMPs. The basis of VACS is to encourage the voluntary installation of agricultural BMPs to meet Virginia's NPS pollution reduction water quality objectives. Although resource based problems affecting water quality occur on all land uses,

VACS promotes efforts for corrective action on agricultural lands only. VACS emphasizes the implementation of agricultural BMPs in locations that provide the greatest nutrient and sediment reductions for the taxpayer's dollars spent. Cost-shared BMPs must maximize nutrient and sediment reductions and also protect the taxpayer's interest by implementing the most cost-effective BMPs possible in locations that achieve the greatest pollutant reductions on a field by field basis. VACS objectives include: reducing nutrients (nitrogen and phosphorus) and sediment loadings to the Chesapeake Bay, preventing additional pollution from entering state waters and meeting the criteria for Virginia's compliance with Section 319 of the Clean Water Act. VACS implementation should be based upon sound conservation planning and best professional judgment.

The agricultural BMPs reported through the NEIEN to the CBPO are generated by qualified professional conservation technicians from one of Virginia's forty seven SWCDs. These conservation technicians receive Natural Resources Conservation Service (NRCS) technical training in conservation and resource management as well as cost-share program administrative training from DCR. Secure logons and built-in quality assurance checks within the AgBMP Tracking Module ensure that accurate data is recorded for each BMP implemented and reported. Each BMP contract and instance within the contract is given a unique identifier tied to the SWCD of its origin. The VACS data is accumulated by DCR's database administrator and transmitted to DEQ to be forwarded to CBPO.

**A6 – Project / Task Description**

The project includes NPS data collection and compilation covering the reporting period for the 2015 progress runs. A full description of the quality assurance performed annually is included in the following sections. The environmental data produced from this project is used by

the EPA-CBPO to project NPS reductions of nutrients and sediment via implementation of NPS BMPs within the Chesapeake Bay drainage of Virginia based on data needs for the 2015 progress runs.

*Internal NPS data.* DCR obtains NPS tracking data from internal sources. The primary internal source of data is the AgBMP Tracking Module database. Other data provided internally is for nutrient management planning acreage.

*Agricultural BMPs*. Data in the AgBMP Tracking Module database originates from the 47 SWCDs and reflects the implementation of Agricultural and Conservation Reserve Enhancement Program (CREP) BMPs installed and funded through VACS, state tax credits, and CREP incentive programs. Specifications for all DCR approved BMPs are in the *Virginia Agricultural BMP Manual.* Each SWCD has internet access to a secured server to access the VACS tracking program. The DCR central office staff maintains the database and updates data requirements associated each BMP reported for each program year. The AgBMP Tracking Module is used to track and report data associated with BMP implementation. The tracking program application and database are stored on remote servers accessed through the internet to allow for all information associated with BMP implementation to be entered and maintained in an enterprise database. The database web application provides printable contract forms that are used to obtain participant signatures. These paper files are archived by the SWCD and retained for three years beyond the lifespan of the practice.

In order to adequately track program effectiveness and to make necessary management decisions, it is vital that all data requested on the DCR Incentives Programs Contract be imputed and updated in the AgBMP Tracking Module in a timely fashion. The tracking program and BMP database will be maintained on the Richmond server and will be available for generating reports through Logi Ad Hoc software accessible by the SWCD and DCR staff.

DCR database management staff will review data for all practices quarterly. All necessary data must be entered into the tracking program according to the identified cost-share program schedule for each quarter and at the close of the program year. SWCDs are to submit an estimated funding need based on data entered into the AgBMP Tracking Module for the coming quarter to their CDC before quarterly disbursement letters can be generated.

The 2018 VACS Program schedule is as follows:

| | |
|---|---|
| May 31, 2017 | Deadline to submit preliminary suggestions and issues related to the VACS Program to the DCR Agricultural Incentives Program Manager for consideration by the Agricultural Best Management Practice Technical Advisory Committee (TAC) in development of their Program of Work |
| June 2017 | TAC sets Program of Work for the upcoming fiscal year. |
| July 1, 2017 | 2018 Cost-Share Program begins. |
| June/July 2017 | CDCs inform districts of program allocations. |
| July 2017 | Districts may begin practice approval after Secondary Considerations have been approved. |
| September 30, 2017 | End of First Quarter. Quarterly reports due including requests for disbursements in 2nd quarter due to CDCs by 10/16/2017. |
| December 31, 2017 | End of Second Quarter. Quarterly reports due including requests for disbursements in 3rd quarter due to CDCs by 1/15/2018. |
| March 31, 2018 | End of Third Quarter. Quarterly reports due including request for disbursements in 4th quarter due to CDCs by 4/16/2018. |
| March 2018 | Matrix of TAC suggested Changes for Fiscal Year 2019 to Soil and Water Conservation Board for approval. |
| May 2018 | Review and update of secondary considerations and submit to CDC by June 30, 2018. |
| June 30, 2018 | End of Program Year. All applications entered into the BMP Tracking Program are to be identified as; (1) Complete or (2) Canceled, or (3) SL-6 Pending Lack |

of Funding or (4) Carry Over with an approved carry over date (only if practice is on the approved list and under construction). All completed projects must be paid by June 30, 2018. Final 2018 Cost-Share Program quarterly reports are due to CDCs by 7/17/2018.

**NOTE:** All BMP payment data for a quarter must be entered into the Tracking Program by the 15th of the next month in order to qualify for a quarterly disbursement. Tracking Program reports will be run by the DCR CDC on the 18th of the month.

This project also includes the quality assurance measures relevant to samples and laboratory procedures used during the development of nutrient management plans. (See pages 14 through 22.)

For NPS BMP implementation levels, the project is considered ongoing because reporting to the EPA-CBPO office is required annually. DEQ reports annual BMP implementation only once, the first year of the total lifespan of the practice. All non-annual BMPs are accumulated by EPA for annual progress runs. Only those Forestry and Residential Septic practices included in the VACS Program or the DEQ TMDL Grant Programs that are tracked in the AgBMP Tracking Module are reported to DEQ by DCR. These BMPs are included in the BMP Crosswalk for the NEIEN mapping report in Appendix 2.

It is noted that DEQ and CBPO have different names for the same practice. DCR and DEQ staff have attempted to crosswalk DCR practice codes to Scenario Builder names. This data is attached as Appendix 2.

## A7 – Quality Objectives and Criteria

The EPA-CBPO is responsible for the planning and design aspects regarding the use of the NPS data provided by DEQ in the annual progress model runs. Details regarding the systematic planning process used to plan and design the study for this data requirement should be

addressed to the EPA-CBPO. Details on the quality of data provided by DCR are included in the following sections.

All BMPs completed must be certified as complete and meeting appropriate VACS and NRCS standards prior to the issuance of any state cost share or tax credits. Each year BMP Verifications will be completed per the rules detailed in Appendix 3. Any BMP found out of compliance with specifications is noted and the SWCD follows the procedures in the *Virginia Agricultural BMP Manual* Spot Check Procedures Overview section (Pg. I-71) and Practice Failure section (Pg. I- 26) if appropriate. Participants that do not maintain practices or do not bring the practice up to specification and standards are expected to return on a pro-rata share basis any cost share and tax credits authorized by the SWCD.

**A8 – Special Training Certifications**

Details regarding specialized training and certifications for DCR NPS programs are provided in Section IV, Personnel Qualifications and Training of the *Quality Management Plan: Virginia Nonpoint Source Pollution Management Program* (Virginia DEQ, 2013). Each new program year, training sessions are held to discuss any revisions to the VACS program. Any revisions to the agricultural BMP technical specifications and program policies are reflected in the VACS program revisions each program year. Training sessions and workshops are provided on the VACS program application with special emphasis on any revisions or improvements to the application. These trainings help maintain data quality by ensuring that the SWCD personnel entering data into the application are properly trained on how to use the application and that the input of data is uniform and correct. The trainings emphasize the importance of quality data and data reporting. The CDCs and Richmond Central Office staff also offer VACS Helpdesk support to address specific questions and data concerns. This helps maintain data quality by ensuring

that the agricultural BMP technical specifications and program policies are interpreted properly. Furthermore, guidelines, policies and training aides are available for reference on the DCR website. A specific presentation entitled "*ROLES & RESPONSIBILITIES FOR DELIVERY OF VIRGINIA AGRICULTURAL BEST MANAGEMENT PRACTICES COST SHARE PROGRAM (VACS) For District Directors & District Staff" is at* http://www.dcr.virginia.gov/soil_and_water/bmptraining.shtml. SWCD conservation specialist personnel typically have agricultural experience or educational backgrounds and over time gain job approval authority through the United States Department of Agriculture's (USDA) NRCS training program. Agricultural BMPs implemented require the signature of the SWCD conservation specialist who is required to have job approval authority on that agricultural BMP type, certifying that the BMP was implemented according to the applicable technical specifications.

**A9 – Documentation of Records**

SWCDs will retain all billings and supporting data in their files according to the following unless notified by DCR.

- SWCDs must complete their data input to the AgBMP Tracking Module according to the program schedule published in the front of the manual.
- Conservation plans and practice design sheets should be kept with individual case files according to SWCD policy.
- Minimum document retention for VACS application forms will be three (3) years. Canceled applications may be discarded after the (3) year period if not needed for future reference by the SWCD.
- If the practice is installed, documentation should be retained for three (3) years beyond the lifespan of the practice.

Each SWCD's VACS data is entered and maintained in a centralized enterprise database accessible via a secured web-based interface. DCR and other agency data are appended to the

data tables needed to supply data to the NEIEN schemas and are the transmitted via established NEIEN protocols for inclusion in the annual progress run input deck by DEQ.

# Group B – Data Generation and Acquisition

Sections B1 through B8 of this QAPP pertain to samples collected for developing Virginia nutrient management plans. Nutrient management plans are prepared to indicate how primary nutrients are to be managed on farm fields and other lands for crop production and in ways, which protect groundwater and surface water from excessive nutrient enrichment.

Laboratories approved by DCR perform soil test and manure sample analysis, and pre-sidedress soil nitrate tests are conducted as a field procedure. Soil test analysis includes information on soil fertility levels for phosphorus and potassium, and pH levels. Manure test analysis includes percentage of moisture, total nitrogen or total Kjeldahl nitrogen, *ammonium nitrogen*, total phosphorus, and total potassium. The pre-sidedress nitrate test is a procedure used to determine soil nitrate-nitrogen levels at a specific time during a corn crop and a few horticultural crops growing season. Sections B1through B8 below are completed as relevant for each of these three types of samples.

**B1 – Sampling Process Design (Experimental Design)**

*Soil test samples.* The design strategy for nutrient management soil test samples is found in Virginia's *Nutrient Management Training and Certification Regulations, 4 VAC 50-85, § 10.1 – 104.2* of the Code of Virginia (Effective: June, 2014). Soil analysis is required for each field at least once every three years to determine the soil fertility and pH, and to update the nutrient management plan. The excerpt below is from the "Required nutrient management plan procedures" section of the regulations:

> "…. Soil analysis results shall be dated no more than three years prior to the beginning date of the nutrient management plan. A single composite soil sample should represent an area up to approximately 20 acres. Fields such as those common to strip cropping may be combined when soils, previous cropping history, and soil fertility are similar….".

*Manure samples.* Manure samples are collected from specific operations in order to accurately assess the nutrient concentrations for the purpose of calculating manure application rates to supply crop nutrient needs. Manure samples are collected for laboratory analysis in order to determine the exact nutrient content. Manure analysis is recommended before field application until a baseline nutrient content is established for the specific manure type on the corresponding farm operation. After a baseline nutrient content is established, a manure analysis is recommended at least once every three years for dry or semisolid manures, and at least once every year for liquid manures. The analysis determines the appropriate rate of animal manures to apply based on the nutrient needs of various crops, soil types, and other production factors.

*Soil nitrate test.* The pre-sidedress soil nitrate tests involve field sampling and field analysis of soil nitrate levels found in the top 12 inches of soil. The sample is taken when corn is approximately 10 to 15 inches in height. The amount of nitrate-nitrogen in the soil sample is a representative index of the plant-available nitrogen that will mineralize from soil organic matter. Recommendations for sidedress nitrogen fertilizer rates applied to corn at the ~ 12 to 24 inch growth state can be modified depending on the level of nitrate-nitrogen found in the soil. Certified nutrient management specialists use these tests to modify top dressing or side dressing application rates of nitrogen in accordance with th*e Virginia Nutrient Management Standards and Criteria (June 2014).*

The soil nitrate test is a field procedure and is not normally performed by a laboratory. Past research data used to calibrate the soil nitrate tests, for both lab tests and various field test kits, was not conclusive for readings below 21 ppm of nitrate-nitrogen in soils. Above this level, the data statistically justified that no crop responses to additional nitrogen was expected. This may limit the use of the procedure in certain instances (i.e. for readings before 21 ppm) the test is used primarily to identify fields, which need no additional nitrogen, and is a reliable predictor in this setting. Recommendations for nitrogen sidedress application rates for fields with 20 or less ppm is based the soil nitrate test results and guidance provided on page 64 of the *Virginia Nutrient Management Standards and Criteria (June 2014).* Use of the test results when soils are found to be at 21 ppm or greater does result in significant nitrogen use reductions by farmers, so targeted use of the kits is essential to Chesapeake Bay and statewide nutrient reduction efforts.

**B2 – Sampling Methods**

*Soil test samples.* The sampling method including data collection procedures to be followed for soil testing samples is found in Virginia's *Nutrient Management Training and Certification Regulations, 4 VAC 50-85, § 10.1 – 104.2* of the Code of Virginia (Effective: March 13, 2014). The excerpt below is from the "Required nutrient management plan procedures" section of the regulations:

> "Representative soil sample cores shall be obtained from the soil surface to a depth of four inches (0-4") for fields that have not been tilled within the past three years, and from the soil surface to a depth of six inches (0-6") for fields, which are tilled or have been tilled within the past three years. Soil sampling of fields based on the subfield grids or management zones may be utilized…."

*Manure samples.* It is important that representative samples are obtained. Accepted manure-sampling techniques are outlined in Chapter 9, "Manure as a Nutrient Source", in the Mid-Atlantic Regional Water Program's February 2006 publication, *The Mid-Atlantic Nutrient Management Handbook* (MAWP 06-02). Detailed sampling and handling procedures for semi-solid lot manure, liquid manure slurry, lagoon liquid, and boiler or turkey litter are provided on pages 212-213 of this publication. DCR provides sampling bags and bottles for collection of manure samples. Samples are collected in zip-lock bags for solid samples and plastic bottles for liquid samples. Each sample is less than 1 pint.

*Soil nitrate test.* The pre-sidedress soil nitrate test is used on select fields where organic sources of nitrogen rates have been applied in accordance with the appropriate timing criteria to supply nitrogen to the present corn or small grain crop along with certain horticultural crops. Samples are taken when corn height is 10 to 15 inches tall at the whorl as it stands, not to the tallest part of the plant or just before horticultural crops flower for begin to send out runners. The sample collection procedure involves taking 10 to 20 cores from across the field to a depth of 12 inches. Samples are taken between rows to avoid starter fertilizer bands and areas where roots have depleted nitrogen. The samples are combined, mixed, and crumbled and then a test kit is used to determine the soil nitrate-nitrogen concentration.

**B3 – Sample Handling and Custody**

*Soil test samples.* Currently DCR approved soil test laboratories that are correlated to the Virginia Tech soil test lab using the Mehlich III procedure for phosphorus analysis include A & L Eastern Agricultural Laboratories, Brookside Laboratories, and Spectrum Analytical

Laboratories, Agri Analysis Testing Laboratories, Agro Lab, Inc., Logan Labs, LLC. And Midwest Laboratories. Waters Agricultural Laboratories uses the Mehlich I procedure and therefore the phosphorus soil test results can be interpreted the same as Virginia Tech phosphorus soil test results. Additional details on required soil test procedures that related to handling are in the sections that follow.

*Manure samples*. Manure storage and handling facilities and equipment results in moderate variability in both manure consistency and actual rate of material applied. Accepted manure sampling, handling and storage techniques are outlined on pages 212-213 in *The Mid-Atlantic Nutrient Management Handbook* (February 2006). Currently the DCR approved laboratory for analysis of manure samples is the Clemson University Agricultural Service Laboratory (Lab). The Lab must maintain a maximum sample turn-around time of 7 working days measured from the date a sample is received by the laboratory until the complete analysis is mailed out. If unforeseen circumstances are expected to delay sample analysis beyond the 7-day time, the project manager of DCR must be notified.

All samples submitted to the Lab by certified nutrient management planners must include a sample submission form. The Lab must log each sample with a unique lab number, adding this information to the sample submission form. One sub sample of each sample must be stored in a refrigerator at 5 degrees C and a second sub sample must be weighed, dried at 80 degrees C overnight, then weighed and ground through a Tecator Mill to pass through a 0.5 mm screen. The moisture will be determined from the weighings. The laboratory staff involved in the sample analysis and their roles includes: laboratory technician logs and grinds the samples, a lab chemist prepares and analyzes samples and lab director reviews and sends analysis reports.

The sample results are mailed to the individual listed on the form if a mailing address is included. If an email address is listed on the form, an email notification will be sent so that the results can be viewed on the web. DCR has access to all results. The Lab must notify DCR by email to seek pre-approval if any single farm appears to have submitted more than two samples that arrive at the Lab in the same year unless the samples were submitted by DCR staff.

**B4 – Analytical Methods**

*Soil test samples.* The analytical method to be followed for soil test samples is found in Virginia's *Nutrient Management Training and Certification Regulations, 4 VAC 50-85 § 10.1 – 104.2* of the Code of Virginia (Effective: June, 2014). Soil test analysis includes information on soil fertility levels for phosphorus and potassium, and pH levels. The excerpt below regarding the required analytical method is from the "Required nutrient management plan procedures" section of the regulations:

> "…. Representative soil analysis results for fields shall be determined by using standard soil sampling and analysis methods according to *Methods of Soil Analysis, Part 3, Chemical Methods, 1996* utilizing the Mehlich I extraction procedure for phosphorus or other methods and laboratories approved by the department and correlated to Mehlich I and utilizing correlation procedures contained in Virginia Nutrient Management Standards and Criteria, revised June 2014.".

*Manure samples*. Manure test analysis includes percentage of moisture, total nitrogen or total Kjeldahl, ammonium nitrogen, total phosphorus, total potassium, calcium, magnesium, sulfur, zinc, manganese, copper, aluminum and sodium. Manure test results must be reported on

an as sampled basis in pounds per ton for dry manure and pounds per 1,000 gallons for liquid manure. Manure analysis must be performed using laboratory methods consistent with *Recommended Methods of Manure Analysis,* 2003 publication # A3769 of the University of Wisconsin. Guidelines from this publication and additional analytical methods and reporting requirements are described below.

a. Results will be reported on an "as-is" basis and also calculated to lbs/ton for solid samples of lbs/1000 gallons for liquid samples.
b. Laboratory Procedure 3.2 Total Kjeldahl Nitrogen will determine TKN for liquid manure.
c. Laboratory Procedure 3.3 Total Nitrogen by Combustion will determine nitrogen for solid and semi-solid manure (greater than 15% solids).
d. Laboratory Procedure 4.1 Ammonium-N Determination by Distillation will determine ammonium nitrogen, except that KCI will be used as a reagent instead of MgO.
e. Laboratory Procedure 5.4 Nitric and Hydrochloric Acid Digestion with Peroxide will determine Phosphorus, Potassium, Calcium, Magnesium, Zinc, Copper, Manganese, Sulfur, and Sodium, and then analyzed on inductively coupled plasma (ICP).

Laboratories are required to provide a suitable report approved by DCR that utilizes the mineralization rates and ammonium nitrogen availability coefficients, which have been agreed to by DCR as currently listed in the Virginia Nutrient Management Standards and Criteria (June 2014). The laboratory will print expected nitrogen availability based on immediate incorporation and no incorporation along with the manure analysis results on the approved report. The initials of the appropriate lab analyst must be printed on the approved report for the nitrogen,

phosphorus, potassium, calcium and magnesium results as well as a brief reference to method of analysis for those parameters.

*Soil nitrate tests.* Merckoquant 10020 Nitrachek meters are utilized to read color metric test strips which are exposed to soil solutions extracted with 0.025 molar aluminum sulfate-solution. The test meters are standardized daily using a 10 ppm nitrate-nitrogen standard solution. The extracted soil solution is analyzed at least two times to ensure consistent results.

**B5 – Quality Control**

*Manure samples.* DCR requires that the laboratory used for manure samples hold a Manure Testing Laboratory Certification by the Minnesota Department of Agriculture. The laboratory is also requested to participate in sample exchange programs including: North American Proficiency Testing Program, Manure Analysis Program, National Forage Testing Association, and Association of American Feed Control Officials, Inc. All analysis reports of results must include the initials of the lab analyst that performed the analysis for percent moisture, total nitrogen, ammonium nitrogen, total phosphorus, calcium, and magnesium. The laboratories are required to provide DCR with monthly and annual reports including a summary of the total manure samples analyzed, and average test values for all parameters analyzed each quarter for each category of manure type.

**B6 – Instrument / Equipment Testing, Inspection, and Maintenance**

The individual laboratories performing soil test and manure analysis are responsible for meeting appropriate operating standards for equipment testing, inspection, and maintenance.

***Soil nitrate tests.*** Merckoquant Nitrate Test, test strips are used for the detection and semi-quantitative determination of nitrate ions. Unopened Merckoquant Nitrate Test packs are stored in a refrigerator. After opening, the kits are stored in a dry and cool area, but not in a refrigerator to avoid too much atmospheric moisture condensation in the tube. Test strips are dipped into the solution for 1 second to allow the reaction zones to be fully wetted. The test strip is removed and excess liquid shaken off. After 1 minute has passed the test strip is compared to the reaction zones on the color scale provided on the test kit tube / container. All field nitrate test kits are carefully maintained in order to obtain reliable results. The test meters are checked daily during the use season, using a 10-ppm nitrate-nitrogen standard solution, and standardizing the results with the fixed color strip to ensure proper functioning of the meter.

**B7 – Instrument / Equipment Calibration and Frequency**

*Manure samples.* The LECO combustion units used by the DCR approved laboratory must be calibrated with certified EDTA and checked with NIST peach or orchard leaf reference materials. The inductively coupled plasma (ICP) is standardized with standards made in house from stock solutions purchased from High Purity. The ICP standardization is checked with the NIST peach reference material. The reference materials for the LECO combustion unit and standard for the ICP are to be rechecked by the laboratories after every 15 samples.

**B8 – Inspection / Acceptance of Supplies and Consumables**

This section does not apply to this QAPP.

**B9 – Non-direct Measurements**

*Internal NPS data.* DCR obtains NPS tracking data from internal sources. The primary internal source of data is the VACS Tracking Program. Other data provided internally is for nutrient management planning acreage.

*Agricultural BMPs*. Data in the VACS database originates from the 47 SWCDs and reflects the implementation of Agricultural and CREP BMPs installed and funded through VACS, state tax credits, and CREP incentive programs. Specifications for all DCR approved BMPs are in the *Virginia Agricultural BMP Manual.* Each SWCD has internet access to a secured server to access the VACS tracking program. The DCR central office staff maintains and updates the program data reporting for each program year. The AgBMP Tracking Module is used to track and report data associated with BMP implementation. The AgBMP Tracking Module application and database are stored on remote servers accessed through the internet to allow for all information associated with BMP implementation to be entered and maintained in an enterprise database. The database web application provides printable contract forms to obtain participant signatures. These paper files are archived by the SWCD and retained for three years beyond the lifespan of the practice.

*Nutrient management.* Agricultural nutrient management plan implementation and urban nutrient management acres are supplied by the DCR nutrient management staff, which includes plans developed by certified private nutrient management planners as well as DCR's certified nutrient management specialists. As required in Virginia's *Nutrient Management Training and Certification Regulations* all certified nutrient management planners must submit an annual activity report including number of nutrient management plans completed; acreage covered by plans and planned acreage by county and state watershed codes; breakdown of planned acreage

by cropland, hay, pasture, specialty crops, and turf/landscape by county and watershed code; and other information indicating number of practices facilitated by the planner such as manure testing and use of the pre-sidedress nitrate test.

**B10.1 – Data Management: Agricultural BMP Cost Share Data**

*Automated quality assurance.* Beginning July 1, 2009 at the start of the 2010 state fiscal year, the AgBMP Tracking Module was redesigned and implemented as a web-based application using MS SQL Server. Highly relational database schema and application logic, coded in ASP.NET, allows very strict control of data entry to ensure data quality. At the start of each program year, the database is setup to restrict entries to allowable practices for allowable funding sources in specific geographic areas. BMP installations cannot be marked as completed and paid without a minimum set of fields entered. A mapping component, utilizing ArcGIS Server, incorporates recent high resolution aerial imagery that helps ensure the quality of spatial attributes as well.

*Regional review.* Data in the VACS database originates from the 47 SWCDs. Data entries from SWCDs are initially screened by a DCR regional office CDC for a local knowledge review. After the end of each quarter, SWCD records are reviewed by the assigned CDC for completeness and accuracy of financial reporting. Any irregularities are brought to the attention of the appropriate SWCD staff for corrections.

*Business Intelligence Review.* In addition to the strict control of data entry to ensure data quality, DCR also uses a Business Intelligence tool to allow for the QA of BMP data. DCR staff have built a suite of reports for both internal and SWCD Staff use to review data at any time during the program year and especially at data closeout. These reports allow for both simple QA

(i.e. missing data) and more complex review (i.e. ensuring calculated buffer acres values match other data entered for a BMP).

**B10.2 – Data Management: Nutrient Management Data**

Nutrient management implementation and urban nutrient management acres are not derived from the agricultural cost share database. This data is supplied separately by DCR nutrient management staff and is reported to the data management staff using MS Excel spreadsheets, and MS Access database files. The data is at the 12-digit hydrologic unit spatial scale for agricultural nutrient management and at the county or jurisdiction scale for urban nutrient management. The nutrient management data is provided to DEQ and mapped to the established NEIEN XML schemas and reported via established NEIEN protocols to CBPO.

DCR currently builds, compiles and tracks state written NMPs in the NutMan software versions three. NutMan v3 is a stand-alone PC application written in Microsoft Visual Basic. DCR is currently working with a contractor to develop a new web-based Nutrient Management Planning application which will be integrated with the existing Ag BMP Tracking, Conservation Planning and Resource Management Planning System. This new application will be spatially enabled and based on the same MS SQL Server database used by the other DCR systems.

**B10.3 – Data Management: External Data**

This section does not apply to this QAPP.

**B10.4 – Data Management: Reporting to EPA-CBPO**

This section does not apply to this QAPP.

## Group C – Assessment and Oversight

### C1 – Assessments and Response Actions

*BMP Verification.* A primary form of QA of the BMP data occurs during the verification process, where records are pulled from the database per the logic in Appendix 3 and the practices identified are visited to assure that the BMPs that were recorded have actually been installed and are in compliance with the BMP's specifications.

*Number of BMPs.* It is important to note that the AgBMP Tracking Module can track voluntary BMP installations if the SWCD personnel are willing to verify the BMP meets specifications and report on the installations. Prior to this Program Year's effort to recertify structural BMPs that had fallen out of lifespan only 483 voluntary BMPs had been reported. An additional 648 recertifications of structural BMPs that had fallen out of lifespan were reported. These figures do not adequately reflect the actual level of voluntary agricultural BMP installations. Therefore, the BMPs reported to any EPA program based on the AgBMP Tracking Module are conservative overall estimates of agricultural BMP implementation in the Commonwealth of Virginia.

A Virginia Polytechnic Institute & State University report, *Factors Influencing Implementation of Best Management Practices in Virginia's Chesapeake Bay Drainage Basin,* confirmed that 81% of farmers in the Chesapeake Bay watershed implemented BMPs, 31% implemented BMPs using cost share funds, and 75% implemented BMPs without cost share assistance. The overlapping 6% is associated with farmers reporting both cost share and voluntary implementation of BMPs. This report also showed that on an average, each farmer adopted four non-cost share BMPs for every cost share BMP implemented in the basin

(Mostaghimi, Lowery, Gupta, McClellan, 1996). A follow-up report, *An Assessment of the Quality of Agricultural Best Management Practices Implemented in the James River Basin of Virginia,* shows that there is no statistically significant difference between the quality of cost share and non-cost share practices. This report concludes "non-cost share practices should be treated equally when accounting for NPS pollution reductions due to BMPs in watershed management and computer modeling" (Cunningham, 2003).

*Assessment responsibility.* In early spring of each year, after the 4th quarter (program year) data is processed for the previous program year (July 1 through June 30), the Agricultural BMP implementation records of the practices funded through the VACS program and CREP are randomly selected for verification during the following summer and fall. The SWCD and CDC typically schedule the verification visits during the parts of the year when the producers are not so busy. CREP installations are also spot checked by USDA-NRCS staff under guidelines developed and followed by USDA NRCS and FSA personnel.

***Frequency and type of assessment.*** Virginia DCR's agriculture verification scheme was approved by the EPA CBP during the spring of 2016. During PY17 DCR will be developing guidance and modifying existing systems (mainly the AgBMP Tracking Module) to fully implement this new verification scheme. The new verification scheme is described below and Table D4-1 summarizes the proposed changes.

Verification procedures for BMPs are subdivided into verification groups based primarily on the risk of failure as demonstrated by the spot check histories for each type of BMP, as well as program type (cost-share, voluntary, regulatory, cooperative), credit duration, and applicability to the Chesapeake Bay Watershed Implementation Plan. Details of this grouping can be found in Appendix 3. The result is nine verification groups, each with specific procedures for initial

inspection, follow-up checks and lifespan/sunset provisions. Additionally, any agricultural BMPs required in CAFO/AFO permits are subject to compliance inspections associated with those programs. These regulatory compliance inspections are independent of and in addition to this verification protocol and will serve to add additional confidence in the BMPs installed on CAFO/AFO sites.

Onsite initial inspections for 100% of practices are the standard for all but three of the agricultural verification groups. These onsite inspections are performed by the implementing agencies, typically DCR, SWCDs and NRCS. Records of the initial onsite inspections are captured in the reporting agency's databases, along with the appropriate reportable measures for the installed practice. Information on data management by these agencies are, or will be, included in each reporting agency's QAPP or SOP.

The three practice groups that do not have 100% initial onsite inspections are tillage practices, manure transport and feed additives. Tillage practice reporting will be based on a transect survey, described in section B9 of this plan. The transect survey approach was reviewed by the Statistical Design Review Team (SDRT) and found to be sufficient for use in the Bay Program modeling system. Manure transport reporting will be based on weigh station tickets from manure haulers and transport records required in the Poultry General Permit (9VAC630). Finally, reports of feed additives will come from a combination of cooperative agreements with the integrators that dictate feed composition for their animals and manure samples from growers for each integrator. The manure samples are typically taken at time of clean-out, permit renewal and annually for permitted operations. The manure sample phosphorus concentrations are compared to historical data preceding the addition of phytase to the feed. These three classes of BMPs do not lend themselves to traditional onsite inspections to ensure implementation, but

these alternate measures represent a reasonable approach to satisfying the Verification requirements.

Several alternative approaches are used for the follow-up inspections to ensure reported BMPs are still in place and functioning as intended through time. Annual practices typically do not have follow-up checks. Four of the nine verification groups; Cover Crops, Tillage Practices, Manure Transport and Feed Additives, fall into this category. However, cover crops are inspected at least once to ensure establishment.

Nutrient Management Plans are reported as an annual BMP in the Bay model, but the plans typically have a 1- to 3-year life. Each year, plans that are within their active life are reported to the Bay Program for credit. More details on this procedure can be found in Section 10.2 of this QAPP. Follow-up inspections of Nutrient Management Plans are conducted by DCR Nutrient Management Specialists (Specialists) at the time of plan renewal, revision or modification. Farmer records of yields and nutrient applications are compared against the Nutrient Management Plan and standards for nutrient management as promulgated in Standards and Criteria. Specialists record the results of their finding to the Program Manager on a monthly basis. These records are tracked and reported on a semi-annual basis.

Practices that are installed under State or Federal Cost-Share programs and have contracts requiring maintenance are divided into three BMP Types for the purpose of verification. The three BMP Types in this group are Structural, Land Management and CREP. It should be noted that failure to maintain BMPs during the contractual period also carries the potential for financial penalty to the producer. This requirement to repay cost-share funds if practices are not maintained serves as a significant deterrent to non-compliance. Additionally, cost-shared practices are designed and installed following strict standards and there is robust initial

inspection (100% onsite initial verification) to ensure the practices, as built, meet those strict design standards.

The next BMP Group includes those practices that were designed and installed in accordance with the strict standards of agricultural cost-share programs, but no longer have a contractual maintenance requirement. These could be practices that used State or Federal Cost-Share programs, but have fallen out of the contractual period, as well as voluntary practices installed in accordance with the program standards and specifications but without the financial assistance or contractual stipulations of the State or Federal Cost-Share programs. Practices in this group are split into two types, structural and Land Management. CREP is not included in this group because the practices in the CREP type are specific to participation in that Cost-Share program.

The third verification BMP grouping in the agricultural sector that uses statistical sampling for follow-up inspections includes all practices that meet the Bay Program approved definitions of Resource Improvement Practices. In general, these are BMPs that are similar to a cost-shared BMP, but do not meet the same design and construction standards. Despite this fact, these BMPs have been determined during the initial onsite inspection to be functioning and producing a resource improvement. Typically, these practices have been voluntarily installed at the producers' full expense. These practices have shorter credit durations in the modeling system which will result in the removal of the practice from the models unless a re-inspection is conducted. The high level of producer initiative and investment in the practices in this group lends itself to a high likelihood that the practices will be continually maintained.

The final grouping in the agricultural sector is for practices that may be part of a Resource Management Plan. This agricultural certainty program includes a compliance

inspection every 3 years for all practices required for the RMP certificate. These inspections would be in addition to the other verification requirements described in this section.

The Bay Program approved credit durations will be used as the basis for removing reported BMPs for all verification groups in the agricultural sector unless the practices are re-inspected to verify continued operation. DCR plans to conduct 100% re-inspections for all BMPs prior to the end of their credit duration in order to maintain credit for CBP reporting. While this is encouraged for other providers of agricultural BMP data, it is not a requirement for satisfying the verification standard.

The CDC and the SWCD conservation specialist (sometimes accompanied by District directors or Richmond Central office staff) notify the producers of the verification visits and then go to the respective agricultural BMP implementation sites and inspect the installation. The staff then enters data into the Verification Module for that BMP.

The SWCD follows a written procedure for requesting the return of a pro-rated share of the cost share funds. This calculation is based upon the number of months that the practice was functioning before receiving a Not Function Properly status when the program participant is unwilling to return the calculated pro-rated cost-share amount. Participants may have a maximum grace period of 6 months to restore the BMP to its intended function of repay the pro-rated cost share amount. After sixty additional days the delinquency is turned over the Office of the Attorney General for assistance in reclaiming the state funds.

**C2 – Reports to Management**

*Compiling results.* A Verification results are entered into the AgBMP Tracking Module by SWCD staff for each BMP installation visited. SWCD staff may enter multiple inspection

that may be a part of a single Verification. Each inspection requires SWCD staff to indicate that each specific verification criteria for the BMP either passes or fails. A BMP may not be marked as 'verified' until it passes all of the practice specific verification criteria. This information can be used to filter data extraction. Of the 70 BMPs tracked in the AgBMP Tracking Module database 55 or 79% are considered verification eligible. Of the 70 BMPs tracked in the AgBMP Tracking Module database 30 or 43% are recognized and modeled by EPA-CBPO. Of these 30 EPA-CBPO recognized BMPs 23 or 77% are verification eligible.

## Group D – Data Validation and Usability

### D1 – Data Review, Verification, and Validation

*Acceptance criteria.* Criteria for accepting or rejecting agricultural BMP cost share practices for the resulting data can be found under the individual practices in the most recent version of the *Virginia Agricultural BMP Manual.* SWCDs are responsible for the verification of all installations paid for through the VACS program. For example even though cover crops are not considered a verification eligible BMP before a participant can receive funds for this practice the SWCD conservation specialist verifies planting dates at or near the time of planting and verifies crop plant density at time of crop kill dates. These verification inspections insure that the farmer is planting the crop in a timely manner and that the crop was of sufficient density to provide the desired water quality benefit. This is a recent modification in the tracking of this BMP and will allow DCR to report to EPA-CBPO acreage of cover crops as early or normally planted. Additional details regarding the verification and validation criteria for individual BMPs can be found under the previous section C1 – Assessments and Response Actions.

*BMP verification and validation.* Agricultural BMPs implemented require the signature of the producer and the SWCD conservation specialist (who is required to have job approval authority on that agricultural BMP type), certifying that the BMPs were implemented according to the applicable technical specifications. The signature form is a legal document that, for structural BMPs, typically requires maintenance and proper usage of the implemented BMPs during the design life spans. These are also typically the types of agricultural BMPs that are later eligible for verification during the design life span time window.

*Tracking program QA.* The specific types of QA conducted on the AgBMP Tracking Module and resulting cost share BMP data include:

- BMP location coordinate pair and other spatially determined fields are populated using a web-based mapping application. SWCD personnel locate BMP installation using a variety of base maps including; USGS 7.5 minute quads, recent high resolution aerial imagery and high resolution road centerlines.
- Many fields of data are populated from drop down lists so that those items are uniformly entered (for example, County names, Agricultural BMP codes, Funding Source Types [Program Types], Practice status, Animal Type [on applicable Agricultural BMPs], etc.).
- Each SWCD personnel login is associated with a particular SWCD and data entry is limited to funding sources, practices and other variables approved for each SWCD.
- The cost share payment amount approved by the SWCD board cannot be greater than the estimated cost share payment.
- The cost share payment amount cannot be greater than the approved cost share payment amount (which in turn, cannot be greater than the estimated cost share payment).

**D2 – Verification and Validation Methods**

General content regarding data verification and validation is provided in section C1, Assessments and Response Actions. Information pertaining to the validation of data based on the tracking program is provided above in section D1, Data Review, Verification, and Validation. These sections identify who is responsible for verifying and validating the different components of the cost-share data.

All SWCD employees sign 1619 Agreements at the local level with their NRCS District Conservationist. This signed agreement is required before the employee can be set up in the

DCR AgBMP Tracking Module with a username and password. All DCR staff that have access to the VACS and data reporting have a signed 1619 Agreement with the NRCS State Office.

*Report of Verification Results.* At any time, DCR can generate a report of the Verification results for a specific time period. This data will be provided

**D3 – Reconciliation with User Requirements**

There are various factors related to possible uncertainty during the collection of historic NPS BMP implementation data from the 47 SWCDs and historically the majority of data quality issues have been data input errors with these errors primarily being the entering of invalid data in the VACS tracking program. The redesigned VACS tracking program, implemented July 2009, has a great number of features to ensure the quality of data entered and avoid common types of data entry errors that the previous tracking application could not address.

Another source of potential uncertainty in the historic data is in the field collection of the data. An example of this type of uncertainty is variable interpretations on where to collect representative location coordinates. This arises in part due to the type of BMP(s) being installed on various farms. Cover crops may have coordinates taken at a representative point near or in the field(s) where the crops are planted such as the middle of the farm or middle of the individual fields. Stream exclusion fencing may have these coordinates collated at a central point along a linear feature (the fence) near the stream or could be collected in the upland pasture if rotational grazing of the upland acres benefiting from the exclusion/rotational grazing system BMP is installed. These types of collection uncertainty are significant if very fine scale modeling is of concern since they could induce error of plus or minus tens to hundreds of meters between the BMPs actual location coordinates and that of those reported. These types of inaccuracies cannot

be programmed away with any software type fixes.

It is possible that a conservation specialist with a SWCD picks a point of convenience for collecting the data (the center of the farm, near the front gate, at the farmhouse) that is not actually reflective of the individual BMP installation point. For a practice such as stream exclusion without rotational grazing a SWCD conservation specialist according to the BMP manual is required to report linear feet of streambank excluded not the linear feet of fencing installed. However, it is possible that the fence is what is measured and reported. These types of collection uncertainty are significant if medium scale modeling is of concern since they could induce errors of plus or minus hundreds to thousands of meters between the BMPs actual location coordinates and that of those reported.

For all data collected for program years 2009 and forward utilizing the location selection associated with the mapping function of the new tracking program will significantly reduce locational inaccuracies. For the EPA-CBPO phase 5.x watershed model the level of uncertainty described above should be acceptable since the confidence that the data exists within a given watershed model segment is very high due to the very large scale of the models segmentation and the very high probability that the reported coordinates are valid for the topographic quadrangle reported and that those quadrangles are in a given hydrologic unit or county contained within a model segment. Additionally, DCR provides training on correct data collection and input in order to minimize this type of uncertainty. The previous sections provide details on the multiple quality assurance measures that DCR undergoes to develop, track, and report quality BMP implementation data to the citizens of Virginia, Executive and Legislative branches of state government, and to the EPA.

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Virginia Department of Conservation and Recreation, Virginia Soil and Water Conservation Districts. http://www.dcr.virginia.gov/soil-and-water/swcds

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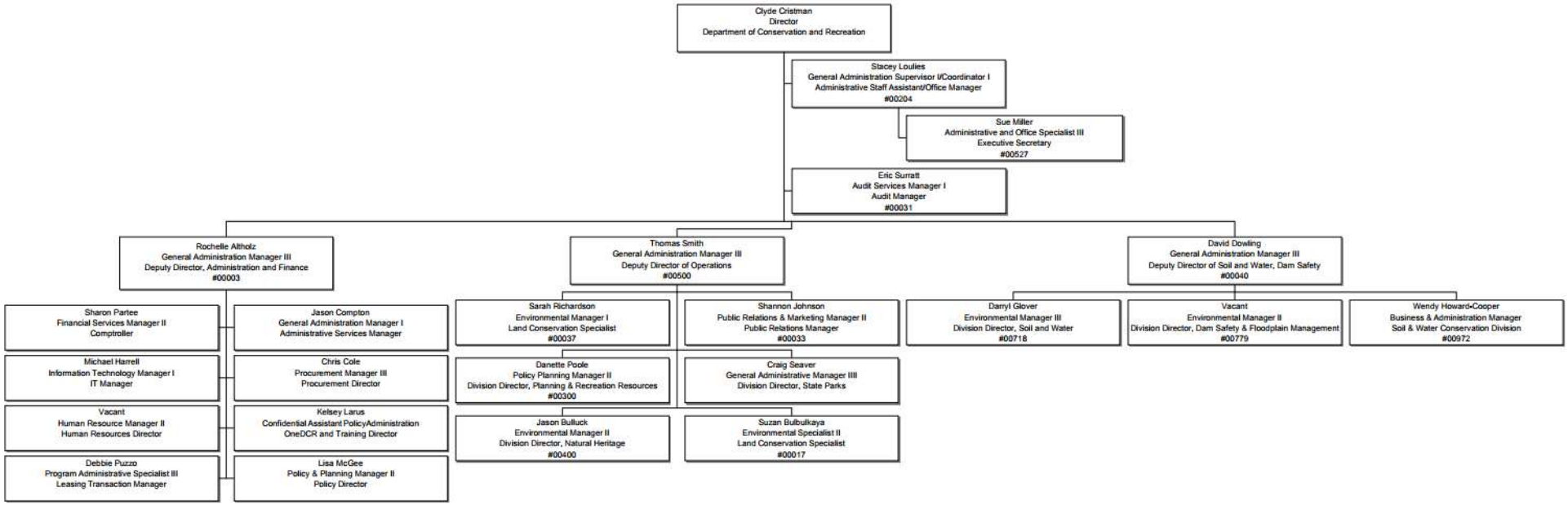
**Appendix 1**

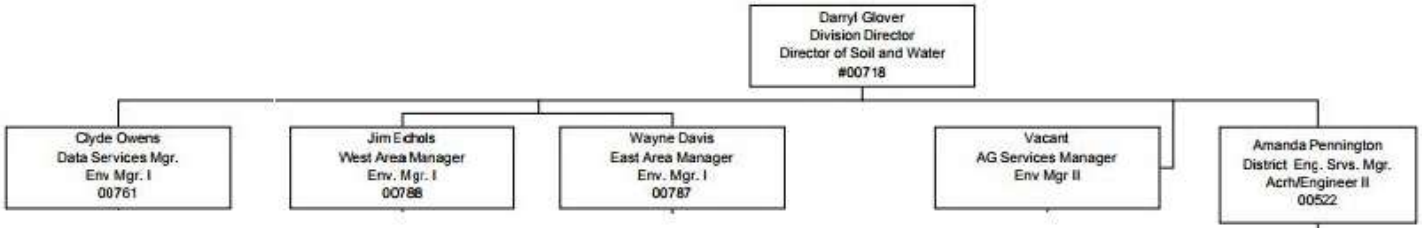
# VA Department of Conservation and Recreation
## Director's Office
## July 2017

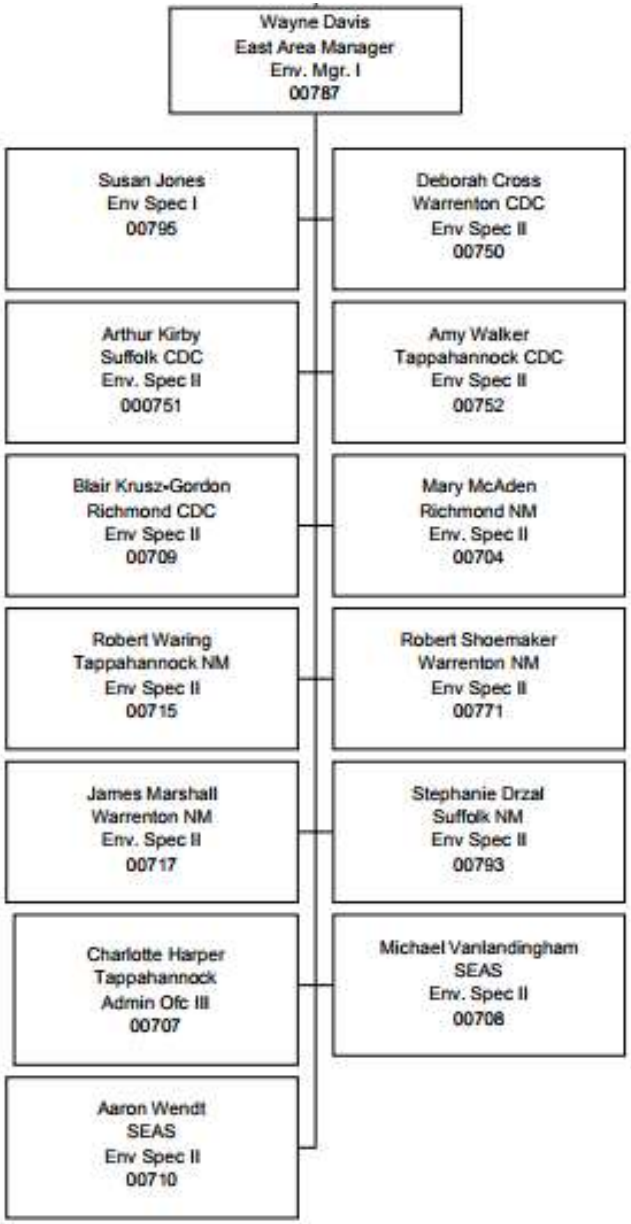


# VA Department of Conservation and Recreation

## Division of Soil and Water Conservation

## July 2017

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Env. Spec II
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Amy Walker
Tappahannock CDC
Env Spec II
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Blair Krusz-Gordon
Richmond CDC
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Mary McAden
Richmond NM
Env. Spec II
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Robert Waring
Tappahannock NM
Env Spec II
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Robert Shoemaker
Warrenton NM
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James Marshall
Warrenton NM
Env. Spec II
00717
Stephanie Drzal
Suffolk NM
Env Spec II
00793
Charlotte Harper
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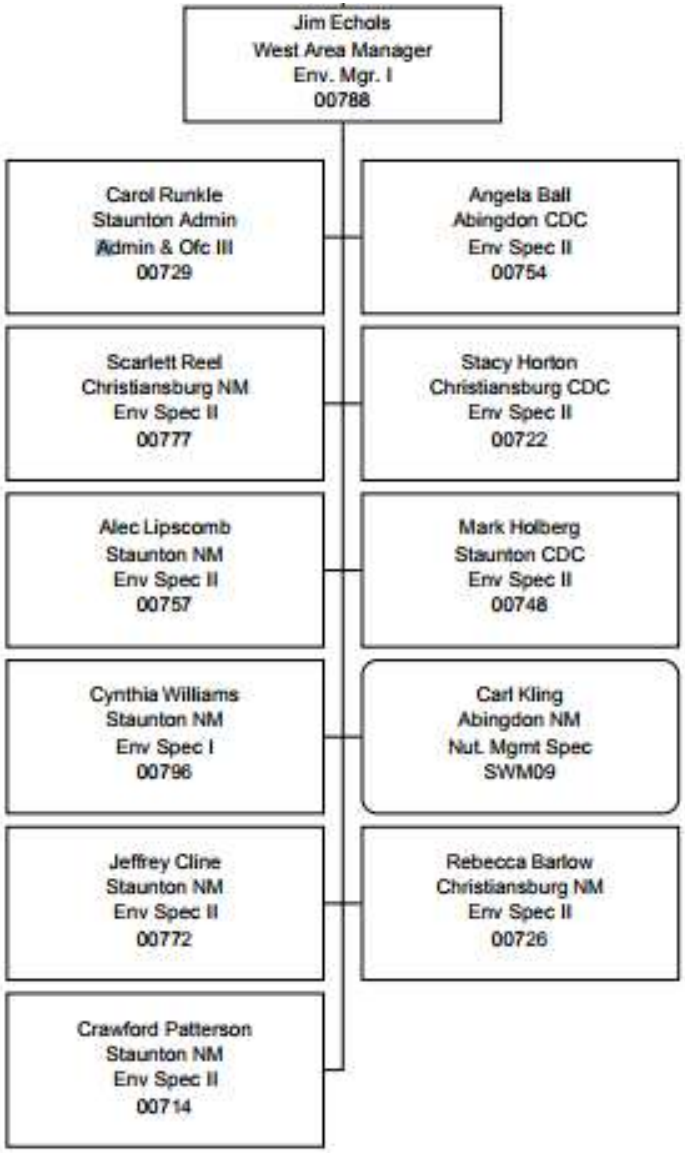
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Carol Runkle
Staunton Admin
Admin & Ofc III
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Angela Ball
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Scarlett Reel
Christiansburg NM
Env Spec II
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Stacy Horton
Christiansburg CDC
Env Spec II
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Alec Lipscomb
Staunton NM
Env Spec II
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Mark Holberg
Staunton CDC
Env Spec II
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Cynthia Williams
Staunton NM
Env Spec I
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Carl Kling
Abingdon NM
Nut. Mgmt Spec
SWM09
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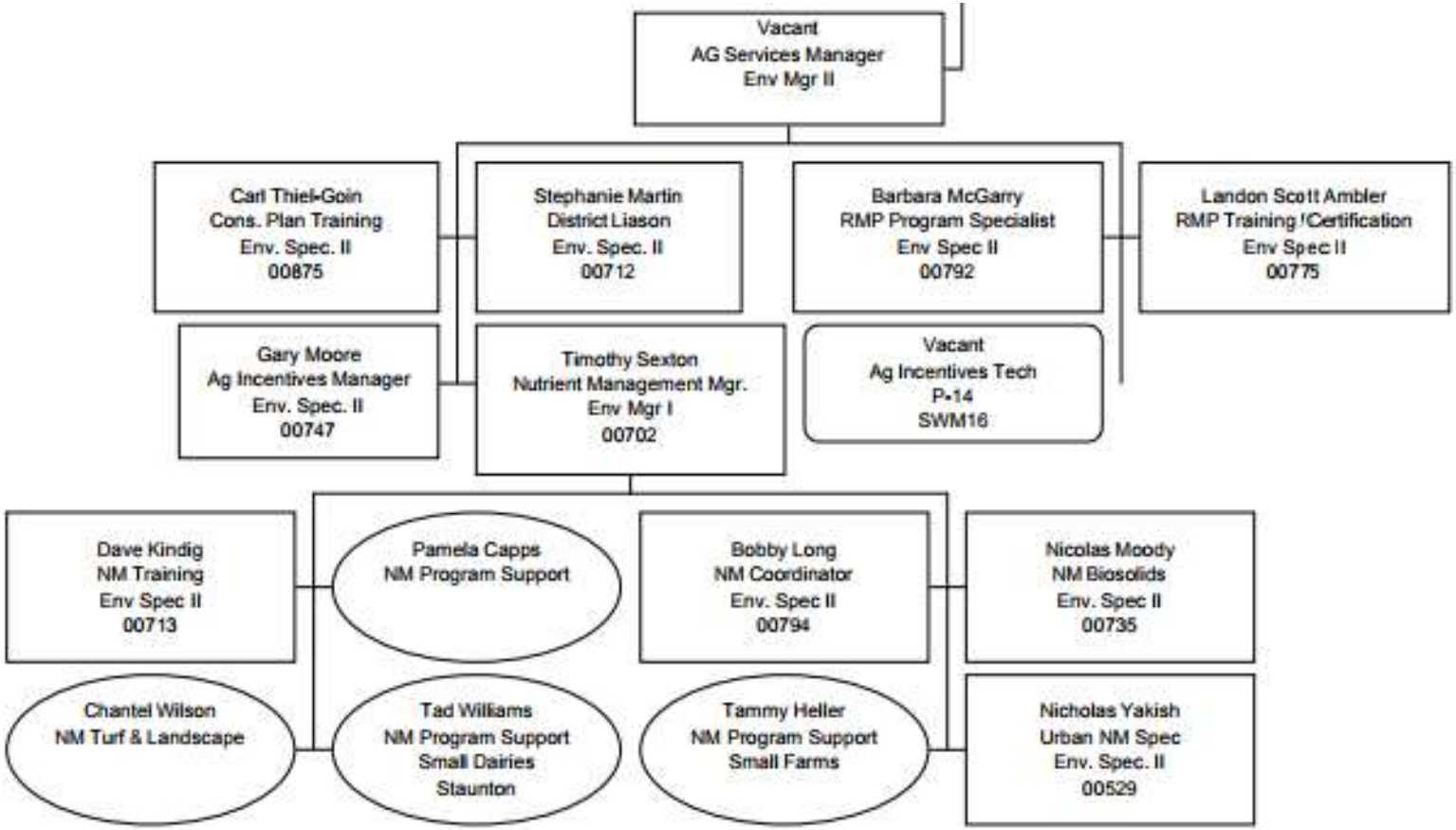
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Carl Thiel-Goin
Cons. Plan Training
Env. Spec. II
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Stephanie Martin
District Liason
Env. Spec. II
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Barbara McGarry
RMP Program Specialist
Env Spec II
00792
Landon Scott Ambler
RMP Training /Certification
Env Spec II
00775
Gary Moore
Ag Incentives Manager
Env. Spec. II
00747
Timothy Sexton
Nutrient Management Mgr.
Env Mgr I
00702
Vacant
Ag Incentives Tech
P-14
SWM16
Dave Kindig
NM Training
Env Spec II
00713
Pamela Capps
NM Program Support
Bobby Long
NM Coordinator
Env. Spec II
00794
Nicolas Moody
NM Biosolids
Env. Spec II
00735
Chantel Wilson
NM Turf & Landscape
Tad Williams
NM Program Support
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Staunton
Tammy Heller
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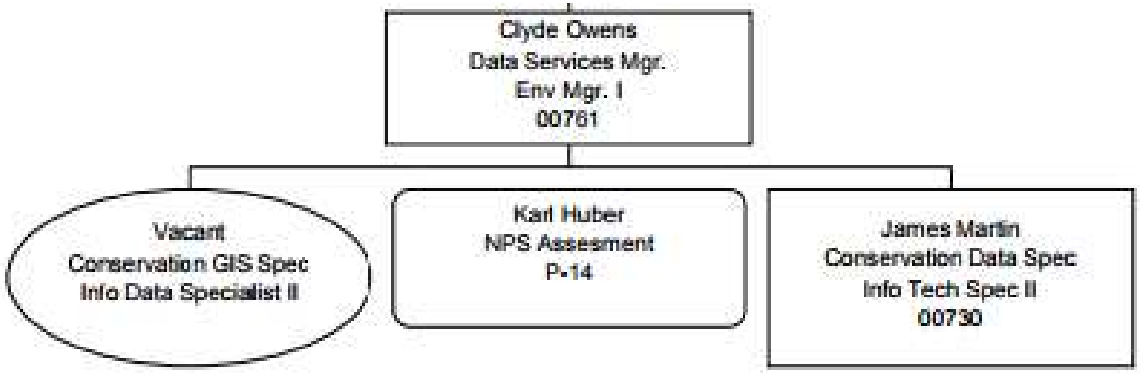
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Env Mgr. I
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Info Data Specialist II
Karl Huber
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James Martin
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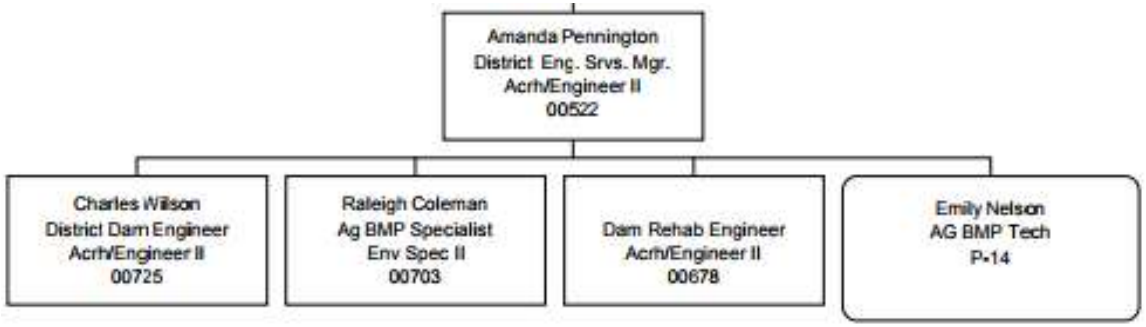
Amanda Pennington
District Eng. Srvs. Mgr.
Acrh/Engineer II
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Charles Wilson
District Dam Engineer
Acrh/Engineer II
00725
Raleigh Coleman
Ag BMP Specialist
Env Spec II
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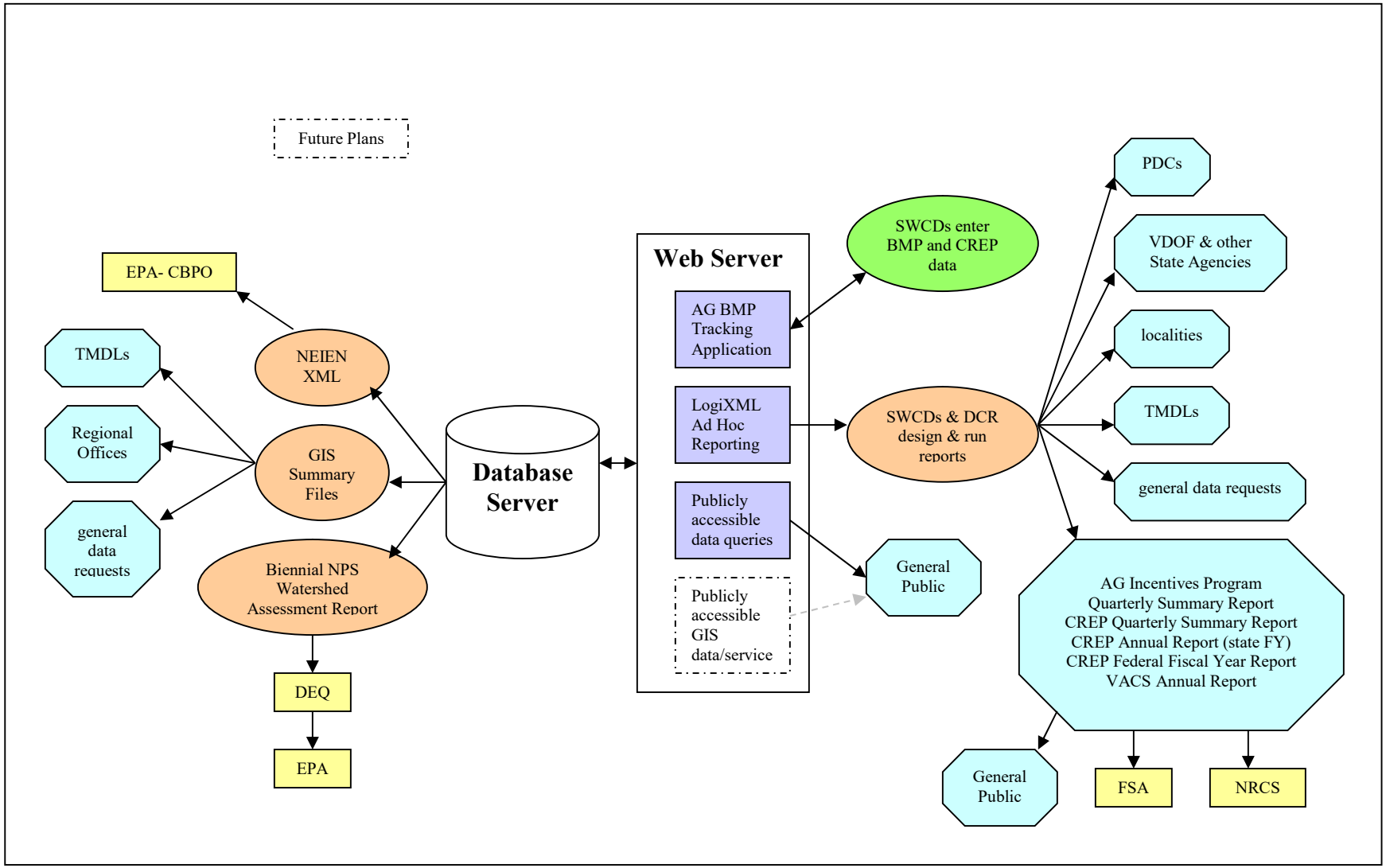
Dam Rehab Engineer
Acrh/Engineer II
00678
Emily Nelson
AG BMP Tech
P-14

# Appendix 2
# General Flow of Agricultural BMP Data Deployment



# Appendix 3
# Agricultural BMP Verification Groups

| Verification Grouping | BMP Type | Initial Inspection | | | | Follow-up Check | | | Changes Made for 2018 and Future Verification |
|---|---|---|---|---|---|---|---|---|---|
| | | *(Is the BMP there?)* | | | | *(Is the BMP still there?)* | | | |
| | | Method | Frequency | Who inspects | Documentation | Follow-up Inspection | Statistical Sub-sample | Response if Problem | |
| State or Federal Cost-Share Cover Crops | Annual | Onsite | 100% at planting | DCR, SWCD, NRCS | VACS Database, NRCS | Onsite | 100% at establishment to ensure required cover is achieved | Practices that fail to establish sufficient cover are disallowed and not reported as cover crops | No changes necessary. The AgBMP Tracking Module currently tracks the data the cover crop was planted and the date it was established |
| Tillage Practices | Annual | Transect Survey | Quinquennial | DCR, SWCD or Certified Planner | VACS Database | N/A | N/A | N/A | No changes necessary, methodology already approved |
| State or Federal Cost-Share In Contractual Period | Structural | Onsite | 100% | DCR, SWCD, NRCS | VACS Database, NRCS | Onsite | Statistical sample of 2% per year<br><br>100% Re-inspection of practices two years prior to end of contract is encouraged. | Practices found not functioning as intended are issued a 60 day Correction of Maintenance Issue Agreement (CMIA) to restore BMP function. If CMIA is not completed, BMP is deemed failed in survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 2% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices two years prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |

| Verification Grouping | BMP Type | Initial Inspection | | | | Follow-up Check | | | Changes Made for 2018 and Future Verification |
|---|---|---|---|---|---|---|---|---|---|
| | | *(Is the BMP there?)* | | | | *(Is the BMP still there?)* | | | |
| | | Method | Frequency | Who inspects | Documentation | Follow-up Inspection | Statistical Sub-sample | Response if Problem | |
| | Land Management | Onsite | 100% | DCR, SWCD, NRCS | VACS Database, NRCS | Onsite | Statistical sample of 5% per year<br><br>100% Re-inspection of practices two years prior to end of contract is encouraged. | Practices found not functioning as intended are issued a 60 day Correction of Maintenance Issue Agreement (CMIA) to restore BMP function. If CMIA is not completed, BMP is deemed failed in survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 5% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices two years prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |
| | CREP | Onsite | 100%<br><br>Forestry verification during first 2 years | NRCS, VDOF | NRCS | Onsite | Statistical sample of 5% per year<br><br>100% Re-inspection of practices one year prior to end of contract is encouraged. | NRCS will respond to any issues identified. | While CREP BMPs can be manually selected for verification, the AgBMP Tracking Module will not select BMPs for verification as part of the yearly process. |
| State or Federal Cost-Share Out of Contractual Period or Voluntary meets program design standards | Structural | Onsite | 100% | DCR, SWCD, NRCS or Certified Planner | VACS Database | Onsite | Statistical sample of 4% per year<br><br>100% Re-inspection of structural and land use change practices one year prior to end of credit duration is encouraged. | Practices components found not functioning as intended are deemed failed in the survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 4% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices one year prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |

| Verification Grouping | BMP Type | Initial Inspection | | | | Follow-up Check | | | Changes Made for 2018 and Future Verification |
|---|---|---|---|---|---|---|---|---|---|
| | | *(Is the BMP there?)* | | | | *(Is the BMP still there?)* | | | |
| | | Method | Frequency | Who inspects | Documentation | Follow-up Inspection | Statistical Sub-sample | Response if Problem | |
| | Land Management | Onsite | 100% | DCR, SWCD, NRCS or Certified Planner | VACS Database | Onsite | Statistical sample of 7.5% per year<br><br>100% Re-inspection of structural and land use change practices one year prior to end of credit duration is encouraged. | Practices components found not functioning as intended are deemed failed in the survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 7.5% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices one year prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |
| Voluntary Resource Improvement (Does not meet program design standards, but adequately provides the desired resource improvement) | Structural | Onsite Visual Indicators | 100% | DCR, SWCD or Certified Planner | VACS Database | Onsite | Statistical sample of 5% per year<br><br>100% Re-inspection of structural and land use change practices one year prior to end of credit duration is encouraged. | Practices found not meeting the visual indicators are deemed failed in the survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 5% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices one year prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |
| | Land Management | Onsite Visual Indicators | 100% | DCR, SWCD or Certified Planner | VACS Database | Onsite | Statistical sample of 10% per year<br><br>100% Re-inspection of structural and land use change practices one year prior to end of credit duration is encouraged. | Practices found not meeting the visual indicators are deemed failed in the survey. Failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | AgBMP Tracking Module will randomly select a 10% portion of this BMP Type and produce a BMP specific verification form. The system will also produce a BMP specific re-inspection form/list for practices one year prior to end of contract. Results of verification will be entered into the Verification portion of the AgBMP Tracking Module. |

| Verification Grouping | BMP Type | Initial Inspection | | | | Follow-up Check | | | Changes Made for 2018 and Future Verification |
|---|---|---|---|---|---|---|---|---|---|
| | | *(Is the BMP there?)* | | | | *(Is the BMP still there?)* | | | |
| | | Method | Frequency | Who inspects | Documentation | Follow-up Inspection | Statistical Sub-sample | Response if Problem | |
| Manure Transport | Annual | Report with weight records | 100% | DCR, DEQ | DCR and DEQ databases | N/A | N/A | N/A | |
| Feed Additives | Annual | Cooper-ative Agree-ment | 100% | DCR | DCR databases | Manure /Litter Sampling required by permit and associated with Nutrient Manage-ment Plan develop-ment | Manure P concentrations are compared against pre-Phytase baseline data to calculate reductions. | Reported treatment levels are adjusted accordingly. | |
| Nutrient Management Plans | Annual | Onsite Plan Develop-ment | 100% | Certified Planner | NutMan Database | Onsite, Farmer interview, yield and fertilizer/m anure application records evaluation | 10% DCR and DCR Contractor Developed Plans at time of plan renewal or revision in 205 and 2016 to establish baseline data.<br><br>Program design to be adjusted based on initial findings. | Frequency of sampled plan acres found to have not been implemented consistent with nutrient management planning standards will be used to discount implemented BMPs included in future reporting. | |

| Verification Grouping | BMP Type | Initial Inspection | | | | Follow-up Check | | | Changes Made for 2018 and Future Verification |
|---|---|---|---|---|---|---|---|---|---|
| | | *(Is the BMP there?)* | | | | *(Is the BMP still there?)* | | | |
| | | Method | Frequency | Who inspects | Documentation | Follow-up Inspection | Statistical Sub-sample | Response if Problem | |
| Resource Management Plans (with RMP Certificate) | Group | Onsite Imple-mentation Certifi-cation | 100% | Certified Planner, SWCD, DCR | VACS Database, RMP module | Triennial onsite compliance evaluation | 100% Triennial | Practices found not functioning as intended are issued a 90 day Correction of Maintenance Issue Agreement (CMIA) to restore BMP function. If the CMIA is not completed, RMP Certificate is revoked and the failed verification records will be reported to CBP so the BMP can be removed from receiving credit. | RMP Module has been modified to produce a produce a BMP specific verification form for BMPs required as part of a RMP in addition to the RMP inspection form. BMP verification results will be entered into the AgBMP Tracking Module. RMP verification results will be tracked through the RMP Module |