New York City
Department of Environmental Protection

Watershed Agricultural Program – Precision Feed Management Proposal

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Prepared in accordance with Section 4.4 of the NYSDOH Revised 2007 Filtration Avoidance Determination

Prepared by: John Schwartz and Ed Blouin
Watershed Lands and Community Planning
Bureau of Water Supply

1. Introduction

The 2014 mid-term revisions to the 2007 FAD require that DEP develop and submit a proposal, in consultation with the Watershed Agricultural Council (WAC) and Cornell Cooperative Extension (CCE), for funding and implementing a Precision Feed Management (PFM) Program on 60 eligible farms in the watershed; the FAD stipulates that fewer than 60 farms may be justified if minimal water quality benefits are expected.

This report proposes to fund and implement PFM on up to 60 active farms in the Cannonsville reservoir basin that are also participating in the Watershed Agricultural Program (WAP); the PFM proposal itself (methodology, staffing, budget, etc.) was developed by CCE in consultation with WAC and DEP during the past several months.

2. Overview

Purchased feed represent the single largest source of nutrients coming onto dairy farms; the typical dairy farm imports approximately 100 kg nitrogen (N) per cow per year and 18 kg phosphorus (P) per cow per year in purchased feed. Precision Feed Management (PFM) is the continual process of providing adequate, not excess, nutrients to the animal and deriving a majority of nutrients from homegrown feeds through the integration of feeding and forage management for the purpose of maintaining environmental and economic sustainability. PFM is an ongoing practice that is intended to become a routine part of farm management.

As demonstrated by CCE Delaware County over the past several years, PFM is one way to manage the source of nutrients on farms and it's a practical way to lower the N and P content of dairy cow manure. For example, during the period 2008-2011, participants of the Delaware County PFM Program reported average purchased grain P import reductions of 1.72 kg per cow per year while achieving manure N and P reductions of 15.2 and 4.1 kg per cow per year, respectively. These reductions are typically realized earlier in the farm's feed management improvement process and they must be continually maintained through routine monitoring. The Delaware County PFM Program has shown that without routine monitoring of feed rations and ongoing farmer support, there can be "backsliding" on nutrient reductions due to overfeeding and a lack of incentives to trigger ration reformulation for phosphorus. PFM creates benchmarks for maintaining ration changes or corrections, thereby providing an ongoing mechanism for good nutrient management. With respect to the WAP, a secondary benefit of PFM is that it will provide greater contact with many WAP participants, which is critical to the long-term success of the WAP as a whole.

With support and agreement from WAC and CCE, DEP proposes to integrate PFM into the WAP over a three-year period that includes a phased approach to participation. The WAP PFM Program will be modeled on the Delaware County PFM Program and based on the New York State Agricultural Environmental Management (AEM) Feed Management Principle: "Providing adequate, not excess, nutrients to the animal through the integration of feeding and crop management can reduce nutrient excretion in manure and nutrient accumulation in soil;

lowering potential pollution risks to water and air resources and improving farm profitability." The basic tenants of integrating PFM into the WAP are as follows:

- PFM would be assigned to an expanded WAP Nutrient Management Team that is currently spearheaded by CCE via WAC subcontract; PFM staff will work closely with farmers to collect data, identify feed management opportunities and select feed management goals, and conduct PFM benchmarking and coaching.
- The PFM process will engage WAP participants closely and regularly (4-6 times annually) in an ongoing cycle of planning, implementation, and monitoring.
- The WAP will utilize the USDA NRCS-592 Feed Management Planning Standard to ensure that PFM planning and implementation is consistent with other BMPs; similar to how the WAP develops nutrient management plans, Feed Management Plans would be updated no less than every three years to remain current while outlining comprehensive steps to be taken annually over a longer 3-5 year horizon.
- PFM would be integrated into the WAP's BMP tracking and procurement process in order to conform to the WAP's administrative structure; the Feed Management Plan and corresponding BMPs would be listed in each participant's Whole Farm Plan (WFP).
- With regard to monitoring, PFM will be integrated with the WAP's Quality Management Assistance (QMA) process, which offers farmers one-on-one technical and educational support to ensure effective BMP implementation, operation and maintenance.
- A BMP Procurement Record Form (WFP-3) will be issued with the development of an approved NRCS-592 Feed Management Plan and its subsequent updates. Each year a WFP-3 will be generated and signed through the QMA process along with an annual PFM Implementation Summary, which details feed management accomplishments for the current year and goals for the ensuing year.
- As part of the QMA monitoring process, the WAP will use PFM benchmarks that were developed by CCE and Cornell University and have been accepted as standard PFM metrics in New York State (i.e., improved nutrient efficiency, homegrown feed utilization, milk income over purchased feed costs, optimization of purchased feed nutrient imports, crop production for the feeding system, minimized nutrient overfeeding, reduced manure nutrient excretions, and lower soil nutrient accumulations).

A critical aspect of PFM is that it is quantifiable and measurable, which is why the inclusion of monitoring benchmarks are needed to determine if farms are accomplishing PFM goals. PFM monitoring involves analyzing farm records as well as testing feeds and evaluating herd production. Periodic meetings between farmers and PFM experts are key tactics for effective implementation and for achieving the proposed benchmarks below:

1. Forage Neutral Detergent Fiber (NDF) intake as % of body weight: $\geq$0.90%
2. Forage as a percent of diet: $\geq$60%
3. Home grown feeds as a percent of diet: $\geq$60%
4. Ration P as percent of National Research Council requirements: <110%
5. Diet crude protein, % of dry matter: <16.5%
6. Milk Urea Nitrogen (MUN): 8-12
7. Cows culled less than 60 Days In Milk (DIM): <8%

3. PFM Program Structure

Currently there are 79 active dairy farms that participate in the WAP and constitute the initial pool of PFM participants along with 11 beef farms that also import a significant amount of feed nutrients. The 79 dairy farms have 5,261 mature dairy cows and 10,313 total animal units (AUs), whereas the 11 beef farms have 841 mature animals and 2,160 total AUs. Collectively, these 90 farms have received more than $28.3 million worth of BMP improvements through the WAP to date. It is worth noting that a significant majority of all active dairy farms (56 or 71% total) are located in the Cannonsville basin, and these farms have 72% of all mature dairy cows and 74% of total AUs amongst dairy farms; fourteen dairy farms are located in the Pepacton basin (912 mature dairy cows and 1,577 total AUs) and nine dairy farms are located in the Schoharie basin (544 mature dairy cows and 1,080 total AUs). For the 11 beef farms that CCE and WAC have identified as potential PFM participants, eight are located in the Cannonsville basin and these eight farms have 623 mature animals and 1,591 total AUs.

At this time, DEP proposes to focus PFM eligibility on farms in the Cannonsville reservoir basin for the following reasons. First, DEP has already documented in prior FAD reports that reservoir P loads have been steadily declining for the past 20 years with the greatest reductions being attributed to wastewater treatment plant upgrades, construction of new wastewater treatment plants, the accomplishments of the WAP, and the overall reduction of agricultural activities in the watershed. Second, according to DEP's *2013 Watershed Water Quality Annual Report*, annual total phosphorus (TP) concentrations in all Catskill and Delaware reservoirs ranged from low to normal in 2013, while the 2013 median TP concentrations for major input streams to these reservoirs were near or slightly below historical averages; for the three reservoirs with active dairy farms in their basins, the TP geometric mean declined from 8.4 µg/L (2012) to 7.9 µg/L (2013) in Pepacton and from 20 µg/L (2012) to 15 µg/L (2013) in Schoharie, while increasing from 12.4 µg/L (2012) to 15 µg/L (2013) in Cannonsville. Given that nearly three-fourths of all active dairy farms, mature dairy cows, and total AUs on dairy farms are found in the Cannonsville basin, DEP feels that any water quality improvements to be achieved by PFM will be best served by focusing on Cannonsville farms.

As stated previously, DEP proposes to implement the WAP PFM Program in a phased approach over a three-year period. During the first year of the program (2016), up to 20 eligible farms from the Cannonsville basin would be selected to participate. During the second year (2017), another 20 eligible farms from the Cannonsville basin would be selected for a maximum total of 40 participants. During the third year (2018), the remaining eligible dairy and beef farms in the Cannonsville basin would be targeted, with no more than 20 new farms enrolled for a maximum of 60 total participants. Because final numbers will need to be based on eligibility criteria (to be developed next year by CCE, WAC, and DEP) along with farmer interest/readiness to participate in PFM, it is necessary to maintain flexibility with regards to committing to a final number of farms. For example, even though 56 dairy farms are located in the Cannonsville basin, at least six of these farms have less than 30 mature dairy cows which CCE has indicated might represent a potential minimum threshold given PFM costs and workload intensity.

PFM would be accomplished by expanding the WAP Nutrient Management Planning Team, which currently operates under the leadership of CCE Delaware County through a WAC

subcontract. PFM would fall under the programmatic guidance of the WAC Nutrient Management Subcommittee, with additional reporting to the WAC Agricultural Committee, WAP coaches, and DEP. An annual PFM progress report will be requested from CCE and WAC so that DEP can document the progress of PFM in its FAD annual report for the WAP.

The WAP PFM Program would be funded by DEP through a change order and amendment to the current WAC contract for the WAP, and the program itself would be staffed by CCE Delaware County through a WAC subcontract. All PFM staff would be based out of Walton in Delaware County, but they would operate with a "mobile office" (out of their vehicles) in order to remain field-based as much as possible. The intent is for PFM staff to become directly engaged with farmers the majority of their time to accomplish the following:

1. CCE WAP Team Leader (on staff presently): This position would be responsible for overall PFM program guidance and staff supervision (including feed management and manure nutrient management), in addition to providing leadership for the WAP Farmer Education Program.
2. Nutrient Management Team Leader (on staff presently): This position would provide leadership and direction to feed management and manure nutrient management planning efforts. This position may also provide feed or nutrient management functions if needed, and it will be responsible for PFM program reporting requirements and leadership for any field based research as needed.
3. Certified Feed Management Planner/Educator (to be hired): This position would develop and sign off on the NRCS-592 Feed Management Plans while contributing to farmer education efforts, QMA monitoring, and field-based research as needed.
4. Two Feed Management Planners/Educators (to be hired): These two positions will conduct annual feed management planning, implementation and monitoring activities along with PFM data collection. These two positions would also contribute to farmer education efforts and assist with farm-based demonstrations.
5. Feed Management Technical Support Staff (to be hired): This half-time position would provide clerical and data management support to all PFM staff while assisting with data collection and other PFM/WAP needs.

The proposed staffing structure for the first three years of the WAP PFM Program is outlined below and is subject to adjustment and refinement as DEP continues to work with WAC and CCE on program development and staffing/budget/workload requirements:

	Year 1	**Year 2**	**Year 3**
Position	**20 Farms**	**40 Farms**	**60 Farms**
On staff presently:			
CCE WAP Team Leader	1.0 FTE	1.0 FTE	1.0 FTE
Nutrient Management Team Leader	1.0 FTE	1.0 FTE	1.0 FTE
To be hired:			
Certified Feed Management Planner/Educator	1.0 FTE	1.0 FTE	1.0 FTE
Feed Management Planner/Educator	1.0 FTE	2.0 FTE	2.0 FTE
Feed Management Technical Support Staff	0.5 FTE	0.5 FTE	0.5 FTE
TOTAL:	**4.5 FTE**	**5.5 FTE**	**5.5 FTE**

The following timeline is estimated for the development and implementation of the WAP PFM Program between now and the first year of implementation (2016):

Task	Timeframe
Submission of WAP PFM Proposal to the NYSDOH/EPA	September 2014
Review and approval of WAP PFM Proposal by the NYSDOH/EPA	September – December 2014 (?)
Development of farm eligibility criteria and prioritization process by CCE, WAC, DEP	October 2014 – June 2015
DEP initiates and completes PFM change order and scope of work amendment to existing WAC contract for the WAP	January – December 2015
Development of WAC subcontract with CCE for implementation of PFM Program; CCE begins initial farm contact to develop pool of participants and begin screening farms	August – December 2015
CCE initiates hiring of PFM staff	January – March 2016
CCE completes initial farm selection and prioritization for PFM Years 1-3	February – June 2016
CCE begins to develop NRCS-596 Feed Management Plans along with QMA planning and monitoring on first 20 farms	February – December 2016

The following estimated budget is based on the implementation plan above and is also subject to adjustment and refinement as DEP continues to work with WAC and CCE on program development and staffing/budget/workload requirements:

	Year 1	Year 2	Year 3
	20 Farms	40 Farms	60 Farms
Staffing	$325,173	$373,569	$357,653
Education / Demonstration	$5,000	$7,500	$7,500
Feed Analysis	$30,000	$50,000	$75,000
Administration	$18,009	$21,553	$22,008
TOTAL:	**$378,181**	**$452,623**	**$462,161**

4. Summary

This report summarizes a proposal developed by DEP, CCE and WAC to integrate PFM into the WAP beginning in 2016, which allows time for the NYSDOH/EPA to approve this proposal in concept and for DEP and WAC to negotiate and execute a contract change order and amendment to allow for PFM funding and new scope of work deliverables. This proposal seeks to engage up to 60 eligible farms in the Cannonsville basin over a three-year period (2016-2018) at an estimated total cost of $1,292,965. The annual accomplishments and progress of the WAP PFM Program will be documented by DEP in future FAD annual reports for the WAP.