Charge and Scope of Work

Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads Phase 6.0 Expert Panel

Prepared for the Chesapeake Bay Program Partnership's Agriculture Workgroup by the Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads Expert Panel Establishment Group

March 6, 2015

Background

In the current version of the Chesapeake Bay Program (CBP) partnership's Watershed Model (version 5.3.2), Animal Waste Management Systems (AWMS) are defined as "practices designed for proper handling, storage, and utilization of wastes generated from confined animal operations. Reduced storage and handling loss is conserved in the manure and available for land application." In the current Watershed Model, an AWMS reduces the environmental loss of nitrogen and phosphorus from improperly stored livestock manures through surface runoff, by the implementation of federal and state recognized engineered storage and handling systems.

The Phase 5.3.2 modeling tools incorporate a standard estimate of baseline environmental nutrient losses from improper storage and handling based on the consistency of the livestock manure; e.g. solid or liquid. Nutrient losses are applied as a base environmental load irrespective of the potential impacts of the livestock housing facility, from which the AWMS BMP effectiveness values are applied. Atmospheric ammonia losses are not directly affected by AWMS BMPs, but managed through a separate atmospheric management BMP.

Poultry Heavy Use Area Concrete Pads represent the current industry standard of placing concrete pads at the primary doors of poultry housing facilities to reduce environmental litter handling losses during crust out and total house cleanup operations. These structures are not currently recognized as an existing or interim BMP by the Phase 5.3.2 models, and thus are not simulated in the Watershed Model for either implementation credit or for planning purposes until recommendations from an expert panel are adopted by the CBP partnership.

Virginia Tech, through its Expert Panel Management Cooperative Agreement with the CBP, will issue a Request for Proposals to convene an expert panel for these BMPs following adoption of this Charge and Scope of Work by the Agriculture Workgroup (AgWG).

The Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads Expert Panel Establishment Group (EPEG) was formed to:

- Identify priority tasks for the first Phase 6.0 (P6.0) Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads Expert Panel (EP),
- Recommend areas of expertise that should be included on the Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads EP, and
- Draft the Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads EP's charge (the assigned tasks) for the review process.

From February 13, 2015 through March 5, 2015 the EPEG met 4 times by conference call and worked collaboratively to complete this charge for presentation to the Agriculture Workgroup (AgWG) on March 18-19, 2015. Members of the EPEG are listed in Table 1.

Table 1. Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads Expert Panel Establishment Group membership and affiliations.

Member	Affiliation
Peter Hughes	Red Barn Consulting, Lancaster, PA
Robb Meinen	Pennsylvania State University
Jeff Porter	USDA NRCS
Lauren Torres	Delaware Department of Agriculture
EPEG support staff	
Jeremy Hanson	Virginia Tech
Mark Dubin	University of Maryland
Emma Giese	Chesapeake Research Consortium
Don Meals	Tetra Tech, Inc.

Method

The Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads EPEG developed its recommendations in accordance with the process specified by the AgWG (AgWG 2014). This process is informed by the strawman proposal presented at the December 11, 2014 AgWG meeting, the Water Quality Goal Implementation Team (WQGIT) Best Management Practice (BMP) protocol, input from existing panelists and chairs, and the process recently undertaken by the AgWG to develop the charge for the Manure Treatment Technologies EP.

The collective knowledge and expertise of EPEG members formed the basis for the recommendations contained herein. A number of EPEG members have had experience on BMP expert panels, including the P5.3.2 AWMS EP. Other EPEG members have knowledge and/or expertise in state and federal programs, the Chesapeake Bay model, and animal waste management practices within the Chesapeake Bay watershed.

Communication among EPEG members was by conference call and email. All decisions were consensus-based.

Recommendations for Expert Panel Member Expertise

The AgWG expert panel organization process directs that each expert panel is to include eight members, including one non-voting representative each from the Watershed Technical Workgroup (WTWG) and Chesapeake Bay Program modeling team. Panels are also expected to include three recognized topic experts and three individuals with expertise in environmental and water quality-related issues. A representative of USDA who is familiar with the USDA-Natural Resources Conservation Service (NRCS) conservation practice standards should be included as

one of the six individuals who have topic- or other expertise. Panelists' areas of expertise may overlap.

In accordance with the WQGIT BMP protocol, panel members should not represent entities with potential conflicts of interest, such as entities that could receive a financial benefit from Panel recommendations or where there is a conflict between the private interests and the official responsibilities of those entities. All Panelists are required to identify any potential financial or other conflicts of interest prior to serving on the Panel. These conditions will minimize the risk that Expert Panels are biased toward particular interests or regions.

The Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads EPEG recommends that the P6.0 Animal Waste Management Systems and Poultry Heavy Use Area Concrete Pads EP should include members with the following areas of expertise:

- Biological/bio-systems engineering
- Livestock production and manure management systems typical in the Chesapeake Bay region.
    - Knowledge of dairy and poultry practices required
    - Knowledge of swine, beef, and equine practices preferred
- Knowledge of how BMPs are tracked and reported, and the Chesapeake Bay Program partnership's modeling tools.
- Knowledge of relevant NRCS practice codes or standards.

Expert Panel Scope of Work

The panel will review the Phase 5.3.2 definition and loading or effectiveness estimates for the AWMS practices listed above and make adjustments or modifications as needed for Phase 6.0. In addition, the panel will review and provide recommendations on the current standard baseline estimates of environmental nutrient losses associated with storage of various types of livestock manures for the Phase 6 modeling tools. The Panel will consider the results of a recent survey of CBW jurisdictions on animal waste management systems that they track and report (see Attachment 1) as they choose which waste storage system types to include in their deliberations. The Panel will consider different loss and recoverability factors for specific animal species, livestock manure types, and manure storage and handling systems. The panel will consult regionally-appropriate published data sources in developing recommendations, including both of the following two USDA-NRCS reference sources:

- Table 11-5 of the USDA-NRCS *Agricultural Waste Management Field Handbook Chapter 11, Waste Utilization* (see Attachment 2), and
- Table B-3 of USDA-NRCS *Costs Associated With Development and Implementation of Comprehensive Nutrient Management Plans. Part I—Nutrient Management, Land Treatment, Manure and Wastewater Handling and Storage, and Recordkeeping*[1]

[1] http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012131.pdf

The Panel will also develop a recommendation on the partnership request for a definition and loading or effectiveness estimates for Poultry Heavy Use Area Concrete Pads. The Panel will address only issues related to waste storage, while any effects of treatment will be covered by the Manure Treatment Technologies Expert Panel. Collaboration between the two panels will be critical to ensure that recommendations are complimentary as well as to avoid double-counting and ensure effective reporting of practices.

The Expert Panel will be provided a project timeline for the development of the panel recommendations based on the Phase 6 development schedule. Due to additional VT technical assistance considerations for this panel, this timeline will not include the development of a provisional recommendation for this BMP prior to the finalization of a fully documented recommendation report with effectiveness values. Instead, the EPEG panel charge document may be considered by the partnership in replacement of the provisional panel recommendations, and potentially used only for initial Phase 6 Beta model development and calibration. The EPEG document however cannot be used for the final version of Phase 6.0 for future implementation progress reporting by the jurisdictions.

The panel will develop a report that includes information as described in the Water Quality Goal Implementation Team's *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*, hereafter referred to as the BMP Protocol[2] (see Attachment 3 for an outline of the final report).

Timeline/Deliverables

May/June 2015 - Panel stakeholder kickoff meeting

Spring 2015 – The panel's proposed scope of work will be based on the written EPEG charge and the Virginia Tech RFP, which will include BMP structure and type, draft BMP definition(s), and initial elements of the BMP such as associated components and conservation practices, and USDA-NRCS associated CP codes. Initially identified literature citations will be included to provide a range of potential effectiveness values that the panel will consider and supplement with further evaluation. The technical assistance coordinator for Virginia Tech will jointly present the panel's EPEG report and proposed scope of work to the AgWG, WTWG, and WQGIT for informational purposes, and for initial partnership comments on the proposed direction of the panel's evaluation. The paper will not represent a full recommendation report, and the partnership will not be asked for formal approval at this time.

Prior to October 1, 2015 – **Target date** for partnership approval of full panel recommendations. If approved by the partnership, the CBPO modeling team will build the recommendations in to the Phase 6 Beta Scenario Builder tool to meet an early October deadline. If a partnership approved panel report will not be available at this time, the CBPO modeling team will request a decision by the partnership of whether the BMP will be represented using the Phase 5.3.2

[2] http://www.chesapeakebay.net/documents/Nutrient-Sediment_Control_Review_Protocol_v7.14.2014.pdf

information, or if the panel's EPEG charge and proposed scope of work will be the interim representation of the BMP.

Early October 2015 – All inputs are final and delivered to the WSM by the Scenario Builder team for the final calibration run. Final targets are based on this information.

April 2016 – **Final date** for panel to release full recommendations for approval by the AgWG, WTWG, and WQGIT.

July 2016 – If approved by the partnership, panel recommendations are final and will replace the interim representation of the BMP in the final version of the Phase 6 modeling tools.

Phase 6.0 BMP Verification Recommendations

The panel will utilize the Partnership approved *Agricultural BMP Verification Guidance*[1] as the basis for developing BMP verification guidance recommendations that are specific to the BMP(s) being evaluated. The panel's verification guidance will provide relevant supplemental details and specific examples to provide the Partnership with recommended potential options for how jurisdictions and partners can verify recommended animal waste management systems and poultry heavy use area concrete pads practices in accordance with the Partnership's approved guidance.

[1] http://www.chesapeakebay.net/documents/Appendix%20B%20-Ag%20BMP%20Verification%20Guidance%20Final.pdf

References

AgWG. 2014. Agriculture Workgroup expert panel organization – DRAFT January 8, 2014. Agriculture Workgroup, Chesapeake Bay Program.

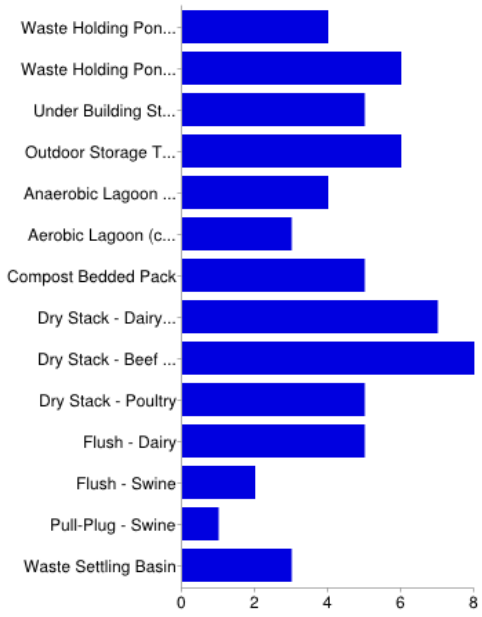
Attachment 1: Agriculture Workgroup feedback on Animal Waste Management Systems

2/20/15

10 responses

Summary

Please select all systems that are tracked and reported in your jurisdiction



Waste Holding Pond - Compacted Earth Lined	4	40%
Waste Holding Pond - Geomembrane Lined	6	60%
Under Building Storage Tank	5	50%
Outdoor Storage Tank (Open Top)	6	60%
Anaerobic Lagoon (compacted earth or geomembrane lined)	4	40%
Aerobic Lagoon (compacted earth or geomembraned lined)	3	30%
Compost Bedded Pack	5	50%
Dry Stack - Dairy (Dry Stack/Bedded Pack)	7	70%
Dry Stack - Beef (Dry Stack/Bedded Pack)	8	80%
Dry Stack - Poultry	5	50%
Flush - Dairy	5	50%
Flush - Swine	2	20%
Pull-Plug - Swine	1	10%
Waste Settling Basin	3	30%

Please list below any systems not included in the list above that are tracked and reported in your jurisdiction

Dry Stack – Equine: 3 sided above ground waste storage structure designed to house a combination of equine solids and saturated bedding material.

Non of the above. This list is far too specific based on the data reported to Virginia. The main source for animal waste systesm is NRCS which does not report type of animal or system installed just a count by practice code aggregated based on 1619 confidentiality rules. Virginia cost share collects animal type and amount of manure stored but nothing from the list provided. Currently VA discards the VACS data and only reports NRCS because of NRCS engineering support and to eliminate potential double counting.

VA currently tracks the primary type and number of animals generating the waste being stored but only limited data on the exact type of waste storage facility.

PA comments: Waste Holding Pond: we have some of these as concrete lined, should that be added as a subset? Under Building: this should include poultry. Outdoor Storage Tank: We have some of these as “covered” – the Amish buried railcar comes to mind. Dry Stack- had a question whether these are all roof-covered systems, some of them are not and is that critical to the definition or a different type of system? Also: we have poultry rooftop and litter shed systems if those are not captured in the poultry dry stack definition.

Attachment 2: USDA NRCS Estimates of Nutrient Retention in Various Waste Management Systems

Table 11–5 Percent of original nutrient content of manure retained by various management systems

Management system	Beef			Dairy			Poultry			Swine		
	N	P	K	N	P	K	N	P	K	N	P	K
	Percent											
Manure stored in open lot, cool, humid region	55–70	70–85	55–70	70–85	85–95	85–95				55–70	65–80	55–70
Manure stored in open lot, hot, arid region	40–60	70–80	55–70	55–70	85–95	85–95						
Manure liquids and solids stored in a covered, essentially watertight structure	70–85	85–95	85–95	70–85	85–95	85–95				75–85	85–95	85–95
Manure liquids and solids stored in an uncovered, essentially watertight structure	60–75	80–90	80–90	65–75	80–90	80–90				70–75	80–90	80–90
Manure liquids and solids (diluted less than 50%) held in waste storage pond				65–80	80-95	80-95						
Manure and bedding held in roofed storage				65–80	80–95	80–95	55–70	80–95	80–95			
Manure and bedding held in unroofed storage, leachate lost	55–75	75–85	75–85									
Manure stored in pits beneath slatted floor	70–85	85–95	85–95	70–85	90–95	90–95	80–90	90–95	90–95	70–85	90–95	90–95
Manure treated in anaerobic lagoon or stored in waste storage pond after being diluted more than 50%	20–35	35–50	50–65	20–35	35–50	50–65	20–30	35–50	50–60	20–30	35–50	50–60

Source: U.S. Department of Agriculture, Natural Resources Conservation Service. 2013. Agricultural Waste Management Field Handbook, Chapter 11, Waste Utilization..
http://directives.sc.egov.usda.gov/viewerFS.aspx?hid=21430

Attachment 3: Outline for Final Expert Panel Reports

- Identity and expertise of Panel members.
- Detailed definition of the practice.
- Recommended N, P, and sediment loading or effectiveness estimates.
    - Discussion may include alternative modeling approaches if appropriate.
- Justification for the selected effectiveness estimates, including:
    - List of references used (peer-reviewed, grey literature, etc.).
    - Detailed discussion of how each reference was considered and, if applicable, which sources of potential relevance were not considered.
- Description of how best professional judgment was used, if applicable, to supplement available literature and data.
- Expected Phase 6 Watershed Model land uses to which the BMP will be applied.
- Load sources that the BMP will address and potential interactions with other practices.
- Description of pre-BMP and post-BMP circumstances, including the baseline conditions for practices.
- Conditions under which the BMP works:
    - Should include conditions where the BMP will not work, or will be less effective. An example is large storms that overwhelm the design.
    - Any variations in BMP effectiveness across the watershed due to climate, hydrogeomorphic region, or other measureable factors.
- Temporal performance of the BMP including lag times between establishment and full functioning (if applicable).
- Unit of measure for the BMP and its effectiveness estimate (e.g., feet, acres).
- Locations within the Chesapeake Bay watershed where this practice is applicable.
- Useful life; effectiveness of practice over time.
- Cumulative or annual practice.
- Description of how the BMP will be tracked, reported, and verified.
    - Include a clear indication that this BMP should be used and reported by jurisdictions;
- Suggestion for a review timeline; when will additional information be available that may warrant a re-evaluation of the estimate.
- Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any, that may inform future reviews of the practice.
- Documentation of any dissenting opinion(s) if consensus cannot be reached.
- Operation and Maintenance requirements and how neglect alters performance.

Additional Guidelines

- Identify ancillary benefits and unintended consequences
- Include negative results
    - Where studies with negative pollution reduction data are found (i.e. the BMP acted as a source of pollutants), they should be considered the same as all other data.

- Include results where the practice relocated pollutants to a different location. An example is where a practice eliminates a pollutant from surface transport but moves the pollutant into groundwater.

In addition, the Expert Panel will follow the "data applicability" guidelines outlined in Table 1 of the Water Quality Goal Implementation Team's BMP Protocol.