THE CHESAPEAKE BAY FOUNDATION'S

FINAL REPORT
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THE U.S. DEPARTMENT OF AGRICULTURE
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Project Title: ***Operationalizing Water Quality Trading in the Chesapeake Bay***	
Agreement Number: # **69-3A75-12-209**	
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Project Deliverables:

1) On farm assessment of roughly 200 farms from three conservation districts in VA and four counties in PA, including documentation of existing BMPs, conformance with trading baseline, the Chesapeake Bay Total Maximum Daily Load, "Agricultural Certainty," and the potential nutrient credit supply. Results will be summarized to protect confidentiality.

2) Refinements to the Howard County Inventory Tool to simplify its use.

3) Summary document on farmers' perceptions of nutrient trading and willingness to participate based on informal observations and queries of farm assessment trainees.

4) Policy paper comparing a performance-based approach to trading baseline to the operational approaches currently used in PA and VA.

5) Requirements analysis of additional CBNTT enhancements/requirements as a result of state policy changes and/or user input.

6) National transferability and alignment analysis which will examine features between CBNTT and the national NTT tool and identify elements that need to be aligned in order to facilitate transferability in the future.

7) Enhanced version of CBNTT to include enhancements to calculation tools and registry as laid out in requirements analysis and transferability analysis.

EXECUTIVE SUMMARY

In December 2010, the Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load [1] (TMDL) to address the nutrient- and sediment-related water quality impairments in the main stem of the Chesapeake Bay and its tidal rivers. All of the Bay jurisdictions rely, to some extent, on nutrient trading to meet and maintain the nutrient and sediment limits under the Bay TMDL. Agricultural sources typically have lower nutrient reduction costs per pound than other sources of nutrients such as wastewater treatment plants and municipal stormwater systems and hence are viewed as the likely "sellers" in a nutrient credit trading market. There are, however, some fundamental differences among the state trading programs, in particular regarding the baseline to be eligible for trading and credit calculation method, that create an "uneven playing field" for agricultural producers across the region.

In this project, the Chesapeake Bay Foundation (CBF) worked with the World Resources Institute (WRI), Texas Institute for Applied Environmental Research (TIAER), Red Barn Consulting, and the Howard County Soil Conservation District (MD) to build upon and expand earlier efforts to create and improve an on-farm credit calculation tool, now known as the Chesapeake Bay Nutrient Trading Tool (CBNTT), to estimate an on-farm nitrogen and phosphorus losses and compare that to a performance-based baseline for trading. This tool is currently being used in Maryland's trading program. Specifically, our project objectives were:

1) Outreach: Conduct outreach to roughly 200 EQIP-eligible farmers in Virginia (VA) and Pennsylvania (PA) to determine eligibility for participation in trading and Agricultural Certainty programs, if applicable.
2) Supply Analysis: Assess the potential for the supply of credits from agricultural producers using in-place state policies for establishing the agricultural baseline.
3) Policy Analysis: Compare policies for setting the trading baseline in PA and VA and the practice-based Resource Management Plan (RMP) requirement for agricultural certainty in VA with performance-based approaches using the CBNTT. The results can be used to inform state policies on these issues, to link these policies with compliance with the TMDL requirements, and to facilitate multi-state trading opportunities.
4) Tool Development: The project sought feedback from producers as well as state policy makers on the CBNTT to help improve the tool and add features that are consistent with ongoing and future developments in state trading policies as well as user needs.

The project addressed the goals of the Conservation Innovation Grants program by helping to increase awareness and participation of EQIP-eligible farmers in nutrient credit markets and assessing the potential supply of credits from agricultural producers. Of the 276 farms included in our analysis, 184 met the numeric baseline for nitrogen and 65 met the phosphorus baseline. WRI and TIAER are continuing to refine the way in which phosphorus fate and transport is modeled in the CBNTT.

The ability to compare the existing state trading baselines with the results of the CBNTT helped inform state policies on trading eligibility and agricultural certainty. In VA, the proportion of farms achieving the practice-based baseline was similar to those achieving the numeric, performance-based baseline. VA's new trading

[1] Actually, the "Bay TMDL" is 92 TMDLs for sediment, nitrogen and phosphorus addressing the 92 impaired tidal segments.

regulations do allow a “performance based” approach to be used to estimate baseline. In addition, WRI and TIAER were recently invited to submit a proposal for enhancing CBNTT’s use in VA. Our preliminary efforts to evaluate VA’s RMP requirements suggest they may not be equivalent to the trading baseline. Based on these results, we encourage VA to include riparian buffers as a requirement in their RMP.

In PA, there is a big difference in the number of credits estimated using PA’s current trading baseline and calculation tool and the amount using the CBNTT and a numeric baseline. In particular, our study confirmed that PA’s “threshold” requirements for participating in trading were too low and did not equate to agriculture’s share of the Chesapeake Bay TMDL load reduction requirements. PA is currently revising their trading regulations and, because of this project, is considering using the CBNTT in its program.

Lastly, the functionality of CBNTT was improved through this project. Modifications and enhancements to the CBNTT included: updating soils information for PA, adding shape-file import functionality, adding more crop and tillage options, increasing user friendliness through the addition of copying features, and revising baseline assessment methods and/or questions to better match current state policies.

INTRODUCTION

Over the course of the past decade, Pennsylvania (PA), Virginia (VA), Maryland (MD), and West Virginia (WV) have all issued legislation, regulations and/or guidance that allow water quality trading, specifically for nutrients. Agricultural sources typically have lower nutrient reduction costs per pound than other sources of nutrients such as wastewater treatment plants and municipal stormwater systems. This cost advantage opens a window of economic opportunity for farms—selling nutrient credits to sources facing more expensive nutrient control options. However, there are some fundamental differences in these programs e.g., the baseline to be eligible for trading, verification procedures, credit calculation methodologies, etc. These differences create an "uneven playing field" for trading across the region.

In this project, the Chesapeake Bay Foundation (CBF) worked with the World Resources Institute (WRI), and other partners to build upon and expand earlier efforts to create and improve an online multi-state platform for water quality trading in the Chesapeake Bay. This calculation tool, now known as the Chesapeake Bay Nutrient Trading Tool (CBNTT), integrates WRI's NutrientNet on-farm calculator with USDA's Nutrient Tracking Tool (NTT) to estimate on-farm nitrogen, phosphorus and sediment losses.

At the beginning of the project, the CBNTT was only being used in MD's trading program. The intent of the current project was to encourage broader use of the CBNTT by testing and calibrating it for use in PA and VA, modifying the functionality to capture the policy features of the various state programs, and comparing baseline and nutrient credit generation under different policy scenarios.

Specifically, our project objectives were:

1) Outreach: Conduct outreach to roughly 200 EQIP-eligible farmers in VA and PA to determine eligibility for participation in trading and Agricultural Certainty programs, if applicable.

2) Supply Analysis: Assess the potential for the supply of credits from agricultural producers using in-place state policies for establishing the agricultural baseline.
3) Policy Analysis: Compare policies for setting the trading baseline in PA and VA and the practice-based Resource Management Plan (RMP) requirement for agricultural certainty in VA with performance-based approaches using the CBNTT. The results can be used to inform state policies on these issues, to link these policies with compliance with the TMDL requirements, and to facilitate multi-state trading opportunities.
4) Tool Development: The project sought feedback from producers as well as state policy makers on the CBNTT to help improve the tool and add features that are consistent with ongoing and future developments in state trading policies as well as user needs.

We also hoped to increase farmer awareness of the opportunities for trading and encourage their participation in the market. Although state trading programs have been in existence for several years, there have been very few trades involving agricultural producers. Limited polling by the Maryland Association of Conservation Districts has suggested farmers have limited knowledge of trading, are skeptical of the concept, and have no idea of whether or not their farms would be eligible to generate credits. One of the outcomes of our project was an estimate of the number of assessed farms that are currently meeting the applicable trading baseline.

This project represented a partnership among organizations with experience and expertise working with agricultural producers, on Bay restoration, with water quality trading, and complex geochemical models. Dr. Beth McGee, Senior Water Quality Scientist at CBF provided overall grant coordination and oversight. CBF

field staff helped facilitate farm evaluations and collaboration with conservation districts, as well as conducting verification of on-farm results. CBF staff also participated in project briefings with state agency staff in VA and PA. Mindy Selman, a senior associate at WRI (now currently with the USDA's Office of Ecosystem Markets) and Sara Walker (WRI) led the requirements gathering and implementation of enhancement and modifications to the CBNTT by soliciting feedback from users and state agency staff. Bob Ensor of the Howard Soil Conservation District (HSCD) and Dana York (Green Earth Connections) took the lead on training soil and water conservation district staff in VA to conduct the on-farm evaluations and enter the information into the CBNTT. Peter Hughes, of Red Barn Consulting, led efforts to conduct on-farm evaluations and use of CBNTT in PA. Dr. Ali Saleh and his staff at Texas Institute for Applied Environmental Research (TIAER), with oversight from WRI, calibrated and enhanced the CBNTT.

The total project cost was $1,512,922.32, with the CIG providing $700,880 and matching contributions providing $812,042.32. CBF fundraising provided $317,592.22 in cash match during the project period, including staff time and support for on-farm evaluations in PA. WRI provided $280,339 in cash match to support additional WRI staff working on the project related activities. TIAER provided $64,111.10 in match to support additional TIAER staff working on the project related activities. HSCD provided in-kind matching contributions for use of the data gathering tool estimated value of $50,000. Red Barn Consulting provided $90,000 of in-kind matching contributions for the on-farm evaluations and trading policy work. Green Earth Connection provided $10,000 in in-kind match for staff involved with a pilot test of the multi-state nutrient trading tool on 10 farms in Virginia.

BACKGROUND

In December 2010, the Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load [2] (TMDL) to address the nutrient- and sediment-related water quality impairments in the main stem of the Chesapeake Bay and its tidal rivers. This TMDL is the largest and most complex in the country, involving six states (Delaware, Maryland, Virginia, Pennsylvania, New York, West Virginia and Virginia) and the District of Columbia (DC). In conjunction with the TMDL, the six states and DC developed "watershed implementation plans" (WIPs) that describe how the pollution load caps are allocated among the various source sectors (e.g., wastewater treatment plants, agriculture, urban stormwater) and how the necessary pollution reductions will be achieved by the final implementation deadline of 2025. In their WIPs, all of the Bay jurisdictions rely, to some extent, on nutrient trading to meet and maintain the nutrient and sediment limits under the Bay TMDL.

Agricultural sources typically have lower nutrient reduction costs per pound than other sources of nutrients such as wastewater treatment plants and municipal stormwater systems. This cost differential opens a window of economic opportunity for farms—selling nutrient credits to sources facing more expensive nutrient control options or to new sources, needing to offset their loads. However, despite sharing a large portion of the Chesapeake Bay watershed and collaborating on other Bay restoration issues, state trading programs evolved independently and as a result there are substantial differences. These differences create an "uneven playing field" among the Chesapeake watershed states. Among the most significant differences is the baseline for agricultural sellers to be eligible to participate in nutrient trading markets and the credit calculation methodologies.

[2] Actually, the "Bay TMDL" is 92 TMDLs for sediment, nitrogen and phosphorus addressing the 92 impaired tidal segments.

MD has adopted a "performance-based" approach that is defined as the per acre annual loading rate (lbs N/acre, lbs P/acre) that equates to the agricultural share of the TMDL load reductions. The numeric baseline generated by the CBNTT is basically a calculation of the farm's allowable contribution to its particular Major Basin's Phase II WIP allocation. The model determines the lb/acre loading rate for pasture land and crop land within a major basin that would result in the major basin meeting its agriculture WIP loads. The baseline nutrient load for the whole operation is calculated by multiplying the appropriate loading rate by the number of acres of either pastureland and/or cropland contained within the operation. The CBNTT is used to determine if the suite of BMPs present on a particular farm will meet or exceed the baseline loads. Maryland recently established a voluntary Agricultural Certainty Program[3] that will give farmers a 10-year exemption from new environmental laws and regulations in return for installing best management practices in order to meet local or Chesapeake Bay Total Daily Maximum Load (TMDL) goals ahead of schedule. The CBNTT and the trading baseline is being used to determine the level of conservation needed to qualify for the Agricultural Certainty program.

VA's baseline is also defined as agriculture's share of the TMDL load reductions, but they have adopted an "operational approach" to implementing it. Farm eligibility is determined by either a practice-based baseline or the implementation of a Resource Management Plan (RMP). The requirements for Virginia's practice-based baseline include evidence of sufficient soil conservation, nutrient management, cover crops, stream fencing and riparian buffers. Specifically, the tract being assessed must have a soil conservation plan developed according to NRCS Field Office Technical Guide specifications in order to achieve a soil loss tolerance value of *T* or less for all cropland, hay, or pasture. The tract must have a nutrient management plan written by a certified nutrient management planner as well as evidence of implementation of the nutrient management plan provided by a nutrient application field record sheet. The cover crop component requires planting cereal cover crops to meet the standard planting date and other specifications that are required as part of the Department of Conservation and Recreation's (DCR) cost share program. This requirement applies to all land where summer annual crops are grown if the summer annual crop received greater than a total of 50 pounds of nitrogen application from any nutrient source. The exception is if the land is planted to winter cereal crops for harvest (barley, oats, rye, wheat) in the fall following the harvest of the summer annual crop.

For pasture land, for a tract to be eligible for trading, there must be exclusionary fencing that restricts livestock access to perennial streams, rivers, lakes, ponds or other surface waters as well as a riparian buffer having a minimum width of 35 feet. Finally, for a tract to be eligible according to VA practice-based requirements, a vegetative buffer with a width of at least 35' must be maintained in accordance with NRCS standards to protect all perennial flow surface waters.[4] Next, if a farm has a RMP implemented, the operation/tract covered by the RMP is eligible to generate and sell nutrient credits. *The requirements of an RMP are the same as those required by the nutrient trading regulations except for the buffer requirement associated with stream exclusion fencing on pastures.* The RMP regulations only require pasture fields to have livestock excluded from perennial streams.

In 2010, the PA Department of Environmental Protection (DEP) published its nutrient trading program regulations. In these regulations, there are three types of pollution reduction activities eligible to generate nutrient credits; agricultural best management practices, manure nutrient destruction and conversion technologies, and the export of poultry manure and agriculture application outside of the Chesapeake Bay

[3] http://mda.maryland.gov/resource_conservation/Pages/agricultural_certainty_program.aspx

[4] Currently, due to the complexity of several of the practice requirements, the CBNTT only actively checks that buffer and stream fencing requirements are met.

watershed. In order for any of these three activities to generate credits, they must be in compliance with four regulations as applicable. The activity must comply with:[5]

- Erosion and sedimentation control regulations that require all operations with agricultural plowing or tilling, or animal heavy use areas that disturb 5,000 square feet or more must have written erosion and sedimentation control plans, with implemented BMPs to minimize the potential for accelerated erosion and sedimentation (25 Pa. Code chapter 102, Erosion and Sedimentation Control Regulations).
- Regulations that define the pollution control and preventative requirements at agricultural operations, including requirements related to land application of animal manure (25 Pa. Code Section 91.36).
- Regulations that define the requirements for Concentrated Animal feeding operations with NPDES permits (25 Pa Code Section 92.29).
- Regulations promulgated by the State Conservation Commissions that define and regulated concentrated animal operations through the development and implementation of Nutrient Management Plans (25 Pa. Code Chapter 83, Subchapter D).

In addition to the four regulations listed above, there is a "threshold requirement" which requires one of the following three conditions to be met at the credit generating operation:

- Manure may not be mechanically applied within 100 feet of a perennial or intermittent stream with a defined bed or bank, a lake, or a pond, and a commercial fertilizer is applied at or below appropriate agronomic rates.
- A minimum of 35 feet of permanent vegetation is established and maintained between the field and any perennial or intermittent stream with a defined bed or bank, a lake, or a pond. No mechanical application of manure may occur within the 35 foot vegetative buffer. [6]
- A downward adjustment of 20% to the overall amount of pollution reduction generated by the pollution reduction activity.

If the requirements listed above have been met, a credit calculation spreadsheet tool is used to calculate the number of credits to be certified. This is a practice-based Excel spreadsheet created by DEP and WRI in 2007.[7]

The goal of our project was to promote the use of a consistent tool for estimating nutrient reduction credits from agricultural operations across the Chesapeake region.

Project Methods:

Outreach and Supply Analysis: On-Farm Assessments

Virginia

The Soil Conservation District in Howard County (HSCD), MD trained staff with the Northern Neck Soil and Water Conservation District (SWCD), the Culpeper SWCD, and the Thomas Jefferson SWCD in VA to catalogue on-farm best management practices (BMPs) and enter the necessary information into the CBNTT. The HSCD has developed a detailed hard copy inventory list that the trainees were asked to use for this assessment. This inventory data collection tool is designed to be as "fool proof" as possible – including check-off boxes and multiple choice questions – and this innovation allows its use by minimally trained personnel.

[5] Retrieved from: http://www.portal.state.pa.us/portal/server.pt/community/nutrient_trading/21451/background/1548035
[6] The recently revised Manure Management Manual now requires setbacks or permanent vegetative buffers under certain circumstances, narrowing the distance between regulatory requirements and the "threshold."
[7] Retrieved from: http://pa.nutrientnet.org/

Our objective was to assess 100 EQIP eligible farms: 25 in the Northern Neck SWCD, 50 in the Culpeper SWCD, and 25 in the Thomas Jefferson SWCD.

Pennsylvania

In PA, we targeted 100 farms in four counties: Lancaster, Bradford, Chester, and Franklin. Farms were chosen to represent the diversity of agricultural operations and the scale of BMP implementation on PA farms. Red Barn Consulting, an agricultural technical consultant and nutrient credit aggregator, conducted the on-farm assessments and entered the data into the CBNTT. Red Barn was trained in the use of the Howard County Inventory Tool, but due to the level of expertise of staff conducting the farm assessments, did not feel the need to use it on all farms.

Policy Analysis: Eligibility for Trading

We compared the practice based approach in VA with a performance based numeric baseline estimated via the CBNTT using the same approach as is used in MD. That is, the numeric baseline generated by the CBNTT is basically a calculation of the farm's allowable contribution to its particular Major Basin's Phase II WIP allocation. The model determines the lb/acre loading rate for pasture land and crop land within a major basin that would result in the major basin meeting its agriculture WIP loads. The baseline nutrient load for the whole operation is calculated by multiplying the appropriate loading rate by the number of acres of either pastureland and/or cropland contained within the operation.

To evaluate whether the lack of a buffer requirement in the RMP regulations would have a noticeable impact on the ability of farms to meet the numeric baseline, we chose a small subset of farms to run scenarios with and without buffers. Since we did not have access to all the raw input data, we needed to pick a subset based on the summary information. We chose five farms with pastures and stream fencing and ran scenarios comparing loads with a fence only (10' grass exclusion area) and a fence with buffer (35' exclusion area with forested vegetation). (See Appendix C).

We compared the PA trading approach with one assuming a performance-based numeric baseline and credits calculated using the CBNTT. Specifically, we compared the credits attributed to certain practices using the DEP calculation methodology and "threshold" versus the credits that would have been assigned using the CBNTT and a performance-based baseline. To make this comparison, projects were chosen that had generated certified nutrient credits through DEP's existing nutrient trading regulations. These farms were run through the CBNTT with certain practices "backed out" in the 'current scenario,' and added back in for the 'future scenario' to determine the nutrient load reductions attributed to the practices.

To calculate the credits that would be calculated by the CBNTT, the following equations were used:

1) Load Reduction - Reduction Necessary to meet baseline = *Additional* Reductions
2) *Additional* Reductions * Delivery Ratio= Credits generated

    - Where:
        - Load Reduction refers to the "Current" load minus the "Future" load in which the specified BMPs are included.
        - "Reduction necessary to meet baseline" refers to the reduction from the current load necessary for the farm to meet the baseline load ("Current" load – "baseline" load).
        - *Additional* Reductions = reductions *beyond* the reductions necessary for the farm to meet the baseline load.

These additional reductions are the basis for credit generation. This value is multiplied by the delivery ratio to determine the credits generated

Tool Development: Chesapeake Bay Nutrient Trading Tool Enhancement and Refinement

WRI coordinated with the on-the-ground activities in order to improve functionality of the CBNTT such that it aligned with the needs of the users, fit the new and emerging needs of the state programs, and is aligned with the national NTT model.

At the beginning of the project period, WRI worked with TIAER to complete a beta version of CBNTT for testing and training in order to begin the other project activities. As part of this process, WRI and TIAER completed a recalibration effort of CBNTT in the initial stages of the project period which included the addition of regional adjustment factors that help ensure CBNTT's results are comparable to those of the Chesapeake Bay Watershed Model.

Following completion of the recalibrated beta version of CBNTT, WRI led demonstrations, trainings, and beta-testing sessions on CBNTT with soil and water conservation districts and other potential users in Pennsylvania and Virginia. WRI also demonstrated the tool to the PA DEP and VA Department of Environmental Quality. WRI also worked closely with project partners Dana York, Bob Ensor, and Peter Hughes who served as the primary testers of the tool. WRI and TIAER used user feedback to make modifications and enhancements to CBNTT. WRI and TIAER also released and demo-ed beta versions of CBNTT's registry and marketplace.

Finally, working closely with EPA, WRI has focused on the next recalibration of CBNTT. WRI, TIAER, and EPA met multiple times over the past year to agree on a method for recalibrating the tool and to ensure it is in line with the methods and results of the Chesapeake Bay Watershed Model.

Discussion of Quality Assurance

Virginia Spot Checks: We conducted a "spot check" of BMPs on farms to determine any inconsistencies in the documentation of on-the-ground BMPs. We did this by having CBF staff verify that the BMP data entered on the CBNTT datasheets was consistent with their observations during an independent field visit. CBF staff inspected each field for residue amounts, tillage type, crop rotation, field buffers, nutrient management and any other BMP listed on the NTT field data collection sheet or actually on the ground. For Northern Neck SWCD spot checks, three farms were re-assessed and the only discrepancy was in soil phosphorus concentrations because old soil test information from the nutrient management plan was replaced with more recent information. In the Northern Neck SWCD, two farms were spot checked and documented BMPs were confirmed. We did not spot check farms in Culpeper SWCD because the datasheets were not available.

Pennsylvania Verification: In PA, we conducted a rigorous verification process that included CBF staff conducting both a duplicate field assessment and entering information into the CBNTT. Results are presented in Appendix A. In summary, we did find some discrepancies in the results, mostly due to the way data were entered into the CBNTT. The most common reasons for differences included: 1) basing crop rotations on the nutrient management plan versus the conservation plan, 2) including or excluding adjacent woodlands as buffers, 3) differences in the way rotational grazing was entered, and 4) differences in entering the type of cover crop.

Findings:

Below we list the main projective objectives and details on how they were accomplished.

1) *On farm assessment of 200 farms from three conservation districts in VA and four counties in PA, including documentation of existing BMPs, conformance with trading baseline, TMDL, Agricultural Certainty, and the potential nutrient-credit supply.*

Virginia

District staff assessed 24 farms in the Northern Neck SWCD, 27 farms in the Thomas Jefferson Soil Conservation District SWCD, and 50 farm tracts in the Culpeper SWCD, bringing the total of on-farm assessments to 101. Of these 101 farms, 52 farms met the practice-based baseline; 90 met the numeric nitrogen baseline, and 52 met the numeric phosphorus baseline (Table 1). Of the 101 farms, about 59 farms were crop only or crop and hay only. Of the 59 crop farms, 27 met the practice-based baseline, 54 met the numeric nitrogen baseline; and 31 met the numeric phosphorus baseline (Table 2). The remaining 42 farms had some combination of crops, hay, pasture, and animal confinement areas. Of these 42 farms that did contain animals, 25 met the practice baseline, 36 met the numeric nitrogen baseline, and 21 met the numeric phosphorus baseline (Table 3). The farms assessed in the Northern Neck conservation district were entirely crop-only except for three, while the Thomas Jefferson conservation district farms assessed were mainly farms that contained some animals and pastureland. The farms assessed in the Culpeper conservation district represented close to a 70%/ 30% split between crop only farms and farms that contained animals.

Table 1. Results summary for all farms assessed.

All 102 Farms Assessed	**Meets Practice Baseline[8]**	**Meet Numeric Baseline**	**Meet Practice-baseline but NOT Numeric baseline**
Nitrogen	52 farms (52%)	90 farms (95%)	2
Phosphorus		52 farms (52%)	18

Table 2. Results for crop & crop/hay farms (farms without animals)

59 Crop only (or crop/hay) Farms	**Meets Practice Baseline**	**Meet Numeric Baseline**	**Meet Practice-baseline but NOT Numeric baseline**
Nitrogen	27 farms (46%)	54 farms (92%)	1
Phosphorus		31 farms (53%)	9

Table 3. Results for farms that contain animals (crop, crop/hay, pasture & animal confinement).[9]

[8] We cannot determine if specific standards for each practice are met (e.g. planting dates for cover crops, meeting T) with just results summary data.

[9] The current version of CBNTT currently can only check if the buffer and stream fencing requirements of baseline are met (not the other 3 practices) and even then, from the summary data we had, we were unable to determine which farms didn't have buffers and fencing simply because they were not adjacent to a stream. It is possible that 4 more crop/ pasture farms meet the practice baseline, but were labeled as not meeting because currently, the CBNTT labels them as not meeting because it defaults to the performance baseline as it can't check for all five practice requirements.

42 farms some combination of crop/hay, pasture, animal confinement	Meets Practice Baseline	Meet Numeric Baseline	Meet Practice-baseline but NOT Numeric baseline
Nitrogen	25 farms (60%)	36 farms (86%)	1
Phosphorus		21 farms (50%)	9

Although we do not have a quantitative assessment of the potential credit supply, qualitatively, the results indicate there is potential for agricultural sources of nutrient credits in the state based on the current nutrient trading baseline requirements. For both nitrogen and phosphorus, more than 50% of the farms met or exceeded the requirements to be eligible for trading.

Pennsylvania

Red Barn assessed a total of 100 farms: 50 in Lancaster, 3 in Chester, 24 in Franklin, and 23 in Bradford counties. We were also able to combine the results of these 100 farm assessments with 75 more assessments conducted by Red Barn for a separate grant (National Fish and Wildlife Foundation Grant to Stroud Water Resources). Of the total 175 farms assessed, 94 farms (54%) met the nitrogen baseline load and 13 farms (7%) met the phosphorus baseline load (Table 4; and see Appendix B). Of the 175 farms, 68 farms contained animals and were some combination of crop, hay, and pasture land. Of these 68 farms, 29 farms (43%) met the nitrogen baseline load and just 1 farm met the phosphorus baseline load (Table 5). The rest of the 107 farms were crop or crop/hay only farms. Of these 107, 65 farms (61%) met the nitrogen baseline load and 12 farms (11%) met the phosphorus load baseline (Table 6). We believe the main reason that few farms achieved the phosphorus baseline is due to the fact that most of the farms in PA currently and historically used manure as fertilizer and hence had high soil phosphorus concentrations. As noted in Table 7, 100% of the farms that reported only using commercial inorganic fertilizer achieved both the phosphorus and nitrogen baseline.

Table 4. Total farms assessed

170 Farms Assessed	**# that meet Baseline**
Nitrogen	94 farms (54%)
Phosphorus	13 farms (7%)

Table 5. Farms assessed that contain animals and are some combination of crop/hay/ pasture/ animal confinement areas

Farms w/ animals			
Crop/hay/ pasture/ animal confinement (68 farms)	**# in category**	**# that meet nitrogen baseline**	**# that meet phosphorus baseline**
Manure & Commercial fertilizer application	48 farms	19 farms (40%)	0 farms
Manure application only	20	10 farms (50%)	1 farm
Total	68	29 farms (43%)	1 farm

Table 6. Farms without animals that are either crop-only or crop/hay- only.

Crop or crop/hay only farms (107 farms)	**# in category**	**# that meet nitrogen baseline**	**# that meet phosphorus baseline**
Manure & Commercial	77 farms	43 farms (55%)	4 farms (3%)
Commercial fertilizer application only	7 farms	7 farms (100%)	7 farms (100%)
Manure application only	23 farms	15 farms (65%)	1 farm
Total	107	65 farms (61%)	12 farms (11%)

Table 7. Total farm results organized by fertilizer type

All 175 farms by fertilizer type	**# in category**	**# that meet nitrogen baseline**	**# that meet phosphorus baseline**
Manure & Commercial fertilizer application	125 farms	62 farms (50%)	4 farms (3%)
Commercial fertilizer application only	7 farms	7 farms (100%)	7 farms (100%)
Manure application only	43 farms	25 farms (58%)	2 farms (5%)
Total	175	94 farms (54%)	13 farms (7%)

Although we do not have a quantitative assessment of the potential credit supply, a qualitative assessment of the results indicates that over 50% of the farms assessed meet the nitrogen baseline load, but only 7% meet the phosphorus baseline. In Maryland, nitrogen, phosphorus, and sediment baselines are handled individually. If baseline is met for any of the three, credits can be generated and traded for those meeting baseline even though the others do not meet baseline. PA has not yet established a policy on this issue, but assuming their policy was the same as MD's, more than half the farms would be able to sell nitrogen credits, but very few could sell phosphorus credits, based on our preliminary results. PA DEP believes that the CBNTT is not accurately modeling fate and transport of phosphorus. Consequently, they are working with WRI to make some adjustments to the way phosphorus is handled in the CBNTT.

2) *Policy analysis comparing performance-based approach to trading baseline to the operational approaches currently used in VA and PA*

Virginia

The results of the 101 farm assessments conducted indicate the practice-based baseline is stricter than the numeric baseline for nitrogen while the same number of farms meet the practice-based baseline as meet the numeric baseline for phosphorus. However, while just two farms that meet the practice requirements do not meet the numeric nitrogen baseline, 18 farms that meet the practice requirements do not meet the numeric baseline for phosphorus. A total 53 farms meet the practice requirements including stream fencing and buffer requirements as well as the implementation of cover crops, conservation tillage, and conservation plans. 90 farms meet the numeric nitrogen baseline load and just 52 farms meet the numeric phosphorus loads (Tables 1-3).

The evaluation of whether the lack of a buffer requirement in the RMP regulations would have a noticeable impact on the ability of farms to meet the numeric baseline indicated that one of the five farms was able to meet the numerical baseline only when buffers were added (see details in Appendix C). At the field level, there was only one instance where the nitrogen baseline was not met in the "no buffer" scenario, and adding the buffer effectively reduced the load to below baseline. The phosphorus baseline was not met under the "no buffer scenario" on 7 fields; adding a buffer to those 7 fields resulted in meeting the phosphorus baseline in one field.

Pennsylvania

A comparison of PA's approach to a performance based approach using the CBNTT revealed substantial differences in the number of eligible credits (Table 8). This evaluation confirms concerns expressed by the Environmental Protection Agency (EPA) and others that PA DEP's "threshold" requirements for participating in trading were too low and did not equate to agriculture's share of the Chesapeake Bay TMDL load reduction requirements.

Table 8. DEP versus CBNTT credit calculation. "CC" and "CNT" refer to cover crops and conservation-no till. NA refers to farms that would not have met the baseline (i.e., threshold for trading) using the CBNTT.

Project	Name	Credit generating BMP	Acres	DEP Certified N Credits	CBNTT Credits
1	Client 015-2014	CC & CNT	52.90	1,071	NA
2	Client 009-2014	Precision Grazing,Off Stream Watering,Rotational Grazing	169.90	1,339	366.44
3	Client 033 thru 40-2014	CC & CNT	470.50	22,807	NA
4	Client 028 thru 32-2014	CC & CNT	512.00	16,051	NA
5	Client 016 thru 27-2014	CC & CNT	507.30	18,697	NA
6	Client 051-2014	CC & CNT	30.70	549	92.25
7	Client 053-2014	CC & CNT	25.50	78	101.15
8	Client 054 thru 55-2014	CC & CNT;Riparian Buffer, Off-Stream Watering, Stream Fencing	85.40	876	526.88
9	Client 056-2014	CC & CNT	26.00	513	NA
10	Client 057-2014	CC & CNT	35.00	491	NA
11	Client 058-2014	CC & CNT	28.50	851	532.29
12	Client 059-2014	CC & CNT	75.00	1,581	NA

Less than half of the projects were eligible to generate credits because even with the reductions associated with the specified practices (cover crops (CC) and conservation no-till (CNT) in most cases) the farms' nitrogen loads were above the numeric baseline nitrogen load. Farms not eligible to generate credits for this reason are indicated by "NA" in the table. In addition, of the five farms that were able to generate credits, meaning they were able to achieve reductions beyond the baseline nitrogen load, the credits calculated by the CBNTT are (with one exception) substantially lower than what was calculated with the DEP method. None of the farms analyzed for this comparison met the numeric phosphorus baseline.

3) *Requirements analysis of additional CBNTT enhancements/ requirements as a result of state policy changes and/or user input.*

Based on user feedback at training sessions and demonstrations to state agencies, WRI and TIAER created a list of modifications to make to the suite of CBNTT tools. Modifications and enhancements included:

CBNTT

- updating soils information for Pennsylvania
- adding shape-file import functionality
- adding more crop and tillage options
- improving the summary page to include more detailed information
- providing more transparency and data to better enter appropriate values
- increasing user friendliness through the addition of copying features
- adjusting values for poultry litter nutrient content
- revising baseline assessment methods and/or questions to better match current state policies

Registry and Marketplace

- adding additional data sorting functions
- adding additional data entry fields to better facilitate verification processes and buyer/seller communication
- adding additional capabilities for document uploads

The states have also reached a preliminary agreement to make most, if not all, registry data and documents publically accessible. The registry and marketplace components also underwent review and testing by the states and will continue to be enhanced and modified beyond this project period.

Currently, EPA is reviewing the recalibration documentation and results. After a number of discussions, EPA took the position that they do not need to vet CBNTT and provide their approval for its use as a trading tool. A new version of CBNTT reflecting this recalibration, the modifications listed above, and improved weather and slope files was released this fall.

Due to remaining uncertainty around policy changes to Pennsylvania's program, and proposed enhancements to Virginia's program, the suite of CBNTT tools will continue to have flexibility to accommodate policy changes (e.g., baselines) in the future as programs continue to evolve.

4) *Summary of farmers' perceptions of nutrient trading and willingness to participate based on informal observations and queries of farm assessment trainees*

Virginia

The Thomas Jefferson SWCD provided the following (unedited) observations regarding farmers' participation in the pilot program and their perceptions about nutrient trading:

<u>Farmer Willingness to Participate</u>

We selected farmers with whom:

- We had an established relationship of trust

- We knew had done a great deal of conservation work already

These points meant we were working with folks who were already at ease with government programs and informed to some degree about computer modeling. These folks were “early adopters” you might say.

For the most part, these were producers on whose farms we had been and knew well.

The farmers were willing to participate based on personal relationships and the feeling that they were already doing their part (had nothing to hide).

I think we would have heard a very different story had we surveyed a broad range of farmers, not just our regular participants.

The producers who did participate were very interested in the results of the NTT assessment to see how their farms rated.

Concerns we heard were:

- Skepticism about the accuracy of NTT (really, skepticism about computer models in general)
- Fear that standard farming practices would be vilified in NTT
- Spreading manure would make a farmer not meet environmentally sound standards
- Paranoia about what would be done with the data and the system not really being anonymous.
- One grazier who I thought for certain would participate as he is really progressive in his practices and even led an on-farm demonstration for the Soil & Water Conservation Society (SWCS) thought that even though the data collected was anonymous, if Bay TMDL reductions were not met, and he was on record (even anonymously) with having no stream fencing etc., then he would be the first person EPA/DEQ would target. I was amazed he thought this, but he was adamant.

<u>Farmer Perception on Nutrient Trading</u>

This opinion may reflect personal bias, but I think here in Virginia the concept of nutrient trading is still rather abstract.

I know in Maryland a big draw to participate was to get a real market value feel for what credits might be generated on a producer’s farm, but here, I’m not certain farmers really think there is a market.

I think if Nutrient Trading were to be more of a real option (more concrete-there is money available if you do_____), folks would be interested in participating in the NTT to see what income they could generate.

We’d have to do outreach/education on nutrient trading in a group setting before trying to target individuals to participate.

I think this is the tack Bob Ensor took in MD, and it sounds like it really worked well for him, but he is so good at what he does and how he talks to people, he’d probably have folks signing up to participate in NTT even if they had to pay to be included!

<u>Farmer Perception of Practice-based Baselines versus Quantitative Measures</u>

I would posit that the response we got from farmers came from the delivery and bias of staff (ME), but I think most farmers feel pretty strongly that a blanket rule for all farms and situations does not work.

They would rather see the science or proof to be guided toward what is best for their property.

For example, fencing at 35-ft. I don't think most farmers feel this standard is necessary/best in all situations. If a field is extremely denuded, you may need a larger buffer to capture sediment and take up nutrients. If a very small tributary with highly vegetated banks flows through a field with low stocking rate, then perhaps no fence or a narrower buffer can function as a filter.

Or, the presence of a nutrient management plan. What good does having a plan written do if it is not followed?

That being said, I think the practice-based baseline (rather than a quantitative approach) is more lax, and the desire for less strict regulations and requirements for farmers from the government probably trumps all.

For their own knowledge, scientific evidence and accuracy.

For government programs/regulations, the least strict guidelines possible.

Pennsylvania

Peter Hughes of Red Barn, LLC provided the following observations about PA farmers:

- Farmers, for the most part, don't have a concept of how nutrient credit trading really works. Most still believe that selling nutrient credits "just allows waste treatment plants to pollute more." There is not a strong connection on how this market would benefit their bottom line.
- Many farmers were interested in how no-till and cover crops compared to nutrient reductions from other Ag related BMP's.
- About 15-20 percent of the farmers were very suspect of the "black box" referring to models being applied to what was actually happening on the ground.
- Farmers with riparian buffers were surprised that they did not show the amount of nutrient reductions as they thought.
- 50 – 60 percent of the participants wanted to make sure that their information was not going to be shared with the regulatory community.
- That same percentage of farmers thought that someday this is how their farm will be regulated in the future.
- Farmers were more comfortable when they found out others were participating and that their information would be kept confidential.
- Farmers wanted to know how they "compared" to other farms within the county.

Conclusions and Recommendations:

Many farms are already at the trading baseline using the CBNTT. Of the 276 farms included in our analysis, 184 met the numeric baseline for nitrogen and 65 met the phosphorus baseline. Compared to VA, far fewer farms in PA met the phosphorus baseline, but we suspect part of the reason was the differences in farming types and concentrations of soil phosphorus. Most of the farms in PA either had livestock or used manure as fertilizer and hence had high soil phosphorus concentrations. In VA, many of the farms were growing grain, using primarily inorganic fertilizer. PA DEP also believes that the model is not accurately characterizing phosphorus fate and transport and hopes to continue working with WRI to refine the tool. Currently, however, there has been no funding identified for WRI to continue to work with DEP on refining the tool for use in PA.

Standardization of data collection and input into the CBNTT is necessary to achieve replicable results. Initially, we envisioned project partners would use the standardized data collection forms that were developed by HSCD as part of QA/QC in Maryland's trading program. However, for knowledgeable field staff, these data sheets were cumbersome and time consuming, so in the end, they were not widely used. The results of our "spot

check" in VA and verification in PA highlighted the areas where discrepancies in farm load estimates were most likely to occur. For the most part, the field inventory of practices seemed fairly consistent and replicable. Differences in data entry seemed to be what accounted for differences in modeled load output (see Appendix A). We recommend that trading programs that use the CBNTT provide guidance for how to standardize data inputs, particularly of these key parameters.

One of the input challenges was for rotational grazing systems. We observed that the CBNTT does not do a good job of simulating rotational grazing systems – data input is not efficient and outputs do not seem accurate. CBF recently received a CIG focused on promoting rotational grazing and quantifying the environmental and economic benefits; one aspect of this grant is to improve the way the CBNTT handles grazing systems.

In VA, the proportion of farms achieving the practice-based baseline was similar to those achieving the numeric, performance-based baseline. Roughly half of the VA farms were compliant with the practice-based baseline and about the same proportion achieved both the nitrogen and phosphorus numeric baseline. It was not, however, the same farms, i.e., there were instances of compliance with the practiced based baseline and not numeric, and vice versa. VA's new trading regulations do allow a "performance based" approach to be used to estimate baseline. Recently, WRI and TIAER were invited to submit a proposal for enhancing CBNTT's use in VA (including expanding the tool to work statewide) as well as to make a number of improvements that have been requested from states, and other users, across the watershed. WRI is currently awaiting a final decision and award amount from VA DEQ.

In PA, there is a big difference in the number of credits estimated using PA's current trading baseline and calculation tool and the amount using the CBNTT and a numeric baseline. We looked at 12 farms that had generated credits under PA's current system. Of those, seven did not meet the numeric baseline for phosphorus or nitrogen and for those that did, the number of credits was substantially reduced. In April 2014, the EPA began objecting to National Pollutant Discharge Elimination System permits issued by PA DEP because of concerns about their nutrient trading program. Among other issues, EPA was concerned that the "threshold" requirements for participating in trading were too low and did not equate to agriculture's share of the Chesapeake Bay TMDL load reduction requirements. As a result of EPA's objections, PA DEP is in the process of revising their nutrient trading program regulations. Because of this grant, PA DEP had indicated they would use a performance based approach in their trading program. According to a PA DEP document entitled "Phase 2 Watershed Implementation Plan Nutrient Trading Supplement" revised June 18, 2015, "DEP is in the process of refining the WRI Multi-State Trading Tool being developed in partnership with the Chesapeake Bay Foundation and the Chesapeake Bay Program to calculate Credits from agricultural nonpoint sources using a performance based approach. When this tool is developed and calibrated to Phase 6 of the Chesapeake Bay Watershed Model, eligibility to generate Credits will be determined by compliance with the following regulations, as applicable, and use of this new performance-based tool to establishing the baseline nutrient loading."[10] More recently, however, PA DEP has also indicated their intent to explore other potential tools for use in their trading program. In the meantime, nonpoint source credits will be subject to a 3:1 trading ratio per DEP's agreement with EPA.

Preliminary results suggests that VA's RMP may not be equivalent to the trading baseline. We chose five farms with pastures and stream fencing and ran scenarios comparing loads with a fence only (10' grass exclusion area) and a fence with buffer (35' exclusion area with forested vegetation). See Appendix C. This small sample showed that in some instances a buffer was necessary for the farm to achieve the trading baseline. Based on these results, we encourage VA to include this provision in their RMP.

[10] Retrieved from: http://files.dep.state.pa.us/Water/BPNPSM/NutrientTrading/NutrientTradingSupplementToPhase2WIP.pdf

Knowledge among agricultural producers of trading programs is still low and skepticism is still high. There are some consistent observations from both Red Barn Consulting and the Thomas Jefferson Soil and Water Conservation District regarding the agricultural community and nutrient trading. For one, farmers for the most part still don't have a concept of how nutrient credit trading really works, nor how a trading market would benefit their bottom line. Many producers are skeptical that models won't accurately portray what is happening on the ground and are concerned that somehow their information would be used against them in the future. On the positive side, there was interest in the quantification of the benefits of conservation as it related to finding out how they "rated" and "compared" to other producers.

Worksheet ID		Acres	Nitro Baseline
1173	FARM	147.46	15.14
	Field A	10.05	11.22
	Field B	13.53	11.22
	Field C	20.22	11.22
	Field D	8.7	11.22
1761	FARM	58.1	5.51
	Field A	0.32	5.51
	Field B	12.08	5.51
	Field C	16.3	5.51
	Field D	8.89	5.51
	Field E	8.16	5.51
	Field F	12.35	5.51
1772	FARM	31.81	5.51
	Field A	31.81	5.51
378	FARM	121.68	16.80
	Field A	3.04	11.22
	Field B	8.16	11.22
163	FARM	84.95	25.86
	Field A	7.38	18.03
	Field B	10.66	18.03
	Field C	28.05	18.03

Notes

*Assumes streambank has a 10' wide exclusion area in grass vegetation

†Assumes streambank has a 35' wide exclusion area in forest vegetation

Overview of Results

At the farm level, 1 of the 5 was able to meet baseline only when buffers were
was only 1 instance where the nitrogen baseline was not met in the "no buffer
phosphorus baseline was not met under the "no buffer scenario" on 7 fields; a
For sediment, baseline was not met at the field level in 4 instances; adding a b

did not meet baseline with fencing alone or with buf

did not meet baseline with fencing alone but did wit

gen Load (lbs/ac)		Phosphorus Load (lbs/ac)			Sediment Load (lbs/ac)			
No Buffer*	Buffer†	Baseline	No Buffer*	Buffer†	Baseline	No Buffer*	Buffer†	Comments
3.59	3.06	1.56	0.47	0.39	427.99	114.75	93.98	did not hav
8.78	6.27	1.01	1.29	0.82	326.69	210.64	108.4	assumed 2
10.25	8.9	1.01	1.17	1.06	326.69	296.09	257.2	assumed 8
11.78	10.86	1.01	0.99	0.93	326.69	325.54	300.7	assumed 7
7.39	5.56	1.01	2.29	1.87	326.69	484.23	368.64	assumed 1
2.48	2.16	0.89	0.66	0.53	1193.20	662.66	512.60	farm is 100
2.78	2.38	0.89	0.39	0.18	1,193.28	531.72	185.52	
1.57	1.38	0.89	0.22	0.19	1,193.28	318.38	267.04	
0.84	0.78	0.89	0.61	0.5	1,193.28	391.22	298.05	
3.33	2.54	0.89	0.48	0.39	1,193.28	634.19	490.59	
3.93	2.92	0.89	1.46	0.92	1,193.28	1,414.70	780.33	
3.95	3.94	0.89	0.77	0.77	1,193.28	885.01	883.65	
3.66	3.02	0.89	0.84	0.73	1,193.28	1,273.30	1,066.45	farm has o
3.66	3.02	0.89	0.84	0.73	1,193.28	1,273.30	1,066.45	
0.44	0.27	1.78	0.14	0.11	467.73	15.08	9.67	did not hav
5.04	2.94	1.01	1.7	1.17	326.69	135.95	75.09	assumed 5
4.65	2.87	1.01	1.48	1.14	326.69	174.11	116.18	assumed 1
2.90	2.72	1.81	0.38	0.35	760.65	99.72	78.08	has 4 other
11.17	10.09	0.97	1.57	1.42	602.11	348.91	302.43	
7.74	7.5	0.97	0.49	0.48	602.11	389.27	280.78	
2.9	2.72	0.97	0.56	0.5	602.11	62.23	50.14	

added (although this farm was only made up of 1 pasture field). At the field level, there
" scenario, and adding the buffer effectively reduced the load to below baseline. The
dding a buffer to those 7 fields reesulted in meeting the phosphorus baseline in 1 field.
uffer resulted in the sediment baseline being met for 3 of those 4 fields.

fers
h buffers

ve pasture fields adjacent to streams; also has 7 other non-pasture fields
250 linear ft of streambank
00 linear ft of streambank
00 linear ft of streambank
000 linear ft of streambank
0% pasture, all fields have adjacent streams

nly 1 field which is pasture, adjacent to stream

ve pasture fields adjacent to streams; also has 5 other non-pasture fields
00 linear ft of streambank
000 linear ft of streambank
non-pasture fields

Red Barn Client #	142-2014		006-2014 and 010-2014	
	CBF data	RB data	CBF data	RB data - total
N Baseline	2,978.64	2,871.39	9,912.17	9,767.18
Current N fields	3,626.40	3,839.50	22,102.55	17,940.94
Current N Animal HQ	821.22	821.22	5,242.47	5,466.49
P Baseline	99.82	96.36	329.96	325.29
Current P fields	394.74	453.47	3,366.18	2,370.34
Current P Animal HQ	113.42	113.42	452.4	451.12
Sed Baseline	91,272.64	87,908.20	304,977.82	300,424.56
Current Sed fields	55,964.24	61,709.93	273,827.10	289,670.22
Current Sed Animal HQ	7,408.90	7,408.90	64,086.99	64,086.99

Notes		
	I added adjacent woodland to fields as a buffer (per Dana York's instructions), but Red Barn didn't enter it because it isn't a certified BMP on their operation and could impact the legitimacy of the tradable credits from this farm. I'm not sure which is appropriate for future use.	The Nutrient Management Plan had detailed information about crop rotations for 3 years, while the Conservation Plan had general information on a 5-year rotation. We entered slightly different data for years 4 and 5, and also had small variations in planting and harvesting dates. Farm will likely make adjustments, so it's difficult to determine which is more accurate. RB did separate calculations for nearby farms owned by same person, but I combined them.

001-2013		004-2014		146-2014	
CBF data	RB data	CBF data	RB data	CBF data	RB data
4,012.76	4,003.75	6,664.36	6,664.36	1,893.21	1,879.40
4,323.64	2,102.85	6,695.15	6,277.05	3,255.08	2,065.11
1,122.24	2,593.64	711.54	711.54	89.47	89.47
131.86	131.57	216.74	216.74	111.24	110.43
1,506.14	738.31	566.98	2,001.74	279.05	237.78
72.64	276.84	58.72	58.72	7.82	7.82
124,433.50	124,150.78	207,921.25	207,921.25	31,122.80	30,895.79
40,151.69	18,558.19	147,166.27	96,058.94	187,882.40	61,268.87
12,965.57	12,965.57	7,408.90	7,408.90	11,113.35	11,113.35

Differences in streambank fencing measurements could have been eliminated by being able to import maps from existing plans. Significantly higher loads when cover crops entered as commodity cover crops harvested as silage.

The Nutrient Management Plan had detailed information about crop rotations for 3 years, which I used. The Conservation Plan had general plans for a 9-year rotation, which Red Barn used on all fields in the same order. The longer rotation probably provides a more comprehensive assessment, but in reality, farmer will adjust crop rotations based on weather and other factors, so it may vary slightly.

NTT doesn't estimate impacts of rotational grazing well. I tried estimating an hourly rate per day based on the field size for 365 days per year, while Red Barn aggregated some of the pastures and had cows grazing in each for longer periods. Neither accurately portrays the actual impacts of the system.

126-2014		012-2014 and 013-2014		009-2014	
CBF data	RB data	CBF data	RB data	CBF data	RB data
7,678.97	7,507.73	4,364.50	4,313.56	2,213.58	2,210.13
11,973.32	10,235.21	2,401.57	2,744.54	8,427.67	1,598.26
12,342.18	13,651.20	3,792.76	3,792.76	300.60	334.54
247.42	241.90	140.63	138.99	130.06	129.86
3,187.90	2,692.32	473.65	1,068.32	1,342.88	330.02
176.38	194.99	185.99	185.99	49.59	82.69
240,882.55	235,510.76	136,910.35	135,312.66	36,389.38	36,332.63
128,373.15	104,977.29	117,991.01	98,418.12	145,305.19	23,498.91
44,453.40	44,453.40	10,002.02	10,002.02	6,893.70	27,866.73

The Nutrient Management Plan had detailed information about crop rotations for 3 years, while the Conservation Plan had general information on a 5-year rotation. We entered slightly different data for years 4 and 5. Farm will likely make adjustments, so it's difficult to determine which is more accurate. I added adjacent woodland to fields as a buffer (per Dana York's instructions), but Red Barn didn't enter it because it isn't a certified BMP on their operation and could impact the legitimacy of the tradable credits from this farm. I'm not sure which is appropriate for future use.

I added adjacent woodland to fields as a buffer (per Dana York's instructions), but Red Barn didn't enter it because it isn't a certified BMP on their operation and could impact the legitimacy of the tradable credits from this farm. I'm not sure which is appropriate for future use. We may have entered different dates for various field activities. RB did separate calculations for nearby farms owned by same person, but I combined them.

NTT doesn't estimate impacts of rotational grazing well. I tried estimating an hourly rate per day based on the field size for 365 days per year, while Red Barn aggregated some of the pastures and had cows grazing in each for longer periods. Neither accurately portrays the actual impacts of the system. Cattle are fed supplemental hay in the winter, but the tool assumes that they are grazing in the winter. This farm has very lush pastures, which would be impossible with my estimated losses.

014-2014		121-2014		122-2014	
CBF data	RB data	CBF data	RB data	CBF data	RB data
2,302.79	2,076.85	9,396.58	10,130.48	11,082.78	11,848.20
1,129.61	1,201.93	5,949.02	5,060.42	7,791.21	16,522.40
5,251.18	5,251.18	1,813.75	1,388.52	0.04	0.00
74.20	66.92	473.58	472.95	515.81	549.61
571.92	952.38	3,221.86	1,415.42	2,289.49	6,128.23
537.31	537.31	165.78	126.59	0.00	0.00
72,236.49	65,140.00	258,438.06	275,003.59	301,595.67	323,266.69
36,643.68	26,460.00	81,478.17	80,497.48	118,051.60	120,523.04
6,001.21	6,000.00	6,478.05	9,207.47	4,334.25	4,337.15

I added adjacent woodland to fields as a buffer (per Dana York's instructions), but Red Barn didn't enter it because it isn't a certified BMP on their operation and could impact the legitimacy of the tradable credits from this farm. I'm not sure which is appropriate for future use.

I aggregated 1-16 and PP1-2. I called FM1 and FM2 "continuous hay" with a lower baseline than RB's "crop." I entered data from 2012-2014 NM plan, but RB also had 2015-17 update, with corn in later years, so included corn in rotation in later years.

RB mapped some fields where there was no production information, and I excluded those fields, thus had a slightly lower overall baseline. NM plan had 20 beef cattle and 80 heifers spread across several pastures. I think RB entered them into each pasture throughout year but I split.

123-2014		113-2014		110-2014	
CBF data	RB data	CBF data	RB data	CBF data	RB data
126.42	126.42	5,472.03	5,472.03	6,270.82	6,437.92
545.00	509.88	2,442.40	2,099.00	640.01	482.05
2,122.07	2,122.07	12,424.40	12,439.40	0.00	0.00
20.11	20.11	243.94	243.94	276.95	290.26
342.27	308.42	1,766.00	458.02	184.82	222.19
99.54	99.45	1,104.62	1,103.22	0.00	0.00
7,025.07	7,025.07	153,878.87	153,880.00	177,543.86	179,528.71
10,951.03	10,307.73	24,906.76	30,436.19	8,173.68	8,138.05
8,081.24	8,071.16	35,858.89	35,990.78	0.00	0.00

I had entered fields as "continuous hay" and RB originally had entered fields as crops with higher loads, and then changed it to "continuous hay." Results closer now.

I entered more cover crops as commodity cover crops that were harvested, RB entered more as unharvested covers, which are handled very differently by Bay model and NTT.

I entered all cover crops as commodity cover crops that were harvested, but believe that RB entered as unharvested covers. RB mapped some fields where there was no production, and they were added to baseline but without loads. I didn't include them.

070-2014		171-2015		115-2014	
CBF data	RB data	CBF data	RB data	CBF data	RB data
1,378.37	1,378.37	25,291.67	24,100.86	9,556.03	9,922.77
1,140.11	1,024.52	28,601.37	22,382.45	8,373.09	6,809.42
28,167.37	28,368.46	4,214.34	4,441.83	715.39	740.29
48.55	48.55	1142.61	1089.79	422.04	438.24
696.18	188.40	8,820.58	8,738.97	12,571.69	5,319.30
1,837.78	2,036.68	374.69	396.25	63.60	67.66
45,385.86	45,385.86	709,311.76	675,441.27	270,556.95	280,940.49
19,223.88	49,302.20	297,206.39	284,067.84	60,977.47	51,728.76
188,926.95	190,433.18	16,280.83	27,795.10	8,525.01	8,730.86

I put the 2 groups of heifers and 4 groups of calves together because I couldn't see any difference in their weight or any reason to keep them separate. The NM plan has sorghum/sudangrass, but the closest option I could find is sorghum hay. In D5, I used Orchard Grass instead of bromegrass, because there was no bromegrass in the drop down menu.

I think RB let NTT calculate field acreages, but I entered acreages from NM plans. I was initially having serious problems with mapping, but glitches were resolved. Farm has 70 fields and 9-year rotations. I grouped some of the adjacent fields that had the same soil phosphorus and crop management.

I entered rotations of corn and soybeans, with one manure application each, plus starter fertilizer for corn.

118-2014		124-2014		175-2015	
CBF data	RB data	CBF data	RB data	CBF data	RB data
15,864.66	15,859.36	851.88	4,530.07	4,870.99	4,926.78
3,664.14	22,144.52	3,817.97	4,452.16	3,309.57	8,252.16
11,576.84	13,019.54	5,558.92	25,606.56	0.00	0.00
780.89	779.74	135.53	200.07	215.13	217.59
13,384.94	6,948.94	5,086.77	3,573.74	3,571.80	3,803.55
336.96	395.38	240.31	594.47	0.00	0.00
413,689.05	412,323.85	47,338.16	128,258.62	137,910.92	139,940.39
45,047.49	233,982.30	121,861.95	44,582.98	53,541.23	45,094.09
15,773.15	21,346.28	46,806.76	59,932.93	0.00	0.00

I entered field 5 as continuous hay, but RB entered it as a regular crop field (with higher baseline). Contour farming is practiced, so I entered as strips, but NTT probably doesn't recognize that they're on contour. Forests are fenced, so I included the wooded areas along streams as riparian forested buffers.

I entered fields as "continuous hay," but RB did as "crops." All fields have alfalfa/brome grass mix, but that wasn't an option in NTT, so I used alfalfa on half of the fields and orchard grass on the other half.

I entered orchard grass for 3 years (6 manure applications and 11 harvests) on B1, 3, 4; wheat speltz and orchard grass on B2, 5, 6, 13; and continuous corn in B7-12 (beef and hog manure in spring).

Client #	County	Operation Type: Crop/Past./Anima	Fertilizer Applied: Manure/Commer	Manure Type: Animal/Manure T	No-Till	CoverCr	Contour	Buffers	ConsPlan	Crop Rot	eHarvest	NMP	MMP	WtrWay	Terrace	Str Fence	Strm Xir	Past.Fer	PG	BY Runoff	HUAP	Wtr Ctrl St	WSF	Mort Com
001-2013	Lancaster	Crop/Past./Anima	manure	Dairy liq/sol	Yes	Yes			Yes	Yes		Yes				Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
002-2014	Lancaster	Crop/Past./Anima	both	Dairy liq/sol	Yes	Yes		Yes	Yes	Yes	Yes	Yes				Yes		Yes		Yes	Yes	Yes	Yes	
003-2014	Lancaster	crop/anim conf	both	swine/steer			Yes		Yes	Yes		Yes		Yes									Yes	
004-2014	Lancaster	Crop/Past./Anima	manure	Dairy liq/sol	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
005-2014	Lancaser	Crop/Past./Anima	manure	swine	Yes	Yes			Yes	Yes	Yes	Yes		Yes		Yes			Yes			Yes		
006-2014	Lancaster	Crop/Past./Anima	manure	Dairy liq/sol	Yes	Yes	Yes		Yes	Yes		Yes		Yes					Yes	Yes	Yes			
007-2014	Lancaster	Crop/Past./Anima	both	Dairy liq/sol	Yes	Yes	Yes		Yes	Yes		Yes		Yes	Yes						Yes			
008-2014	Lancaster	Crop/Past./Anima	manure	heifer/swine		Yes	Yes		Yes	Yes	Yes	Yes								Yes	Yes		Yes	
009-2014	Lancaster	Pasture/Anim Cor	both	dairy/compost	Yes				Yes			Yes				Yes	Yes	Yes	Yes	Yes	Yes		Yes	
010-2014	Lancaster	Crop/Past./Anima	manure	Dairy liq/sol		Yes	Yes		Yes	Yes		Yes		Yes					Yes	Yes	Yes			
011-2014	Lancaster	crop/anim conf	manure	Poultry/Steer		Yes			Yes	Yes		Yes		Yes									Yes	
012-2014	Lancaster	Crop	manure	broiler(poultry)				Yes	Yes	Yes		Yes												
013-2014	Lancaster	crop/anim conf	manure	broiler(poultry)				Yes	No	Yes		Yes								Yes	Yes			
014-2014	Lancaster	crop/anim conf	both	broiler(poultry)	Yes				Yes	Yes		Yes								Yes	Yes			
015-2014	Lancaster	Crop/Past./Anima	both	Dairy liq/sol			Yes	Yes	Yes	Yes		Yes		Yes		Yes	Yes			Yes	Yes			
016-2014	Lancaster	crop/anim conf	both	Dairy liq/sol		Yes			Yes	Yes	Yes	Yes		Yes		Yes			Yes	Yes	Yes		Yes	
017-2014	Lancaster	crop/anim conf	both	Dairy liq/sol	Yes		Yes		Yes	Yes		Yes												
018-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes			Yes	Yes	Yes	Yes		Yes										
019-2014	Lancaster	Crop	both	Dairy liquid		Yes			Yes	Yes	Yes	Yes				Yes			Yes	Yes	Yes			
020-2014	Lancaster	Crop	both	Dairy liquid		Yes			Yes	Yes	Yes	Yes		Yes				Yes		Yes	Yes			
021-2014	Lancaster	Crop	both	Dairy liquid		Yes			Yes	Yes	Yes	Yes								Yes				
022-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes										
023-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes			Yes	Yes	Yes	Yes		Yes										
024-2014	Lancaster	Crop	both	heifer/swine		Yes			Yes	Yes	Yes	Yes												
025-2014	Lancaster	crop/anim conf	both	heifer/swine	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes									Yes	
026-2014	Lancaster	Crop	both	dairy/swine	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes										
027-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes			Yes	Yes	Yes	Yes									Yes			
028-2014	Lancaster	Crop/Past./Anima	both	Dairy liquid	Yes	Yes	Yes		Yes	Yes		Yes		Yes	Yes	Yes				Yes	Yes			
029-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes	Yes		Yes	Yes		Yes		Yes										
030-2014	Lancaster	Crop	both	Dairy Liquid	Yes	Yes			Yes	Yes		Yes		Yes										
031-2014	Lancaster	Crop/Past./Anima	both	Dairy Liquid	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes					Yes	Yes			
032-2014	Lancaster	Crop	both	Dairy Liquid	Yes	Yes		Yes	Yes	Yes		Yes		Yes										
033-2014	Lancaster	crop/anim conf	both	Dairy liquid		Yes	Yes		Yes	Yes		Yes		Yes	Yes	Yes		Yes			Yes		Yes	
034-2014	Lancaster	Crop	both	Dairy liq/sol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes									
035-2014	Lancaster	Crop	both	Dairy Liquid	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes												
036-2014	Lancaster	Crop	manure	dairy liq/sol	Yes	Yes			Yes	Yes	Yes	Yes									Yes			
037-2014	Lancaster	Crop	manure	dairy liq/sol	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes									
038-2014	Lancaster	Crop	both	Dairy liq/sol		Yes	Yes		Yes	Yes		Yes		Yes							Yes		Yes	
039-2014	Lancaster	Crop	both	Dairy liq/sol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes									
040-2014	Lancaster	Crop	both	Dairy Liq/sol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes							Yes		
041-2014	Lancaster	Crop	manure	Dairy Liq/sol	Yes			Yes	Yes	Yes		Yes												
042-2014	Lancaster	Crop	both	Dairy Solid	Yes				Yes	Yes														
043-2014	Lancaster	Crop	both	Dairy Liquid	Yes	Yes			Yes	Yes		Yes		Yes										
044-2014	Lancaster	Crop	both	Dairy Solid	Yes				Yes	Yes		Yes												
045-2014	Lancaster	crop/anim conf	both	Dairy Liq/Sol		Yes	Yes		Yes	Yes	Yes	Yes			Yes						Yes			
046-2014	Lancaster	Crop/Past./Anima	both	Dairy Liquid		Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	
047-2014	Lancaster	Crop	both	Dairy liquid	Yes	Yes	Yes		Yes	Yes		Yes		Yes										
048-2014	Chester	Crop/Past./Anima	manure	Duck liquid	Yes	Yes			Yes	Yes		Yes		Yes				Yes		Yes		Yes	Yes	
049-2014	Chester	Crop	manure	Duck liquid	Yes				Yes	Yes		Yes		Yes										
050-2014	Chester	Crop	manure	Duck liquid	Yes				Yes	Yes		Yes												
051-2014	Lancaster	Crop	both	Swine and beef	Yes	Yes	Yes		Yes	Yes		Yes		Yes										
052-2014	Lancaster	Crop/Past./Anima	both	beef																				
053-2014	Lancaster	Crop/Past./Anima	both	Poultry/Steer	Yes	Yes			Yes	Yes		Yes				Yes			Yes		Yes			
054-2014	Lancaster	Crop/Past./Anima	both	heifer solid	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes							
055-2014	Lancaster	Crop	both	heifer solid	Yes	Yes	Yes		Yes	Yes		Yes			Yes									
056-2014	Lancaster	Crop	both	swine	Yes	Yes	Yes		Yes	Yes		Yes		Yes	Yes									
057-2014	Lancaster	Crop/Past./Anima	both	Dairy liq/sol	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes			Yes		Yes	Yes		Yes	
058-2014	Lancaster	Crop/Past./Anima	both	Dairy liq/sol	Yes	Yes			Yes	Yes		Yes		Yes					Yes	Yes	Yes		Yes	
059-2014	Lancaster	Crop/Past./Anima	both	swine/ dairy sol		Yes			Yes	Yes		Yes		Yes	Yes					Yes	Yes		Yes	
060-2014	Franklin	Crop	both	Dairy Liq./compos	Yes	Yes		Yes	Yes	Yes	Yes	Yes												
061-2014	Franklin	Crop/Past./Anima	both	Dairy Liq./compos	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes									Yes	
062-2014	Franklin	Crop	manure	Dairy Liquid	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes										
063-2014	Franklin	Crop	both	Dairy Liquid	Yes	Yes			Yes	Yes		Yes												
064-2014	Franklin	Crop	both	Dairy Liq./compos	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes										
065-2014	Franklin	Crop	both	Dairy Liquid	Yes	Yes	Yes	Yes	Yes	Yes		Yes												
066-2014	Franklin	Crop	both	Dairy liquid	Yes	Yes		Yes	Yes	Yes	Yes	Yes												
067-2014	Franklin	Crop	manure	Dairy Liq./compos	Yes	Yes			Yes	Yes	Yes	Yes		Yes										
068-2014	Franklin	Crop	both	Dairy liquid	Yes	Yes		Yes	Yes	Yes		Yes												
069-2014	Franklin	Crop	both	Dairy Liquid	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes										
070-2014	Franklin	crop/anim conf	manure	Heifer liquid	Yes				Yes	Yes	Yes	Yes											Yes	
071-2014	Franklin	Crop	manure	Heifer liquid	Yes				Yes	Yes		Yes												
072-2014	Franklin	Crop	manure	Heifer liquid	Yes				Yes	Yes		Yes												
073-2014	Franklin	Crop	manure	Heifer Liquid	Yes				Yes	Yes		Yes												
074-2014	Lancaster	Crop/Past./Anima	both	swine/heifer			Yes		Yes	Yes		Yes		Yes	Yes									Yes
075-2014	Lancaster	Crop/Past./Anima	both	swine/heifer			Yes		Yes	Yes		Yes		Yes	Yes							Yes		Yes
076-2014	Lancaster	Crop	both	swine/heifer			Yes		Yes	Yes		Yes		Yes	Yes							Yes		Yes
077-2014	Lancaster	Crop	both	swine		Yes	Yes		Yes	Yes		Yes		Yes	Yes									
078-2014	Bradford	Pasture	manure	beef	Yes				Yes		Yes	Yes						Yes	Yes	Yes	Yes		Yes	
079-2014	Bradford	Crop	both	dairy solid					Yes			Yes												
080-2014	Bradford	Crop	both	dairy liquid		Yes			Yes			Yes												
081-2014	Bradford	Crop	both	dairy liquid			Yes		Yes			Yes												
082-2014	Bradford	Crop	both	dairy liquid		Yes			Yes			Yes												
083-2014	Bradford	Crop	both	Dairy Solid					Yes			Yes												
084-2014	Bradford	Crop	both	Dairy Solid					Yes			Yes												
085-2014	Bradford	Crop	commercial fert.						Yes			Yes												
086-2014	Bradford	Crop	commercial fert.						Yes			Yes												
087-2014	Bradford	Crop	commercial fert.						Yes			Yes												
088-2014	Bradford	Crop	both	Dairy Liq/sol					Yes			Yes												
089-2014	Bradford	Crop/Past./Anima	both	Dairy Liq/sol					Yes			Yes												
090-2014	Bradford	Crop	both	Dairy Liq/sol					Yes			Yes												
091-2014	Bradford	Crop	commercial fert.						Yes			Yes												
092-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
093-2014	Bradford	Crop/Past./Anima	both	Dairy Liq/Sol					Yes			Yes				Yes	Yes				Yes		Yes	
094-2014	Bradford	Crop	commercial fert.				Yes		Yes			Yes												
095-2014	Bradford	Crop	commercial fert.				Yes		Yes			Yes												
096-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
097-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
098-2014	Bradford	Crop	both	dairy liquid			Yes		Yes			Yes												
099-2014	Bradford	Crop	both	Dairy Liquid			Yes		Yes			Yes												
100-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
101-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
102-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
103-2014	Bradford	Crop	both	Dairy Liquid					Yes			Yes												
104-2014	Bradford	Crop	both	Dairy Solid					Yes			Yes												
105-2014	Bradford	Crop	both	Dairy Liquid			Yes		Yes			Yes												
106-2014	Bradford	Crop	both	Dairy Liquid			Yes		Yes			Yes												
107-2014	Bradford	Crop	both	Dairy Liq/Sol					Yes			Yes												
108-2014	Bradford	Crop	both	Dairy Liquid			Yes		Yes			Yes												
109-2014	Franklin	Crop	manure	Dairy Solid	Yes	Yes	Yes		Yes	Yes	Yes	Yes												
110-2014	Franklin	Crop/Past./Anima	manure	Dairy Liquid	Yes	Yes	Yes		Yes	Yes	Yes	Yes							Yes	Yes	Yes			
111-2014	Franklin	Crop	manure	Dairy Solid	Yes	Yes	Yes		Yes	Yes	Yes	Yes												
112-2014	Franklin	Crop	manure	Dairy Liquid	Yes	Yes	Yes		Yes	Yes	Yes	Yes												
113-2014	Franklin	Crop/Past./Anima	manure	Dairy Liq/Sol	Yes	Yes	Yes		Yes	Yes	Yes	Yes								Yes	Yes		Yes	Yes
114-2014	Franklin	Crop	manure	swine	Yes				Yes	Yes		Yes												
115-2014	Franklin	Crop/anim conf	manure	swine/heifer sol	Yes				Yes	Yes	Yes	Yes												
116-2014	Franklin	Crop	manure	swine/heifer liq	Yes				Yes	Yes	Yes	Yes												
117-2014	Franklin	Crop	manure	swine	Yes				Yes		Yes	Yes												
118-2014	Franklin	Crop/Past./Anima	manure	swine/heifer sol	Yes		Yes	Yes	Yes	Yes	Yes	Yes							Yes	Yes	Yes		Yes	Yes
119-2014	Franklin	Crop	both	Dairy Liquid				Yes	Yes	Yes	Yes	Yes												
120-2014	Franklin	Crop	both	swine				Yes	Yes	Yes	Yes	Yes												
121-2014	Franklin	Crop/Past./Anima	both	Dairy Liq/Sol		Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes		Yes	Yes	Yes	Yes	Yes	
122-2014	Franklin	Crop/Past./Anima	both	swine/heifer sol			Yes	Yes	Yes	Yes	Yes	Yes							Yes					
123-2014	Franklin	crop/anim conf	both	swine								Yes											Yes	Yes
124-2014	Franklin	crop/anim conf	both	swine					Yes	Yes	Yes	Yes									Yes			Yes
125-2014	Bedford	Crop/Past./Anima	both	ducks/beef solid			Yes		Yes	Yes		Yes				Yes							Yes	Yes
126-2014	Lancaster	crop/anim conf	both	swine	Yes		Yes		Yes	Yes		Yes		Yes	Yes								Yes	
127-2014	Bradford	Crop	both	Dairy Liq/sol	Yes	Yes	Yes	Yes	Yes	Yes		Yes						Yes						
128-2014	Bradford	Crop/Past./Anima	manure	Dairy Liq/sol	Yes	Yes	Yes		Yes	Yes		Yes						Yes			Yes		Yes	
129-2014	Perry	Crop/Past./Anima	manure	Dairy Liquid	Yes	Yes		Yes	Yes	Yes		Yes		Yes					Yes					Yes
130-2014	Perry	Crop	manure	Dairy Liquid	Yes	Yes		Yes	Yes	Yes		Yes		Yes										
131-2014	Perry	Crop/Past./ Anim	manure	Dairy Liquid	Yes	Yes		Yes	Yes	Yes		Yes		Yes							Yes		Yes	Yes
132-2014	Perry	Crop	manure	Dairy Liquid	Yes	Yes			Yes	Yes		Yes												
133-2014	Perry	Crop	manure	Dairy Liquid	Yes	Yes			Yes	Yes		Yes							Yes					
134-2014	Juniata	crop/anim conf	both	poultry (layer)					Yes			Yes		Yes										Yes
135-2014	Juniata	Crop	both	poultry (layer)	Yes		Yes	Yes	Yes	Yes		Yes												
136-2014	Juniata	Crop	both	poultry (layer)	Yes		Yes	Yes	Yes	Yes		Yes												
137-2014	Juniata	Crop	both	poultry (layer)	Yes		Yes	Yes	Yes	Yes		Yes												
138-2014	Juniata	Crop	both	poultry (layer)	Yes		Yes	Yes	Yes	Yes		Yes		Yes										
139-2014	Juniata	Crop	both	poultry (layer)	Yes		Yes	Yes	Yes	Yes		Yes												
140-2014	Juniata	Crop	manure	poultry (layer)	Yes		Yes		Yes	Yes		Yes		Yes										

Credit BMPS in Tool

Client #	CNT	CC	Buffer(Gra	PG	CP	FertSetb	NMP	Off-St Water	WtrCtlStruc	Str Fence	BY Runoff Ctrl	Mort Comp	WasteM	HUAP
001-2013	Yes			Yes	Yes		Yes			Yes	Yes	Yes	Yes	
002-2014	Yes	*			Yes		Yes			Yes	Yes		Yes	
003-2014	Yes	Yes	Yes, G		Yes	Yes	Yes						Yes	
004-2014	Yes	Yes	Yes, F	Yes	Yes		Yes				Yes	Yes	Yes	
005-2014	Yes	*		Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	
006-2014		*		Yes	Yes		Yes				Yes	Yes	Yes	
007-2014	Yes	Yes	Yes, F		Yes		Yes							
008-2014	Yes	Yes			Yes		Yes				Yes		Yes	
009-2014				Yes	Yes		Yes			Yes	Yes	Yes	Yes	
010-2014		*	Yes, F		Yes		Yes							
011-2014		*			Yes		Yes						Yes	
012-2014	Yes	*	Yes, B		Yes	Yes	Yes							
013-2014	Yes		Yes, G			Yes	Yes			Yes	Yes	Yes	Yes	
014-2014	Yes	*	Yes, F		Yes		Yes				Yes	Yes		Yes
015-2014	Yes	Yes	Yes, B		Yes	Yes	Yes							
016-2014	Yes	Yes	Yes, F		Yes	Yes	Yes							
017-2014	Yes	Yes			Yes	Yes	Yes							
018-2014	Yes	Yes			Yes	Yes	Yes							
019-2014		Yes			Yes	Yes	Yes							
020-2014		Yes			Yes	Yes	Yes							
021-2014		Yes			Yes	Yes	Yes							
022-2014	Yes	Yes	Yes, G		Yes	Yes	Yes							
023-2014	Yes	Yes			Yes	Yes	Yes							
024-2014	Yes	Yes			Yes									
025-2014	Yes	Yes			Yes	Yes	Yes						Yes	
026-2014	Yes	Yes			Yes	Yes	Yes							
027-2014	Yes	Yes			Yes	Yes	Yes							
028-2014	Yes	Yes			Yes		Yes			Yes	Yes	Yes	Yes	
029-2014	Yes	Yes			Yes		Yes							
030-2014	Yes	Yes			Yes		Yes							
031-2014	Yes	Yes	Yes, G		Yes	Yes	Yes				Yes			
032-2014	Yes	Yes	Yes, B		Yes	Yes	Yes							
033-2014	Yes	Yes	Yes, B		Yes	Yes	Yes			Yes	Yes		Yes	
034-2014	Yes	Yes	Yes, G		Yes	Yes	Yes							
035-2014	Yes	Yes	Yes, G		Yes	Yes	Yes							
036-2014	Yes	Yes			Yes									
037-2014	Yes	Yes			Yes	Yes	Yes							
038-2014	Yes	Yes			Yes	Yes	Yes							
039-2014	Yes	Yes	Yes, G		Yes	Yes	Yes							
040-2014	Yes	Yes	Yes, G		Yes	Yes	Yes		Yes					
041-2014	Yes	Yes	Yes, G		Yes									
042-2014	Yes	Yes			Yes									
043-2014	Yes	Yes			Yes									
044-2014	Yes	Yes			Yes									
045-2014	Yes	Yes			Yes	Yes	Yes				Yes		Yes	Yes
046-2014	Yes	Yes	Yes, G	Yes	Yes	Yes	Yes		Yes	Yes			Yes	
047-2014	Yes	Yes			Yes	Yes	Yes							
048-2014	Yes	*			Yes	Yes	Yes				Yes		Yes	
049-2014	Yes	*			Yes		Yes							
050-2014	Yes	*			Yes	Yes	Yes							
051-2014	Yes	Yes			Yes	Yes	Yes							
052-2014	Yes	Yes			Yes	Yes	Yes						Yes	
053-2014	Yes	Yes		Yes	Yes		Yes			Yes			Yes	
054-2014	Yes	Yes				Yes	Yes				Yes		Yes	
055-2014	Yes	Yes			Yes	Yes	Yes							
056-2014	Yes	Yes			Yes	Yes	Yes							
057-2014	Yes	Yes			Yes	Yes	Yes			Yes	Yes		Yes	
058-2014	Yes	Yes		Yes	Yes	Yes	Yes				Yes		Yes	
059-2014		Yes	Yes, G		Yes	Yes	Yes			Yes	Yes		Yes	
060-2014	Yes	Yes	Yes, G		Yes		Yes							
061-2014	Yes	Yes	Yes, G		Yes	Yes	Yes							
062-2014	Yes	*			Yes	Yes	Yes							
063-2014	Yes	*			Yes		Yes							
064-2014	Yes	*	Yes, G		Yes	Yes	Yes							
065-2014	Yes	*	Yes, B		Yes		Yes							
066-2014	Yes	*	Yes, B		Yes		Yes							
067-2014	Yes	*			Yes		Yes							
068-2014	Yes	*	Yes, F		Yes		Yes							
069-2014	Yes	*			Yes		Yes							
070-2014	Yes	*			Yes	Yes	Yes						Yes	
071-2014	Yes	*			Yes	Yes	Yes							
072-2014	Yes	*			Yes	Yes	Yes							
073-2014	Yes	*			Yes		Yes							
074-2014	Yes	*			Yes	Yes	Yes					Yes	Yes	
075-2014	Yes	*			Yes	Yes	Yes		Yes			Yes	Yes	
076-2014	Yes	*			Yes	Yes	Yes		Yes			Yes		
077-2014		*			Yes									
078-2014				Yes	Yes		Yes				Yes		Yes	
079-2014	Yes				Yes	Yes	Yes							
080-2014	Yes	Yes			Yes	Yes	Yes							
081-2014	Yes	Yes			Yes		Yes							
082-2014	Yes	Yes			Yes	Yes	Yes							
083-2014	Yes				Yes	Yes	Yes							
084-2014	Yes				Yes	Yes	Yes							
085-2014	Yes				Yes		Yes							
086-2014	Yes				Yes		Yes							
087-2014	Yes				Yes		Yes							
088-2014	Yes	Yes			Yes	Yes	Yes							
089-2014	Yes	Yes			Yes	Yes	Yes							
090-2014	Yes	Yes			Yes	Yes	Yes							
091-2014	Yes	Yes			Yes		Yes							
092-2014	Yes	Yes			Yes	Yes	Yes							
093-2014	Yes	Yes			Yes	Yes	Yes	Yes		Yes	Yes		Yes	
094-2014	Yes	Yes			Yes	Yes	Yes							
095-2014	Yes	Yes			Yes	Yes	Yes							
096-2014	Yes	Yes			Yes		Yes							
097-2014	Yes	Yes			Yes	Yes	Yes							
098-2014	Yes	Yes			Yes		Yes							
099-2014	Yes	Yes			Yes	Yes	Yes							
100-2014	Yes	Yes			Yes	Yes	Yes							
101-2014	Yes				Yes	Yes	Yes							
102-2014	Yes				Yes	Yes	Yes							
103-2014	Yes	Yes			Yes	Yes	Yes							
104-2014	Yes				Yes	Yes	Yes							
105-2014	Yes	Yes			Yes		Yes							
106-2014	Yes	Yes			Yes		Yes							
107-2014	Yes	Yes			Yes	Yes	Yes							
108-2014	Yes	Yes			Yes	Yes	Yes							
109-2014	Yes	*			Yes	Yes	Yes							
110-2014	Yes	Yes			Yes	Yes	Yes				Yes			
111-2014	Yes				Yes	Yes	Yes							
112-2014	Yes	Yes			Yes	Yes	Yes							
113-2014	Yes	Yes			Yes	Yes	Yes				Yes	Yes	Yes	
114-2014	Yes				Yes	Yes	Yes							
115-2014	Yes		Yes, G		Yes		Yes							
116-2014	Yes				Yes		Yes							
117-2014	Yes				Yes		Yes							
118-2014	Yes			Yes	Yes		Yes				Yes	Yes	Yes	
119-2014	Yes		Yes, B		Yes	Yes	Yes							
120-2014	Yes		Yes, F		Yes		Yes							
121-2014	Yes	Yes	Yes, G	Yes	Yes		Yes			Yes	Yes		Yes	
122-2014	Yes		Yes, G	Yes	Yes	Yes	Yes				Yes		Yes	
123-2014	Yes				Yes	Yes	Yes					Yes	Yes	
124-2014	Yes				Yes		Yes					Yes	Yes	
125-2014	Yes				Yes		Yes			Yes		Yes	Yes	
126-2014	Yes	*			Yes	Yes	Yes						Yes	
127-2014	Yes	Yes			Yes	Yes	Yes							
128-2014	Yes	Yes			Yes	Yes	Yes				Yes		Yes	
129-2014	Yes	*	Yes, G		Yes		Yes					Yes	Yes	
130-2014	Yes	*	Yes, G		Yes	Yes	Yes							
131-2014	Yes	*	Yes, G	Yes	Yes		Yes				Yes	Yes	Yes	
132-2014	Yes	*			Yes		Yes							
133-2014	Yes	*		Yes	Yes		Yes							
134-2014	Yes				Yes		Yes					Yes	Yes	
135-2014	Yes				Yes		Yes							
136-2014	Yes				Yes		Yes							
137-2014	Yes				Yes		Yes							
138-2014	Yes				Yes		Yes							
139-2014	Yes				Yes	Yes	Yes							
140-2014	Yes				Yes	Yes	Yes							

Client #	WatershedWatershed	CBWM Segment	Major Basin	Farm Acres: Sum of Fields	Av. Slope%	Nitrogen, lbs/yr (Fields): Baseline	Current	Future	Nitrogen, HQ: Current	Future	Delivery Ratio**	Total Reductions	Eligible Reductions	Credits
001-2013	Eshelman Run-Pequea	_2410_2700 ,A42071S1_2	Susquehanna	97.2	6	4003.75	5085.01	4976.92	1935.37	567.16	0.42	1476.30	0.00	0.00
002-2014	Muddy Run-Mill Creek	A42071SL1_2390_2420	Susquehanna	48.2	3	1921.77	1722.89	1596.01	2497.54	782.88	0.42	1841.54	1841.53	774.00
003-2014	Conoy Creek	A42071SL9_2430_2490	Susquehanna	75.27	7	3186.35	6623.57	6623.57	67.42	67.42	0.85	0.00	0.00	0.00
004-2014	West Branch Octoraro	_2480_0001, A42071SL2_	Susquehanna	153.7	6	6664.36	6709.54	6702.00	533.64	166.71	0.68	374.47	374.46	254.63
005-2014	Middle Conestoga Rive	A42071SL2_2200_2350	Susquehanna	31.8	3.7	1180.87	280.63	280.63	655.71	655.71	0.33	0.00	0.00	0.00
006-2014	West Branch Octoraro	_2480_0001, A42071SL2_	Susquehanna	127.2	8	4049.30	8813.21	8813.21	5242.47	4193.97	0.68	1048.49	0.00	0.00
007-2014	Fishing Creek-Susqueha	A42071SL9_2720_0001	Susquehanna	109.24	10	4450.01	4837.99	4837.99	0.00	0.00	0.91	0.00		0.00
008-2014	Donegal Creek	A42071SL2_2300_2520	Susquehanna	118.2	4.4	4892.94	15735.84	15735.84	205.57	205.57	0.70	0.00	0.00	0.00
009-2014	Pine CreekPine Creek	A42071SL2_2480_0001	Susquehanna	172.59	6.5	2210.13	1598.26	1597.88	334.54	334.54	0.68	0.38	0.00	0.00
010-2014	West Branch Octoraro	_2480_0001, A42701SL9_	Susquehanna	126.88	8	5717.88	9192.82	9192.82	0.00	0.00	0.68	0.00	0.00	0.00
011-2014	Middle Conestoga Rive	A42071SL2_2200_2350	Susquehanna	52.59	7.25	2293.70	2644.28	2644.28	3749.34	3749.34	0.33	0.00	0.00	0.00
012-2014	Eshelman Run-Pequea	A42071SL2_2410_2700	Susquehanna	51.93	11	2340.19	1167.35	1167.35	0.00	0.00	0.72	0.00	0.00	0.00
013-2014	Eshleman Run-Pequea	A42071SL2-2410-2700	Susquehanna	48.8	15.8	1973.82	1577.45	1577.45	10580.23	10580.23	0.72	0.00	0.00	0.00
014-2014	Eshelman Run-Pequea	A42071SL2_2410_2700	Susquehanna	66.58	7.5	2054.94	1301.50	1301.50	12761.75	12761.75	0.72	0.00	0.00	0.00
015-2014	Tweed Creek-Octoraro	A42071SL2_2480_0001	Susquehanna	73	7	2692.66	8492.42	8492.42	0.00	0.00	0.68	0.00	0.00	0.00
016-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	138.12	9.7	6224.29	8508.12	8508.12	0.00	0.00	0.85	0.00	0.00	0.00
017-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	37.94	9.6	1709.74	2263.62	2263.62	21291.31	21291.31	0.85	0.00	0.00	0.00
018-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	42.21	12.8	1902.17	2107.36	2107.36	0.00	0.00	0.85	0.00	0.00	0.00
019-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	22.77	12.5	708.18	1297.59	1297.59	0.00	0.00	0.85	0.00	0.00	0.00
020-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	114.24	7.5	5148.16	4661.45	4661.45	0.00	0.00	0.85	0.00	0.00	0.00
021-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	44.73	9.8	1985.70	2687.27	2687.27	0.00	0.00	0.85	0.00	0.00	0.00
022-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	30.17	9.6	1359.59	1410.63	1243.70	0.00	0.00	0.85	166.93	0.00	0.00
023-2014	Conoy Creek/Hartman	A42071SL9_2430_2490	Susquehanna	83.7	6	3771.89	5025.15	5025.15	0.00	0.00	0.85	0.00	0.00	0.00
024-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	20.27	9	913.46	1474.30	1474.30	0.00	0.00	0.85	0.00	0.00	0.00
025-2014	Hartman Run-Susqueh	A42071SL9_2430_2490	Susquehanna	42.86	9	1915.69	2174.25	2174.25	15787.42	15787.42	0.85	0.00	0.00	0.00
026-2014	Conoy Creek	A42071SL9_2430_2490	Susquehanna	84	8.8	3785.41	3523.48	3521.62	0.00	0.00	0.85	1.86	1.86	1.58
027-2014	Conoy Creek	A42071SL9_2430_2490	Susquehanna	40.87	8.4	1594.79	265.82	265.82	0.00	0.00	0.85	0.00	0.00	0.00
028-2014	Conowingo Creek	A42071SL9_2720_0001	Susquehanna	207.85	5	8578.85	8686.34	8686.34	10023.02	10023.02	0.91	0.00	0.00	0.00
029-2014	Tweed Creek-Octoraro	A42071SL2_2480_0001	Susquehanna	93.5	8	4213.52	1053.60	1053.60	0.00	0.00	0.68	0.00	0.00	0.00
030-2014	Tweed Creek-Octoraro	A42071SL2_2480_0001	Susquehanna	73.38	6.8	3306.76	574.03	574.03	0.00	0.00	0.68	0.00	0.00	0.00
031-2014	Conowingo Creek	A42071SL9_2720_0001	Susquehanna	144.11	10.9	5245.18	2938.69	2938.69	1457.25	1457.25	0.91	0.00	0.00	0.00
032-2014	Conowingo Creek	A42071SL9_2720_0001	Susquehanna	64.52	9.5	2907.56	3639.96	3639.96	0.00	0.00	0.91	0.00	0.00	0.00
033-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	116.5	18.3	4686.93	8896.48	8896.48	22394.25	22394.25	0.86	0.00	0.00	0.00
034-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	90.54	9.8	3434.49	2965.32	2965.32	0.00	0.00	0.86	0.00	0.00	0.00
035-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	50.77	12.6	2287.92	2556.39	2556.39	0.00	0.00	0.86	0.00	0.00	0.00
036-2014	West Branch Little Cone	A42071SL3_2420_2700	Susquehanna	37.8	6.6	1703.43	1851.47	1851.47	0.00	0.00	0.68	0.00	0.00	0.00
037-2014	West Branch Little Cone	A42071SL3_2420_2700	Susquehanna	152.34	7.8	6865.00	10178.03	10178.03	0.00	0.00	0.68	0.00	0.00	0.00
038-2014	Cabin Creek-Susquehar	_2520_2700, A42071SL3_	Susquehanna	86.99	8.9	3469.33	3026.46	3026.46	0.00	0.00	0.68	0.00	0.00	0.00
039-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	78.35	7.6	3530.80	8359.18	8359.18	0.00	0.00	0.86	0.00	0.00	0.00
040-2014	Cabin Creek-susquehar	A42071SL9_2520_2700	Susquehanna	120.7	10	5439.27	9612.36	9612.36	0.00	0.00	0.86	0.00	0.00	0.00
041-2014	Lower Conestoga River	A42071SL3_2420_2700	Susquehanna	35	9	1577.25	150.66	150.66	0.00	0.00	0.68	0.00	0.00	0.00
042-2014	Lower Conestoga River	A42071SL3_2420_2700	Susquehanna	27.28	4.4	1229.36	432.96	432.96	0.00	0.00	0.68	0.00	0.00	0.00
043-2014	Millers Run-Little Cones	A42071SL3_2420_2700	Susquehanna	55.7	6.3	2510.09	321.83	321.83	0.00	0.00	0.68	0.00	0.00	0.00
044-2014	Lower Conestoga River	A42071SL3_2420_2700	Susquehanna	8.01	4	361.02	174.20	174.20	0.00	0.00	0.68	0.00	0.00	0.00
045-2014	West Branch Little Cone	A42071SL3_2420_2700	Susquehanna	41.2	8	1847.64	4781.38	4781.38	14138.64	14138.64	0.68	0.00	0.00	0.00
046-2014	West Branch Little Cone	A42071SL3_2420_2700	Susquehanna	213.54	8.8	8903.54	25880.43	25880.43	1605.09	1605.09	0.68	0.00	0.00	0.00
047-2014	West Branch Little Cone	A42071SL3_2420_2700	Susquehanna	31.2	8.9	1406.01	3838.56	3838.56	0.00	0.00	0.68	0.00	0.00	0.00
048-2014	East Branch Big Elk Cree	A42029EU1_2650_0001	Eastern Shore	123.63	7.4	2408.94	720.71	720.71	1494.94	1494.94	0.72	0.00	0.00	0.00
049-2014	East Branch Big Elk Cree	A42029EU1_2650_0001	Eastern Shore	71.2	8	1516.62	606.92	606.92	0.00	0.00	0.72	0.00	0.00	0.00
050-2014	East Branch Big Elk Cree	A42029EU1_2650_0001	Eastern Shore	25.2	8	536.78	307.96	307.96	0.00	0.00	0.72	0.00	0.00	0.00
051-2014	Little Chickies Creek	A42071SL2_2300_2520	Susquehanna	30.7	11.1	1383.48	1396.36	1396.36	0.00	0.00	0.70	0.00	0.00	0.00
052-2014	Middle Creek	A42071SL1_2190_2350	Susquehanna	51.2	8.7	2112.86	802.23	802.23	8568.72	8568.72	0.33	0.00	0.00	0.00
053-2014	Headwaters Pequea Cr	A42071SL2_2410_2700	Susquehanna	91.18	5.3	3428.01	2931.15	2931.15	1653.31	1653.31	0.72	0.00	0.00	0.00
054-2014	West Branch Octoraro	A42071SL2_2480_0001	Susquehanna	240.32	15.2	7739.49	8929.67	8929.67	0.00	0.00	0.68	0.00	0.00	0.00
055-2014	West Branch Octoraro	A42071SL2_2480_0001	Susquehanna	37.2	7.6	1676.40	1265.41	1265.41	0.00	0.00	0.68	0.00	0.00	0.00
056-2014	Climber Run-Pequea Cr	A42071SL2_2410_2700	Susquehanna	47.6	12.4	2145.07	4307.41	4307.41	0.00	0.00	0.72	0.00	0.00	0.00
057-2014	Fishing Creek-Susqueha	A42071SL9_2720_0001	Susquehanna	89.4	12	3232.98	5442.36	5442.36	157.97	157.97	0.91	0.00	0.00	0.00
058-2014	Eshelman Run-Pequea	A42071SL2_2410_2700	Susquehanna	75.52	4.8	2696.65	1280.38	1280.38	614.69	614.69	0.72	0.00	0.00	0.00
059-2014	Tweed Creek-Octoraro	A42071SL2_2480_0001	Susquehanna	124.5	9.6	4625.69	14346.82	14346.82	2275.82	2275.82	0.68	0.00	0.00	0.00
060-2014	Lower West Branch Coi	B42055PU3_2510_3290	Potomac	144.02	6.6	7439.24	14698.31	14698.31	0.00	0.00	0.28	0.00	0.00	0.00
061-2014	Lower West Branch Coi	B42055PU3_2510_3290	Potomac	174.4	4.9	9008.46	18812.35	18812.35	0.00	0.00	0.28	0.00	0.00	0.00
062-2014	Lower West Branch Coi	B42055PU3_2510_3290	Potomac	127.74	4.7	6598.54	10038.58	10038.58	0.00	0.00	0.28	0.00	0.00	0.00
063-2014	Licking Creek	B42055PU3_2510_3290	Potomac	103.2	4.6	5330.71	1161.89	1161.89	0.00	0.00	0.28	0.00	0.00	0.00
064-2014	Lower West Branch Coi	B42055PU3_2510_3290	Potomac	130.52	5.8	6741.91	1248.70	1248.70	0.00	0.00	0.28	0.00	0.00	0.00
065-2014	Licking Creek	B42055PU3_2510_3290	Potomac	221.84	4.4	11458.97	4081.29	4081.29	0.00	0.00	0.28	0.00	0.00	0.00
066-2014	Licking Creek	B42055PU3_2510_3290	Potomac	165.59	6	8553.25	3676.88	3676.88	0.00	0.00	0.28	0.00	0.00	0.00
067-2014	Lower West Branch Coi	B42055PU3_2510_3290	Potomac	150.7	4.9	7784.39	15706.36	15706.36	0.00	0.00	0.28	0.00	0.00	0.00
068-2014	Campbell Run-Back Cre	A42055PU2_2790_3290	Potomac	49.4	5.1	2551.72	781.85	781.85	0.00	0.00	0.28	0.00	0.00	0.00
069-2014	Middle West Branch Cc	_2510_3290, A42055PU2_	Potomac	124.84	5.5	6448.51	8104.44	8104.44	0.00	0.00	0.28	0.00	0.00	0.00
070-2014	Trout Run-Conodoguin	A42055SL2_2540_2370	Susquehanna	89.41	11.4	1378.37	1024.52	1024.52	0.00	0.00	0.33	0.00	0.00	0.00
071-2014	Trout Run-Conodoguin	A42055SL2_2540_2370	Susquehanna	37.7	9.8	1698.93	1042.76	1042.76	0.00	0.00	0.33	0.00	0.00	0.00
072-2014	Trout Run-Conodoguin	_2540_2370, A42055SL4_	Susquehanna	118.4	7.2	3605.17	1865.17	1865.17	0.00	0.00	0.33	0.00	0.00	0.00
073-2014	Trout Run-Conodoguin	A42055SL2_2540_2370	Susquehanna	25.1	9.3	1131.12	745.86	745.86	0.00	0.00	0.33	0.00	0.00	0.00
074-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	62.87	6.5	2488.88	2037.97	2037.97	21606.76	21606.76	0.86	0.00	0.00	0.00
075-2014	Cabin Creek-Susquehar	_2520_2700, A42071SL2_	Susquehanna	135.97	7.8	5733.40	4132.79	4132.79	801.23	801.23	0.70	0.00	0.00	0.00
076-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	72.5	7.4	3267.17	2293.78	2293.78	0.00	0.00	0.86	0.00	0.00	0.00
077-2014	Cabin Creek-Susquehar	A42071SL9_2520_2700	Susquehanna	83.8	11	3776.40	3549.41	3549.41	0.00	0.00	0.86	0.00	0.00	0.00
078-2014	Parks Creek-Wysox Cre	A42015SU7_0730_0860	Susquehanna	50.6	9.5	659.04	105.00	105.00	0.00	0.00	0.62	0.00	0.00	0.00
079-2014	Gaffers Creek-Elk Run/!	A42015SU2_0800_0850	Susquehanna	65.7	11.7	2960.73	1333.83	1333.83	0.00	0.00	0.49	0.00	0.00	0.00
080-2014	Upper Bentley Creek	_0610_0600, A42015SU5_	Susquehanna	110.12	11	4962.55	5254.74	5254.74	0.00	0.00	0.52	0.00	0.00	0.00
081-2014	Upper Bentley Creek	A42015SU5_0610_0600	Susquehanna	68.6	11.25	3091.42	3376.54	3376.54	0.00	0.00	0.52	0.00	0.00	0.00
082-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	51.7	16.5	2329.83	4860.92	4860.92	0.00	0.00	0.49	0.00	0.00	0.00
083-2014	Mill Creek-Sugar Creek	A42015SU2_0800_0850	Susquehanna	30.06	2	1354.64	196.70	196.70	0.00	0.00	0.49	0.00	0.00	0.00
084-2014	Spaulding Creek-Susqu	A42015SU7_0750_0850	Susquehanna	27.5	2.6	1239.27	322.22	322.22	0.00	0.00	0.59	0.00	0.00	0.00
085-2014	Spaulding Creek-Susqu	A42015SU7_0750_0850	Susquehanna	19	5.6	856.22	359.71	359.71	0.00	0.00	0.59	0.00	0.00	0.00
086-2014	Spaulding Creek-Susqu	A42015SU7_0750_0850	Susquehanna	34.2	8.8	1541.20	921.59	921.59	0.00	0.00	0.59	0.00	0.00	0.00
087-2014	Spaulding Creek-Susqu	A42015SU7_0750_0850	Susquehanna	7.6	9.2	342.49	174.43	174.43	0.00	0.00	0.59	0.00	0.00	0.00
088-2014	Browns Creek/Spauldir	_0750_0850, A42015SU2_	Susquehanna	71.8	10.8	3235.62	7494.87	7494.87	0.00	0.00	0.49	0.00	0.00	0.00
089-2014	Tomjack Creek/Spauldi	_0750_0850, A42015SU2_	Susquehanna	79	9.3	2840.13	3269.13	3269.13	0.00	0.00	0.49	0.00	0.00	0.00
090-2014	Browns Creek	A42015SU2_0800_0850	Susquehanna	55	8.9	2478.54	1952.65	1952.65	0.00	0.00	0.49	0.00	0.00	0.00
091-2014	Browns Creek	A42015SU2_0800_0850	Susquehanna	48.1	6.8	2167.60	539.83	539.83	0.00	0.00	0.49	0.00	0.00	0.00
092-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	59.7	12.4	2690.34	2740.25	2740.25	0.00	0.00	0.49	0.00	0.00	0.00
093-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	197.5	11.4	6264.26	15495.90	15495.90	4982.52	4982.52	0.49	0.00	0.00	0.00
094-2014	Spaulding Creek-Susqu	A42015SU7_0750_0850	Susquehanna	91.3	11.7	4114.38	2257.79	2257.79	0.00	0.00	0.59	0.00	0.00	0.00
095-2014	Tomjack Creek/Spauldi	_0600_0750, A42015SU7_	Susquehanna	72.8	12.8	3280.69	1463.33	1463.33	0.00	0.00	0.57	0.00	0.00	0.00
096-2014	Bailey Run-Sugar Creek	A42015SU2_0800_0850	Susquehanna	44.9	8.8	2023.39	1671.24	1671.24	0.00	0.00	0.49	0.00	0.00	0.00
097-2014	Bailey Run-Sugar Creek	A42015SU2_0800_0850	Susquehanna	27.3	9.2	1230.26	946.09	946.09	0.00	0.00	0.49	0.00	0.00	0.00
098-2014	Bailey Run-Sugar Creek	A42015SU2_0800_0850	Susquehanna	44.2	8.7	1991.85	1217.58	1217.58	0.00	0.00	0.49	0.00	0.00	0.00
099-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	60.1	12.9	2708.37	2477.74	2477.74	0.00	0.00	0.49	0.00	0.00	0.00
100-2014	Browns Creek	A42015SU2_0800_0850	Susquehanna	10.2	7.5	459.66	412.65	412.65	0.00	0.00	0.49	0.00	0.00	0.00
101-2014	Browns Creek	A42015SU2_0800_0850	Susquehanna	51.4	8.5	2316.31	2539.33	2539.33	0.00	0.00	0.49	0.00	0.00	0.00
102-2014	Browns Creek	A42015SU2_0800_0850	Susquehanna	60.9	13.7	2744.42	3703.56	3703.56	0.00	0.00	0.49	0.00	0.00	0.00
103-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	193.4	6.3	8715.45	5749.30	5749.30	0.00	0.00	0.49	0.00	0.00	0.00
104-2014	Mill Creek-Sugar Creek	A42015SU2_0800_0850	Susquehanna	70.2	9.7	3163.52	4268.27	4268.27	0.00	0.00	0.49	0.00	0.00	0.00
105-2014	Upper Bentley Creek	A42015SU5_0610_0600	Susquehanna	55.7	7.8	2510.09	1963.49	1963.49	0.00	0.00	0.52	0.00	0.00	0.00
106-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	104.13	10.3	4692.44	6851.91	6851.91	0.00	0.00	0.49	0.00	0.00	0.00
107-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	8.1	17.5	365.02	554.53	554.53	0.00	0.00	0.49	0.00	0.00	0.00
108-2014	Upper Bentley Creek	A42015SU5_0610_0600	Susquehanna	115.4	13.5	5200.43	2836.79	2836.79	0.00	0.00	0.52	0.00	0.00	0.00
109-2014	Mountain Creek-Conoc	A42055PU2_2790_3290	Potomac	40.2	9.6	2076.50	232.00	232.00	0.00	0.00	0.28	0.00	0.00	0.00
110-2014	Falling Spring Branch-C	A42055PU2_2790_3290	Potomac	132.05	6.3	6437.92	482.05	482.05	2039.58	2039.58	0.28	0.00	0.00	0.00
111-2014	Mountain Creek-Conoc	A42055PU2_2790_3290	Potomac	113	5.5	5836.92	147.26	147.26	0.00	0.00	0.28	0.00	0.00	0.00
112-2014	Falling Spring Branch-C	A42055PU2_2790_3290	Potomac	92.79	4.3	4793.22	152.38	152.38	0.00	0.00	0.28	0.00	0.00	0.00
113-2014	Mountain Creek-Conoc	A42055PU2_2790_3290	Potomac	131.18	6.9	5472.03	2099.00	2099.00	1247.48	1247.48	0.28	0.00	0.00	0.00
114-2014	Rockdale Run-Conococ	A42055PU3_3290_3390	Potomac	7.3	12.4	377.08	330.86	330.86	0.00	0.00	0.50	0.00	0.00	0.00
115-2014	Rockdale Run-Conococ	A42055PU3_3290_3390	Potomac	192.1	6.1	9922.77	6800.87	6800.87	0.00	0.00	0.50	0.00	0.00	0.00
116-2014	Rockdale Run-Conococ	A42055PU3_3290_3390	Potomac	42.8	12.9	2210.80	3055.56	3055.56	0.00	0.00	0.50	0.00	0.00	0.00
117-2014	Rockdale Run-Conococ	A42055PU3_3290_3390	Potomac	22.35	10	1154.25	1988.41	1988.41	0.00	0.00	0.50	0.00	0.00	0.00
118-2014	Rockdale Run-Conococ	A42055PU3_3290_3390	Potomac	396.43	8.9	15859.36	21660.41	21660.41	13019.54	13019.54	0.50	0.00	0.00	0.00
119-2014	Upper West Branch Coi	B42055PU3_2510_3290	Potomac	90.7	6.5	4685.04	4290.47	4290.47	0.00	0.00	0.28	0.00	0.00	0.00
120-2014	Upper West Branch Coi	B42055PU3_2510_3290	Potomac	56.61	7.9	2924.09	9196.57	9196.57	0.00	0.00	0.28	0.00	0.00	0.00
121-2014	Upper West Branch Coi	B42055PU3_2510_3290	Potomac	226.41	6.3	10130.48	4467.80	4467.80	1388.52	1388.52	0.28	0.00	0.00	0.00
122-2014	Upper West Branch Coi	B42055PU3_2510_3290	Potomac	257.48	6.4	11857.60	16958.16	16958.16	364.12	364.12	0.28	0.00	0.00	0.00
123-2014	Falling Spring Branch-C	A42055PU2_2790_3290	Potomac	16.11	12.75	671.50	930.41	930.41	8167.08	8167.08	0.28	0.00	0.00	0.00
124-2014	Little Cove Creek	B42055PU2_3080_3640	Potomac	110.76	15.5	4530.07	4452.16	4452.16	25606.56	25606.56	0.46	0.00	0.00	0.00
125-2014	Shaffer Creek	C42009SJ4_2740_2660	Susquehanna	111.1	14	4201.01	3776.25	3776.25	6438.21	2706.99	0.17	3731.22	3731.22	634.31
126-2014	Big Beaver Creek/Eshel	A42071SL2_2410_2700	Susquehanna	178.6	12.1	7507.73	10235.21	10235.21	13651.20	13651.20	0.72	0.00	0.00	0.00
127-2014	Tomjack Creek	A42015SU2_0800_0850	Susquehanna	161	8	7255.37	8538.93	8538.93	0.00	0.00	0.49	0.00	0.00	0.00
128-2014	Mill Creek-Sugar Creek	A42015SU12_0800_0850	Susquehanna	83.9	10.6	2795.43	3440.48	3440.48	1462.43	1462.43	0.49	0.00	0.00	0.00
129-2014	Shultz Creek-Sherman (	A42099SL3_2290_2260	Susquehanna	102.9	5.1	4283.29	2482.18	2482.18	42.93	42.93	0.58	0.00	0.00	0.00
130-2014	Shultz Creek-Sherman (	A42099SL3_2290_2260	Susquehanna	103.9	7.7	4682.19	282.57	282.57	0.00	0.00	0.58	0.00	0.00	0.00
131-2014	Shultz Creek-Sherman (	A42099SL3_2290_2260	Susquehanna	314.26	8.2	12073.40	1264.63	1264.63	7928.87	7928.87	0.58	0.00	0.00	0.00
132-2014	Shultz Creek-Sherman (	A42099SL3_2290_2260	Susquehanna	30	9.3	1351.93	675.22	675.22	0.00	0.00	0.58	0.00	0.00	0.00
133-2014	Shultz Creek-Sherman (	A42099SL3_2290_2260	Susquehanna	145.2	8.2	5852.61	465.09	465.09	0.00	0.00	0.58	0.00	0.00	0.00
134-2014	Willow RunWillow Run	A42067SJ3_2160_2170	Susquehanna	90.02	14.6	3574.51	2520.88	2520.88	11627.97	11627.97	0.75	0.00	0.00	0.00
135-2014	Willow RunWillow Run	A42067SJ3_2160_2170	Susquehanna	71.83	10.7	3236.98	1578.03	1578.03	0.00	0.00	0.75	0.00	0.00	0.00
136-2014	Willow RunWillow Run	A42067SJ3_2160_2170	Susquehanna	29.1	14.6	1311.37	941.56	941.56	0.00	0.00	0.75	0.00	0.00	0.00
137-2014	Willow RunWillow Run	A42067SJ3_2160_2170	Susquehanna	29.05	8.7	1309.12	727.45	727.45	0.00	0.00	0.75	0.00	0.00	0.00
138-2014	Willow RunWillow Run	A42067SJ3_2160_2170	Susquehanna	59.93	9.4	2700.71	1215.03	1215.03	0.00	0.00	0.75	0.00	0.00	0.00
139-2014	Tuscararo Creek-Juniat	A42067SJ3_2160_2170	Susquehanna	63.21	11.3	2848.52	1858.23	1858.23	0.00	0.00	0.75	0.00	0.00	0.00
140-2014	Tuscararo Creek-Juniat	A42067SJ2_2110_2170	Susquehanna	54.74	10.4	2466.83	1104.38	1104.38	0.00	0.00	0.77	0.00	0.00	0.00

Client #	Phosphorus, Fields: Baseline	Current	Future	Phosphorus, HQ: Current	Future	Delivery Ratio**	Total Reductions	Eligible Reductions	Credits	
001-2013	131.57	1026.22	1017.05	191.69	36.04	0.70	164.82	0.00	0.00	rev3/18/15
002-2014	64.49	183.02	172.58	370.24	74.05	0.70	306.63	0.00	0.00	
003-2014	104.93	1337.52	1337.52	22.58	22.58	0.39	0.00	0.00	0.00	
004-2014	216.74	2125.38	2124.56	617.87	123.57	0.70	495.12	495.12	346.58	
005-2014	38.92	140.62	140.62	24.30	24.30	0.70	0.00	0.00	0.00	
006-2014	141.06	1275.32	1275.32	452.40	361.92	0.78	90.48	0.00	0.00	rev 4/1/15
007-2014	149.00	860.01	860.01	0.00	0.00	0.81	0.00	0.00	0.00	
008-2014	162.64	3244.94	3244.94	14.81	14.81	0.39	0.00	0.00	0.00	
009-2014	129.86	330.02	330.19	82.69	82.69	0.78	-0.17	0.00	0.00	rev3/9/15
010-2014	184.23	1105.84	1105.84	0.00	0.00	0.78	0.00	0.00	0.00	
011-2014	74.27	188.94	188.94	1207.99	1207.99	0.70	0.00	0.00	0.00	
012-2014	75.40	486.58	486.58	0.00	0.00	0.70	0.00	0.00	0.00	
013-2014	63.60	581.85	581.85	730.57	730.57	0.70	0.00	0.00	0.00	
014-2014	66.21	987.58	987.58	2617.98	2617.98	0.70	0.00	0.00	0.00	
015-2014	93.81	864.16	864.16	0.00	0.00	0.78	0.00	0.00	0.00	
016-2014	200.55	827.00	827.00	0.00	0.00	0.39	0.00	0.00	0.00	
017-2014	55.09	228.27	228.27	1605.56	1605.56	0.39	0.00	0.00	0.00	
018-2014	61.29	231.06	231.06	0.00	0.00	0.39	0.00	0.00	0.00	
019-2014	26.75	179.99	179.99	0.00	0.00	0.39	0.00	0.00	0.00	
020-2014	165.88	645.40	645.40	0.00	0.00	0.39	0.00	0.00	0.00	
021-2014	64.35	346.97	346.97	0.00	0.00	0.39	0.00	0.00	0.00	
022-2014	43.81	237.26	221.03	0.00	0.00	0.39	16.23	0.00	0.00	
023-2014	121.53	795.78	795.78	0.00	0.00	0.39	0.00	0.00	0.00	
024-2014	29.43	82.63	82.63	0.00	0.00	0.39	0.00	0.00	0.00	
025-2014	61.72	208.08	208.08	0.00	0.00	0.39	0.00	0.00	0.00	
026-2014	121.97	1224.57	1224.03	0.00	0.00	0.39	0.54	0.54	0.21	
027-2014	54.50	282.13	282.13	0.00	0.00	0.39	0.00	0.00	0.00	
028-2014	285.46	899.27	899.27	635.60	635.60	0.81	0.00	0.00	0.00	
029-2014	135.76	375.87	375.87	0.00	0.00	0.78	0.00	0.00	0.00	
030-2014	106.54	258.57	258.57	0.00	0.00	0.78	0.00	0.00	0.00	
031-2014	182.85	466.10	466.10	165.19	165.19	0.81	0.00	0.00	0.00	
032-2014	93.68	420.92	420.92	0.00	0.00	0.81	0.00	0.00	0.00	
033-2014	157.57	5251.75	5251.75	1464.15	1464.15	0.39	0.00	0.00	0.00	
034-2014	118.65	3052.94	3052.94	0.00	0.00	0.39	0.00	0.00	0.00	
035-2014	73.72	1960.60	1960.60	0.00	0.00	0.39	0.00	0.00	0.00	
036-2014	54.89	1034.75	1034.75	0.00	0.00	0.70	0.00	0.00	0.00	
037-2014	221.19	5527.73	5527.73	0.00	0.00	0.70	0.00	0.00	0.00	
038-2014	117.36	1576.16	1576.16	0.00	0.00	0.39	0.00	0.00	0.00	
039-2014	113.76	4272.92	4272.92	0.00	0.00	0.39	0.00	0.00	0.00	
040-2014	175.26	7622.54	7622.54	0.00	0.00	0.39	0.00	0.00	0.00	
041-2014	50.82	144.25	144.25	0.00	0.00	0.70	0.00	0.00	0.00	
042-2014	39.61	184.09	184.09	0.00	0.00	0.70	0.00	0.00	0.00	
043-2014	80.88	689.52	689.52	0.00	0.00	0.70	0.00	0.00	0.00	
044-2014	11.63	61.19	61.19	0.00	0.00	0.70	0.00	0.00	0.00	
045-2014	59.53	692.23	692.23	1309.35	1309.35	0.70	0.00	0.00	0.00	
046-2014	294.87	5194.13	5194.13	147.41	147.41	0.70	0.00	0.00	0.00	
047-2014	45.30	606.34	606.34	0.00	0.00	0.70	0.00	0.00	0.00	
048-2014	86.26	123.26	123.26	151.62	151.62	0.76	0.00	0.00	0.00	
049-2014	52.21	102.69	102.69	0.00	0.00	0.76	0.00	0.00	0.00	
050-2014	18.48	48.15	48.15	0.00	0.00	0.76	0.00	0.00	0.00	
051-2014	44.58	306.32	306.32	0.00	0.00	0.39	0.00	0.00	0.00	
052-2014	70.09	174.07	174.07	1609.31	1609.31	0.70	0.00	0.00	0.00	
053-2014	115.58	258.63	258.63	94.10	94.10	0.70	0.00	0.00	0.00	
054-2014	259.23	560.35	560.35	0.00	0.00	0.78	0.00	0.00	0.00	
055-2014	54.01	96.77	96.77	0.00	0.00	0.78	0.00	0.00	0.00	
056-2014	69.11	677.47	677.47	0.00	0.00	0.70	0.00	0.00	0.00	
057-2014	112.23	358.19	358.19	10.23	10.23	0.81	0.00	0.00	0.00	
058-2014	93.15	943.45	943.45	41.88	41.88	0.70	0.00	0.00	0.00	
059-2014	157.95	1080.70	1080.70	86.17	86.17	0.78	0.00	0.00	0.00	
060-2014	328.55	2582.36	2582.36	0.00	0.00	0.47	0.00	0.00	0.00	
061-2014	397.86	4885.78	4885.78	0.00	0.00	0.47	0.00	0.00	0.00	
062-2014	291.42	2597.94	2597.94	0.00	0.00	0.47	0.00	0.00	0.00	
063-2014	235.43	1372.90	1372.90	0.00	0.00	0.47	0.00	0.00	0.00	
064-2014	297.76	196.60	196.60	0.00	0.00	0.47	0.00	0.00	0.00	
065-2014	506.08	2888.73	2888.73	0.00	0.00	0.47	0.00	0.00	0.00	
066-2014	377.75	2164.18	2164.18	0.00	0.00	0.47	0.00	0.00	0.00	
067-2014	343.80	4761.80	4761.80	0.00	0.00	0.47	0.00	0.00	0.00	
068-2014	112.63	463.63	463.63	0.00	0.00	0.47	0.00	0.00	0.00	
069-2014	284.80	1168.40	1168.40	0.00	0.00	0.47	0.00	0.00	0.00	
070-2014	48.55	188.40	188.40	0.00	0.00	0.39	0.00	0.00	0.00	
071-2014	54.74	188.43	188.43	0.00	0.00	0.39	0.00	0.00	0.00	
072-2014	137.58	375.64	375.64	0.00	0.00	0.39	0.00	0.00	0.00	
073-2014	36.44	128.09	128.09	0.00	0.00	0.39	0.00	0.00	0.00	
074-2014	82.54	333.73	333.73	293.74	293.74	0.39	0.00	0.00	0.00	
075-2014	187.59	926.85	926.85	50.81	50.81	0.39	0.00	0.00	0.00	
076-2014	105.27	530.08	530.08	0.00	0.00	0.39	0.00	0.00	0.00	
077-2014	121.68	481.51	481.51	0.00	0.00	0.39	0.00	0.00	0.00	
078-2014	40.05	49.20	49.20	0.00	0.00	0.39	0.00	0.00	0.00	
079-2014	95.40	35.28	35.28	0.00	0.00	0.39	0.00	0.00	0.00	
080-2014	159.90	437.95	437.95	0.00	0.00	0.39	0.00	0.00	0.00	
081-2014	99.61	338.94	338.94	0.00	0.00	0.39	0.00	0.00	0.00	
082-2014	75.07	390.10	390.10	0.00	0.00	0.39	0.00	0.00	0.00	
083-2014	43.65	27.81	27.81	0.00	0.00	0.39	0.00	0.00	0.00	
084-2014	39.93	28.59	28.59	0.00	0.00	0.39	0.00	0.00	0.00	
085-2014	27.59	3.33	3.33	0.00	0.00	0.39	0.00	0.00	0.00	
086-2014	49.66	11.31	11.31	0.00	0.00	0.39	0.00	0.00	0.00	
087-2014	11.04	3.79	3.79	0.00	0.00	0.39	0.00	0.00	0.00	
088-2014	104.25	521.63	521.63	0.00	0.00	0.39	0.00	0.00	0.00	
089-2014	98.00	210.49	210.49	0.00	0.00	0.39	0.00	0.00	0.00	
090-2014	79.86	122.63	122.63	0.00	0.00	0.39	0.00	0.00	0.00	
091-2014	69.84	12.63	12.63	0.00	0.00	0.39	0.00	0.00	0.00	
092-2014	86.68	421.57	421.57	0.00	0.00	0.39	0.00	0.00	0.00	
093-2014	219.78	3246.46	3246.46	498.60	498.60	0.39	0.00	0.00	0.00	
094-2014	132.57	39.90	39.90	0.00	0.00	0.39	0.00	0.00	0.00	
095-2014	105.70	32.49	32.49	0.00	0.00	0.39	0.00	0.00	0.00	
096-2014	65.19	112.86	112.86	0.00	0.00	0.39	0.00	0.00	0.00	
097-2014	39.64	72.44	72.44	0.00	0.00	0.39	0.00	0.00	0.00	
098-2014	64.18	146.49	146.49	0.00	0.00	0.39	0.00	0.00	0.00	
099-2014	87.26	203.66	203.66	0.00	0.00	0.39	0.00	0.00	0.00	
100-2014	14.81	29.56	29.56	0.00	0.00	0.39	0.00	0.00	0.00	
101-2014	74.63	181.80	181.80	0.00	0.00	0.39	0.00	0.00	0.00	
102-2014	88.43	307.78	307.78	0.00	0.00	0.39	0.00	0.00	0.00	
103-2014	280.81	554.81	554.81	0.00	0.00	0.39	0.00	0.00	0.00	
104-2014	101.93	316.74	316.74	0.00	0.00	0.39	0.00	0.00	0.00	
105-2014	80.88	136.92	136.92	0.00	0.00	0.39	0.00	0.00	0.00	
106-2014	151.19	514.16	514.16	0.00	0.00	0.39	0.00	0.00	0.00	
107-2014	11.76	34.90	34.90	0.00	0.00	0.39	0.00	0.00	0.00	
108-2014	167.56	244.22	244.22	0.00	0.00	0.39	0.00	0.00	0.00	
109-2014	91.71	301.73	301.73	0.00	0.00	0.47	0.00	0.00	0.00	
110-2014	290.26	222.19	222.19	278.07	278.07	0.47	0.00	0.00	0.00	rev6/16/15
111-2014	257.79	28.07	28.07	0.00	0.00	0.47	0.00	0.00	0.00	
112-2014	211.69	260.38	260.38	0.00	0.00	0.47	0.00	0.00	0.00	
113-2014	243.94	458.02	458.02	110.64	110.64	0.47	0.00	0.00	0.00	
114-2014	16.65	287.40	287.40	0.00	0.00	0.47	0.00	0.00	0.00	
115-2014	438.24	5312.74	5312.74	0.00	0.00	0.47	0.00	0.00	0.00	
116-2014	97.64	3125.80	3125.80	0.00	0.00	0.47	0.00	0.00	0.00	
117-2014	50.98	1385.71	1385.71	0.00	0.00	0.47	0.00	0.00	0.00	
118-2014	779.74	6897.81	6897.81	395.38	395.38	0.47	0.00	0.00	0.00	rev6/16/15
119-2014	206.91	2496.51	2496.51	0.00	0.00	0.47	0.00	0.00	0.00	
120-2014	129.14	3083.64	3083.64	0.00	0.00	0.47	0.00	0.00	0.00	
121-2014	472.95	1339.84	1339.84	126.59	126.59	0.47	0.00	0.00	0.00	
122-2014	550.03	6504.79	6504.79	35.00	35.00	0.47	0.00	0.00	0.00	rev6/16/15
123-2014	29.66	251.00	251.00	215.76	215.76	0.47	0.00	0.00	0.00	
124-2014	200.07	3573.74	3573.74	594.47	594.47	0.47	0.00	0.00	0.00	
125-2014	140.05	2168.48	2168.48	1122.84	280.84	0.27	842.00	0.00	0.00	
126-2014	241.90	2692.32	2692.32	194.99	194.99	0.70	0.00	0.00	0.00	rev3/13/15
127-2014	233.77	1913.45	1913.45	0.00	0.00	0.39	0.00	0.00	0.00	
128-2014	96.45	834.91	834.91	146.35	146.35	0.39	0.00	0.00	0.00	
129-2014	141.89	1335.13	1335.13	2.72	2.72	0.39	0.00	0.00	0.00	
130-2014	150.86	646.22	646.22	0.00	0.00	0.39	0.00	0.00	0.00	
131-2014	403.97	1635.78	1635.78	502.80	502.80	0.39	0.00	0.00	0.00	
132-2014	43.56	406.51	406.51	0.00	0.00	0.39	0.00	0.00	0.00	
133-2014	196.67	830.12	830.12	0.00	0.00	0.39	0.00	0.00	0.00	
134-2014	115.17	881.93	881.93	886.76	886.76	0.39	0.00	0.00	0.00	
135-2014	104.30	160.08	160.08	0.00	0.00	0.39	0.00	0.00	0.00	
136-2014	42.25	126.19	126.19	0.00	0.00	0.39	0.00	0.00	0.00	
137-2014	42.18	115.98	115.98	0.00	0.00	0.39	0.00	0.00	0.00	
138-2014	87.02	176.17	176.17	0.00	0.00	0.39	0.00	0.00	0.00	
139-2014	91.78	299.48	299.48	0.00	0.00	0.39	0.00	0.00	0.00	
140-2014	79.48	192.50	192.50	0.00	0.00	0.39	0.00	0.00	0.00	

141-2014	Berks	Crop/Past./Anima	both	Poultry (broiler)	Yes				Yes	Yes		Yes		Yes		Yes			Yes					Yes	Yes			Yes	Yes		Yes			Yes		Yes	Yes		Crosskill Creek	A42011SL1_2000_2090	Susquehanna	103.1	4	3056.23	1063.71	1063.71	8029.58	7902.44	0.41	127.14	127.14	52.13	101.84	1284.71	1284.71	407.92	387.53	0.39	20.39	0.00	0.00	
142-2014	Lancaster	Crop/Past./Anima	both	Dairy Liquid/Hors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes			Yes	Yes	Yes		Yes	Yes, G	Yes	Yes		Yes			Yes	Yes	Yes	Yes		Muddy Run-EB Octorar	A42071SL2-2480-0001	Susquehanna	73	6	2871.39	3834.52	3841.60	821.22	266.71	0.68	552.43	0.00	0.00	96.36	453.47	544.09	113.42	22.68	0.78	0.12	0.00	0.00	rev3/30/15
143-2014	Berks	Crop/Past./Anima	both	Dairy Liq/Sol	Yes	Yes	Yes		Yes	Yes		Yes													Yes	*			Yes	Yes	Yes						Yes		Upper Little Swatara Cr	A42011SL1_2000_2090	Susquehanna	116.2	5.2	4981.72	5127.94	5127.94	909.73	909.73	0.41	0.00	0.00	0.00	162.60	807.71	807.71	59.48	59.48	0.39	0.00	0.00	0.00	
144-2014	Berks	Crop/Past./Anima	both	Dairy Liq/Sol	Yes	Yes	Yes		Yes	Yes		Yes				Yes				Yes			Yes		Yes	*			Yes	Yes	Yes			Yes	Yes		Yes		Upper Little Swatara Cr	A42011SL1_2000_2090	Susquehanna	321.8	6.5	11774.33	18053.29	18053.29	4718.19	4718.19	0.41	0.00	0.00	0.00	399.20	1216.78	1216.78	308.48	308.48	0.39	0.00	0.00	0.00	
145-2014	Lancaster	crop/anim conf	manure	duck	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes		Yes					Yes		Yes	*			Yes	Yes	Yes			Yes		Yes	Yes		Conowingo Creek	A42071SL9_2720_0001	Susquehanna	156.41	8	6237.12	7259.07	7259.07	3211.36	3211.36	0.91	0.00	0.00	0.00	206.35	1129.92	1129.92	250.34	250.34	0.81	0.00	0.00	0.00	
146-2014	Lancaster	pasture	manure	dairy,heifer,horse	Yes				Yes			Yes				Yes	Yes	Yes	Yes	Yes	Yes		Yes					Yes	Yes		Yes			Yes	Yes		Yes		Muddy Run-East Branc	A42071SL2_2480_0001	Susquehanna	137.13	11	1824.63	2061.47	2061.47	86.88	86.88	0.68	0.00	0.00	0.00	107.21	239.65	239.65	7.61	7.61	0.78	0.00	0.00	0.00	rev3/12/15
147-2014	Lebanon	Crop/Past./Anima	both	Dairy Liquid	Yes	Yes			Yes	Yes	Yes	Yes				Yes			Yes		Yes		Yes	Yes	Yes	*		Yes	Yes		Yes				Yes	Yes	Yes		Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	169.16	6.5	5944.12	6509.92	6509.92	10686.24	10686.24	0.47	0.00	0.00	0.00	197.84	1285.74	1285.74	679.03	679.03	0.39	0.00	0.00	0.00	
148-2014	Lebanon	Crop/Pasture	both	Dairy Liq/Sol	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	116.69	4	4839.53	5140.63	5140.63	639.74	639.74	0.47	0.00	0.00	0.00	159.77	564.88	564.88	63.37	63.37	0.39	0.00	0.00	0.00	
149-2014	Lebanon	Crop	manure	Dairy Solid	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	26.4	4.6	1189.70	1693.03	1693.03	0.00	0.00	0.47	0.00	0.00	0.00	38.33	238.04	238.04	0.00	0.00	0.39	0.00	0.00	0.00	
150-2014	Lebanon	Crop	both	Dairy Liquid	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	84	7.7	3785.41	6347.42	6347.42	0.00	0.00	0.47	0.00	0.00	0.00	121.97	823.55	823.55	0.00	0.00	0.39	0.00	0.00	0.00	
151-2014	Lebanon	Crop	both	Dairy Liquid	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	25.26	8.2	1138.33	2541.62	2541.62	0.00	0.00	0.47	0.00	0.00	0.00	36.68	208.67	208.67	0.00	0.00	0.39	0.00	0.00	0.00	
152-2014	Lebanon	Crop	manure	Dairy Liq/Sol	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek - Quittapah	A42075SL0_2180_2220	Susquehanna	33.13	4.6	1493.17	1587.42	1587.42	0.00	0.00	0.47	0.00	0.00	0.00	48.11	244.97	244.97	0.00	0.00	0.39	0.00	0.00	0.00	
153-2014	Lebanon	Crop	both	Dairy Liq/sol	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Snitz Creek-Quittapahil	A42075SL0_2180_2220	Susquehanna	87.4	6.9	3938.63	9557.75	9557.75	0.00	0.00	0.47	0.00	0.00	0.00	126.90	1308.95	1308.95	0.00	0.00	0.39	0.00	0.00	0.00	
154-2014	Lebanon	crop/anim conf	both	turkey	Yes	Yes			Yes	Yes	Yes	Yes												Yes	Yes	*			Yes		Yes					Yes	Yes		Lower Swatara Creek	A42075SL0_2070_2090	Susquehanna	190.9	5	8039.49	10589.32	10589.32	8798.34	8798.34	0.53	0.00	0.00	0.00	259.04	12609.72	12609.72	1111.33	1111.33	0.39	0.00	0.00	0.00	
155-2014	Lebanon	Crop	both	turkey	Yes	Yes			Yes	Yes	Yes	Yes													Yes	*			Yes		Yes								Lower Swatara Creek	A42075SL0_2070_2090	Susquehanna	76.1	11.25	3429.40	5355.55	5355.55	0.00	0.00	0.53	0.00	0.00	0.00	110.50	2217.04	2217.04	0.00	0.00	0.39	0.00	0.00	0.00	
156-2014	Lancaster	Crop	both	Poultry (broiler)	Yes	Yes			Yes	Yes		Yes													Yes	*			Yes	Yes	Yes								Little Cocalico Creek - C	A42071SL1_2190_2350	Susquehanna	23.5	8.4	1059.01	451.95	451.95	0.00	0.00	0.33	0.00	0.00	0.00	34.12	512.00	512.00	0.00	0.00	0.70	0.00	0.00	0.00	
157-2014	Cumberland	Crop	commercial fert.	N					Yes	Yes		Yes													Yes	*			Yes		Yes								Letort Spring Run	A42041SL4_2370_2330	Susquehanna	39.5	6.3	1780.04	554.89	554.89	0.00	0.00	0.54	0.00	0.00	0.00	57.35	4.93	4.93	0.00	0.00	0.39	0.00	0.00	0.00	
158-2014	Cumberland	Crop/Past./Anima	both	Dairy Liq/Sol	Yes	Yes			Yes	Yes		Yes		Yes		Yes			Yes	Yes					Yes	*			Yes		Yes				Yes		Yes		Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	78.5	7	3064.38	2938.88	2938.88	15138.88	5642.75	0.80	9496.13	9496.13	7596.90	98.74	557.27	557.27	1418.84	354.71	0.39	1064.13	0.00	0.00	
159-2014	Lebanon	crop/anim conf	both	Swine/compost					Yes		Yes	Yes		Yes								Yes	Yes	Yes	Yes				Yes	Yes	Yes				Yes	Yes	Yes		Little Chickies Creek	A42075SL2_2300_2520	Susquehanna	94.9	6.5	1623.37	7091.12	7091.12	26112.25	26112.25	0.70	0.00	0.00	0.00	81.58	869.68	869.68	355.48	355.48	0.39	0.00	0.00	0.00	
160-2014	Lebanon	crop/anim conf	both	swine	Yes				Yes	Yes	Yes	Yes		Yes											Yes				Yes		Yes					Yes	Yes		Conewago Creek	A42075SL9_2310_2430	Susquehanna	140.7	7.2	5407.73	4739.69	4739.69	39720.76	39720.76	0.85	0.00	0.00	0.00	174.24	814.87	814.87	939.45	939.45	0.39	0.00	0.00	0.00	
161-2014	Lebanon	Crop/Past./Anima	both	Dairy Liq/Sol	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes				Yes		Yes				Yes	Yes	Yes		Valley Creek-East Branc	A42029SL2_2480_0001	Susquehanna	180.19	6.85	7043.24	11503.01	11503.01	1319.45	1319.45	0.68	0.00	0.00	0.00	237.93	1256.58	1256.58	104.04	104.04	0.78	0.00	0.00	0.00	
162-2014	Lebanon	Crop/Past./Anima	both	poultry (layer)	Yes				Yes	Yes		Yes									Yes			Yes	Yes				Yes		Yes					Yes	Yes		Lower Little Swatara Cr	A42075SL1_2000_2090	Susquehanna	66.3	8.5	2304.82	4774.90	4774.90	4120.74	4120.74	0.41	0.00	0.00	0.00	76.83	2900.67	2900.67	215.64	215.64	0.39	0.00	0.00	0.00	
163-2014	Cumberland	Crop	both	Dairy Solid	Yes	Yes				Yes		Yes								Yes	Yes				Yes				Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	88.3	5.4	3979.19	3423.68	3423.68	0.00	0.00	0.80	0.00	0.00	0.00	128.21	216.64	216.64	0.00	0.00	0.39	0.00	0.00	0.00	
164-2014	Cumberland	Crop	both	Dairy Liq/Sol					Yes	Yes		Yes								Yes	Yes				Yes				Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	76.8	6.9	3460.95	5026.14	5026.14	0.00	0.00	0.80	0.00	0.00	0.00	111.51	530.81	530.81	0.00	0.00	0.39	0.00	0.00	0.00	
165-2014	Cumberland	Crop	both	Dairy Solid					Yes	Yes		Yes																	Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	33.9	7	1527.68	1245.76	1245.76	0.00	0.00	0.80	0.00	0.00	0.00	49.22	107.28	107.28	0.00	0.00	0.39	0.00	0.00	0.00	
166-2014	Cumberland	Crop	both	Dairy Liquid					Yes	Yes		Yes																	Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	74.8	5	3370.82	2488.91	2488.91	0.00	0.00	0.80	0.00	0.00	0.00	108.61	404.60	404.60	0.00	0.00	0.39	0.00	0.00	0.00	
167-2014	Cumberland	Crop	both	Dairy Solid					Yes	Yes		Yes		Yes															Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	96	6.1	4326.18	3894.51	3894.51	0.00	0.00	0.80	0.00	0.00	0.00	139.39	501.72	501.72	0.00	0.00	0.39	0.00	0.00	0.00	
168-2014	Cumberland	Crop	both	Dairy Liq/sol		Yes			Yes	Yes		Yes																	Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	43	6.5	1937.77	1617.43	1617.43	0.00	0.00	0.80	0.00	0.00	0.00	62.44	173.45	173.45	0.00	0.00	0.39	0.00	0.00	0.00	
169-2014	Cumberland	Crop	both	Dairy Liquid	Yes				Yes	Yes		Yes													Yes				Yes		Yes								Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	12	4.2	540.77	297.71	297.71	0.00	0.00	0.80	0.00	0.00	0.00	17.42	83.33	83.33	0.00	0.00	0.39	0.00	0.00	0.00	
170-2014	Cumberland	Crop	both	Dairy Solid					Yes	Yes		Yes								Yes	Yes				Yes				Yes		Yes				Yes		Yes		Middle Yellow Breeche:	A42041SL3_2400_2440	Susquehanna	48.6	6.75	2100.00	3102.36	3102.36	251.96	251.96	0.80	0.00	0.00	0.00	67.66	645.45	645.45	16.03	16.03	0.39	0.00	0.00	0.00	
171-2015	Franklin	Crop/Past./Anima	both	Dairy Liq/Sol	Yes	Yes		Yes	Yes	Yes		Yes				Yes		Yes	Yes	Yes			Yes		Yes	Yes	Grass	Yes	Yes	Yes	Yes				Yes	Yes	Yes		Mountain Creek-Conoc	A42055PU2_2790_3290	Potomac	505.73	6	24100.86	22382.45	22382.45	4441.83	4441.83	0.28	0.00	0.00	0.00	1089.79	8738.97	8738.97	396.25	396.25	0.47	0.00	0.00	0.00	
172-2015	Franklin	Crop/Past./Anima	both	Swine/Beef/Comp	Yes		Yes	Yes	Yes	Yes		Yes						Yes			Yes		Yes	Yes	Yes		Grass		Yes	Yes	Yes			Yes		Yes	Yes		Little Cove Creek	B42055PU2_3080_3640	Potomac	100.43	21	4265.03	4587.62	4587.62	21981.38	21981.38	0.46	0.00	0.00	0.00	203.90	2170.62	2170.62	510.51	510.51	0.47	0.00	0.00	0.00	
173-2015	Franklin	Crop/Pasture	both	swine	Yes		Yes	Yes	Yes	Yes		Yes						Yes							Yes				Yes		Yes			Yes					Little Cove Creek	B42055PU2_3080_3640	Potomac	72.6	10.6	2882.08	1324.55	1324.55			0.46	0.00	0.00	0.00	144.89	1189.35	1189.35			0.47	0.00	0.00	0.00	
174-2015	Franklin	Crop/Pasture	both	swine	Yes		Yes	Yes	Yes	Yes		Yes						Yes					Yes		Yes				Yes		Yes			Yes					Little Cove Creek	B42055PU2_3080_3640	Potomac	59.6	6.8	2207.10	1483.38	1483.38			0.46	0.00	0.00	0.00	115.15	1015.56	1015.56			0.47	0.00	0.00	0.00	
175-2015	Franklin	Crop	both	swine/Beef liq.	Yes		Yes	Yes	Yes	Yes		Yes													Yes		Grass		Yes	Yes	Yes								Little Cove Creek	B42055PU2_3080_3640	Potomac	95.38	6.6	4926.78	14323.81	14323.81			0.46	0.00	0.00	0.00	217.59	3855.40	3855.40			0.47	0.00	0.00	0.00	

* On this project the Cover Crop is not entered as such in the tool because it is a commodity CC, entered on it's own

** Where two or more delivery ratios exist , we used the lowest for this summary table