

## **Livestock and Poultry Mortality Management BMP Expert Panel Request for Proposals**

### **I. Summary:**

The U.S. Environmental Protection Agency (EPA) Chesapeake Bay Program (CBP) through its Expert Panel Management Cooperative Agreement with Virginia Tech (VT) is seeking proposals to assemble an Expert Panel (panel) to determine pollution control performance measure estimates for best management practices (BMPs) used to manage routine mortality of poultry and livestock, including composting, incineration, gasification, freezers and rendering or landfills. Proposals should address the process of developing scientifically-defensible recommendations for nitrogen (N) and phosphorus (P) performance estimates (i.e. efficiencies) for these practices. When conducting their business and reporting their findings, panels are expected to adhere to the process and protocols contained in the current version of the document entitled *Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model*<sup>1</sup> hereafter referred to as the "BMP Protocol." The panel is expected to deliver a report that conforms in content and format as specified in the BMP Protocol<sup>1</sup>. The panel will be assisted by Virginia Tech's Project Coordinator for Expert Panel BMP Assessment who is located in EPA's Chesapeake Bay Program Office in Annapolis, MD. Included in that assistance is logistical support for all panel conference calls (including providing a conference bridge) and meetings, and editorial support for developing the panel's final report.

### **II. Background:**

The CBP partnership's Agriculture Workgroup (AgWG) has requested a review of routine mortality management practices currently in use in the Chesapeake Bay region for incorporation in the Phase 6.0 Chesapeake Bay Watershed Model (Model). This is in response to increased implementation of mortality composting systems and other alternative processes for routine mortality management on agricultural operations. The review is also intended to address the current deficiency of available information in the Model that would allow for planning or crediting animal mortality management practices towards Total Maximum Daily Load (TMDL) goals.

The AgWG requests that the expert panel includes at least six members, one of whom serves as the Panel Chair, with at least three recognized topic experts and three individuals with expertise in environmental and water quality-related issues. One non-voting representative each from the Watershed Technical Workgroup (WTWG) and Chesapeake Bay Program modeling team are also expected to participate on the panel. An additional representative from the EPA Region III office is recommended in cases where implementation of the BMPs evaluated by the panel are associated with federal permitting processes. A representative of USDA who is familiar with relevant USDA-Natural Resources Conservation Service (NRCS) conservation practice standards should also be included. Panelists' areas of expertise may overlap. See section IV for additional information about panel composition.

### **III. Scope of Work:**

The general scope of work for the Livestock and Poultry Mortality Management Expert Panel will be to define and configure the Animal Mortality Management BMPs for use in the Model. Specifically, the AgWG recommends the following charge with associated tasks for the Livestock and Poultry Mortality Management Expert Panel:

1. Determine scope of the Livestock and Poultry Mortality Management Expert Panel based on available data and impact on water quality.
  - o Animal groups and/or group components to be addressed
    - Definitions available on CBP's Chesapeake Assessment Scenario Tool (CAST)<sup>2</sup>
  - o Mortality management practices to be addressed (See Attachment B, Table 2)
2. Define load reduction efficiencies for N and P of selected practices for agricultural feeding space areas.

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<sup>1</sup> [http://www.chesapeakebay.net/documents/CBP\\_BMP\\_Expert\\_Panel\\_Protocol\\_WQGIT\\_approved\\_7.13.15.pdf](http://www.chesapeakebay.net/documents/CBP_BMP_Expert_Panel_Protocol_WQGIT_approved_7.13.15.pdf)

<sup>2</sup> <http://cast.chesapeakebay.net/Home/SourceData>

- Consider fate of N and P across selected practices
    - Decomposition and mineralization
    - Leachate
    - Volatilization
    - Field application
    - Removal from agricultural system
3. Determine how the selected mortality management practices can be represented in the Model.

The Panel shall consider incorporating relevant USDA-NRCS conservation practice standards and codes and other established practices in recommending BMPs for animal mortality management practices, e.g., NRCS Conservation Practice Standard 316 (Animal Mortality Facility).

#### Guidelines for final report

The panel will consult peer-reviewed literature and any regionally-appropriate published data. In developing its recommendations the panel will follow the data characterization approach described in Table 1 of the BMP Protocol<sup>1</sup>, which is provided below as Attachment A. The panel is encouraged to utilize resources listed in Attachment B in addition to others identified by the panel.

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*, known as the BMP Protocol<sup>1</sup>. The elements of the report required under the BMP Protocol<sup>1</sup> are listed here, but additional detail is available in the BMP Protocol<sup>1</sup> document.

- Identity and expertise of panel members
- Name or title of the practice(s)
- Detailed definition of the practice(s)
- Recommended N, P and TSS loading or effectiveness estimates
- Justification of selected effectiveness estimates
  - List of data sources considered and description of how each data source was considered
  - Identify data sources that were considered, but not used in determining practice effectiveness estimate
  - Documentation of uncertainties in the published literature
  - Documentation of how the Panel addressed negative results or no pollution reduction as a result of implementation of a specific practice
- Description of how best professional judgment was used, if applicable, to determine effectiveness estimates
- Land uses to which BMP is applied
- Load sources that the BMP will address and potential interactions with other practices
- Description of pre-practice and post-practice circumstances, including the baseline conditions for individual practices
- Conditions under which the practice performs as intended/designed
- Temporal performance of BMP including lag times between establishment and full functioning
- Unit of measure
- Locations in CB watershed where the practice applies
- Useful life; practice performance over time
- Cumulative or annual practice
- Recommended description of how practice could be tracked, reported, and verified

- Guidance on BMP verification<sup>3</sup>
- Description of how the practice may be used to relocate pollutants to a different location
- Suggestion for review timeline; when will additional information be available that may warrant a re-evaluation of the practice effectiveness estimates
- Identification of any unintended consequences or ancillary benefits associated with a practice
- Outstanding issues that need to be resolved in the future and a list of ongoing studies, if any
- Documentation of dissenting opinion(s) if consensus cannot be reached
- Operation and Maintenance requirements and how neglect alters the practice effectiveness estimates
- A brief summary of BMP implementation and maintenance costs estimates, when this data is available through existing literature

While the panel is active the Panel Chair and Panel Coordinator will provide updates on the panel's progress to the AgWG as described in the BMP Protocol.

As the panel drafts its report for release the Panel Chair and Panel Coordinator will work with the CBP modeling team and Watershed Technical Workgroup (WTWG) to develop a technical appendix for incorporating the recommended BMPs into the Model. Coordination with the panel's WTWG and Modeling Team representatives throughout the process will help to ensure the panel's recommendations fit within the overall model framework.

As described in the BMP Protocol, the Panel Chair and Panel Coordinator will facilitate the CBP partnership review, comment and approval process on behalf of the panel, updating and seeking input from panel members as needed. The Panel Chair and Panel Coordinator will respond to CBP partnership comments and make edits or revisions to the report, seeking panel input on substantive revisions. The panel is dismissed following CBP partnership approval of the final report (as amended).

#### **IV. Content and Length:**

Proposals submitted under this RFP may request funding up to \$60,000 in total costs, including any indirect or overhead. The project duration is a maximum of eighteen (18) months from the award date. The panel should deliver its draft report within 12 months after the panel's first meeting or conference call. An additional 3-6 months is typically needed for CBP partnership review, comment and approval. Proposals should be no longer than six (6) 8 ½" x 11" pages, single-spaced, 11 pt Arial font. Two-page (maximum) CVs that document the qualifications of each of the proposed panelists, including the Panel Chair, should be included with the proposal submission. The CVs are in addition to the six page proposal limit. Proposals must specify/identify the following:

1. Expert Panel Chair.
2. A minimum of six (6) and a maximum of ten (10) panel members is recommended. This does not include the Panel Coordinator or non-voting representatives from the WTWG, Chesapeake Bay Program modeling team, or EPA Region 3. The Chesapeake Bay Program Office will assign representatives from the WTWG and the CBP modeling team and applicants need not include the CV's of these individuals in their proposal. These assigned participants will lend specific expertise to each panel (e.g., the CBP modeling team panel member will lend a working knowledge of the Model and potential ways the Model can accommodate various BMPs). Panelists' areas of expertise may overlap. **Panel members MUST 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**

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<sup>3</sup> The panel will utilize the Partnership approved *Agricultural BMP Verification Guidance*, 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 livestock and poultry mortality management practices in accordance with the Partnership's approved guidance. <http://www.chesapeakebay.net/documents/Appendix%20B%20-Ag%20BMP%20Verification%20Guidance%20Final.pdf>

**panelists MUST identify any potential financial or other conflicts of interest prior to serving on the Panel.**

Proposed panel members identified in the Proposal should include members with the following areas of expertise:

- Expertise in design/engineering/implementation of mortality management systems.
- Experience with carrying out scientific research projects relating to mortality management.
- Expertise in fate and transport of N and P from farmsteads.
- Knowledge of effectiveness of livestock and poultry mortality management practices implemented in the Bay jurisdiction(s).
- Experience with verification of livestock and poultry mortality management practices used at farmsteads.
- Knowledge of and experience with relevant USDA-NRCS conservation practice standards and codes. One panel member should be a representative of USDA who is familiar with relevant USDA-NRCS conservation practice standards for mortality management.

The panel composition should cover each of the above areas of technical expertise; an individual panel member may be considered an expert in multiple areas based on their CV. For the proposal selected, the proposed panel membership must be reviewed and approved as summarized in section V below and described in the BMP Protocol. Applicants may contact Virginia Tech's Project Coordinator, Jeremy Hanson for details regarding panel composition and the BMP Protocol process for approving panel membership ([jchanson@vt.edu](mailto:jchanson@vt.edu); 410.267.5753).

3. Project Narrative/Scope of Work that details how the Expert Panel Chair and membership plan to develop their final report. This section should document how the proposed Expert Panel will execute the process and procedures detailed in the CBP's BMP Protocol<sup>1</sup>.
4. Project timeline. As noted above, the panel's report is requested 12 months from when the panel convenes for its first call or meeting, with additional time expected for the CBP partnership review and approval process. The proposed timeline should use the general timeline included in Attachment B as a guide. Future modifications to the timeline, including extensions, can be negotiated as needed.
5. Project Budget including a detailed budget justification. Typical costs include Panel Chair salary and fringes, travel costs, and if justified staff time. Panelists are normally volunteers, but eligible panelists can be reimbursed for travel costs under the project budget.

## V. Proposal Review and Selection

Proposals will be reviewed by a panel that includes Virginia Tech faculty and staff associated with the Expert Panel Management Cooperative Agreement that is funding this effort and selected CBP staff familiar with the panel's charge and the associated CBP needs. Proposals will be scored and ranked using the criteria specified below. The proposals will also be shared with and reviewed by the CBP Program Officer responsible for oversight of the Expert Panel Management Cooperative Agreement with VT. Review comments made by the CBP Program Officer will be considered when selecting the winning proposal. Upon selection, the Panel's scope of work (SOW) and list of proposed panel membership will be subject to review and comment by CBP partnership groups, as described in the BMP Protocol,<sup>1</sup> including the Water Quality Goal Implementation Team, relevant workgroups such as the AgWG and WTWG and CBP Advisory Committees such as the Scientific and Technical Advisory Committee. Approval of the SOW and membership will be requested from the AgWG. Any changes to the SOW or membership as a result of this process will be made cooperatively between the Panel Chair and the CBP partnership. The feedback and approval process typically takes 1-3 months. The panel will convene for its first call and begin its timeline following approval from the AgWG.

**V.i. *Evaluation Criteria:***

**1. *Organizational Capability and Program Description (40%):***

Proposals will be scored based on the overall quality of the proposal and how it demonstrates/illustrates the process/tasks that will be undertaken to successfully achieve the project's objectives by the posed deadline. Reviewers will specifically assess the extent to which proposed project acknowledges and will adhere to the BMP Protocol<sup>1</sup>. As presented in the BMP Protocol, Expert Panels are expected to develop definitions and loading or effectiveness estimates for the nutrient- and sediment-reducing technologies and practices they have agreed to review. Each Expert Panel will work with the VT Project Coordinator, the appropriate CBP source Workgroup(s) and the CBP WTWG to develop a final report that documents the elements listed on page 4 of this RFP and discussed in more detail in the BMP Protocol<sup>1</sup>.

In addition, the Expert Panel will follow the "data characterization" guidelines outlined in Table 1 of the BMP Protocol<sup>1</sup> (provided as Attachment A to this RFP). The panel will utilize the CBP partnership approved Agriculture Verification Guidance<sup>4</sup> 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 practices in accordance with the CBP partnership's approved guidance.

**2. *Past Performance and Programmatic Capability (20%)***

Proposals should, to the extent possible, discuss how the applicant's past performance will ensure the successful completion of proposed activity (i.e., managing a panel of experts to seek out and review relevant data/information to produce a science-based, defensible report on a given topic or suite of topics).

**3. *Probability of success of the project (40%)***

Proposals will be evaluated against the following criteria:

- a. Reasonableness of timeline.
- b. Qualifications of proposed Expert Panelists and their willingness to participate (can be demonstrated with a letter or collaboration appended to proposal).
- c. Appropriateness of requested budget and budget justification.
- d. Adequacy of available support personnel and facilities (if specified in proposal).

**VI. Proposal Submission**

**Proposals are due by the close of business on June 18, 2018.** Proposals may be submitted via email or via regular mail to:

Brian Benham

Professor and Extension Specialist

Virginia Tech

Biological Systems Engineering (MC0303)

Seitz Hall RM 209, Virginia Tech

155 Ag Quad Lane

Blacksburg, VA 24061

540.231.5705

[benham@vt.edu](mailto:benham@vt.edu)

Questions about this RFP should also be directed to Project Coordinator Jeremy Hanson (410.267.5753; [jchanson@vt.edu](mailto:jchanson@vt.edu)) or Dr. Benham.

<sup>4</sup> <http://www.chesapeakebay.net/documents/Appendix%20B%20-Ag%20BMP%20Verification%20Guidance%20Final.pdf>

**Attachment A: Table 1 from BMP Protocol – Data Source Characterization [for BMP Panel literature reviews]**

	<b>High Quality</b>	<b>Medium Quality</b>	<b>Low Quality</b>
Extent of Replication	Clearly documented and well-controlled past work that has since been replicated or strongly supported by the preponderance of other work; recent (< 5-year old) work that was clearly documented and conducted under well-controlled conditions and thus conducive to possible future replication	Clearly documented older (>5-yr old) work that has not yet been replicated or strongly supported by other studies, but which has also not been contraindicated or disputed	Work that was not clearly documented and cannot be reproduced, or older (>5-yr old) work for which results have been contraindicated or disputed by more recent results in peer-reviewed publication or by other studies that are at least equally well documented and reproducible
Applicability	Purpose/scope of research/publication matches information/data need	Limited application	Does not apply
Study location	Within Chesapeake Bay	Characteristic of CB, but outside of watershed	Outside of CB watershed and characteristics of study location not representative
Data collection & analysis methods	Approved state or federal methods used; statistically relevant	Other approved protocol and methods; analysis done but lacks significance testing	Methods not documented; insufficient data collected
Conclusions	Scientific method evident; conclusions supported by statistical analysis	Conclusions reasonable but not supported by data; inferences based on data	Inconclusive; insufficient evidence
References	Majority peer-review	Some peer-review	Minimal to none peer-review

**Attachment B**  
**Recommendations for Livestock and Poultry Mortality Management**  
Prepared for the Chesapeake Bay Program Partnership's Agriculture Workgroup by the  
Animal Mortality Management Expert Panel Establishment Group  
Approved by Agriculture Workgroup, March 15<sup>th</sup>, 2018

**Background**

In the recently approved Chesapeake Bay Program (CBP) Phase 6.0 Watershed Model, animal mortality and associated mortality management practices are not fully represented for crediting purposes. The only existing partnership-approved Best Management Practice (BMP) associated with mortality management is termed “mortality composting” and is defined as: “A physical structure and process for disposing of any type of dead animals. Composted material is land applied using nutrient management plan recommendations. Enter units of the percent of dead animals composted, animal count, animal units, or number of systems.” Efficiency values for nitrogen (N) and phosphorus (P) are not currently represented in the model for the mortality composting BMP.

The Agriculture Workgroup (AgWG) has requested a review of mortality management practices currently in use in the Chesapeake Bay watershed for the Phase 6.0 Model. This is in response to increased implementation of mortality composting systems and other alternative management processes for routine mortality management on agricultural operations. The review is also intended to address the current deficiency of available information in the Phase 6.0 Model that would allow for planning or crediting animal mortality management practices towards Total Maximum Daily Load (TMDL) goals.

The Animal Mortality Management Expert Panel Establishment Group (EPEG) was formed to:

- Determine the necessity for a Phase 6.0 Animal Mortality Management Expert Panel (EP).
- Identify priority tasks for the Phase 6.0 Animal Mortality Management EP,
- Recommend areas of expertise that should be included on the Animal Mortality Management EP, and
- Draft the Animal Mortality Management EP’s charge for the review process.

From November 8, 2017 through January 19<sup>th</sup>, 2018 the EPEG met two times by conference call and worked collaboratively to complete this charge for presentation to the AgWG on February 15<sup>th</sup>, 2018. Final approval of the charge was obtained by online polling of all EPEG members (Table 1).

**Table 1. Animal Mortality Management Expert Panel Establishment Group membership and affiliations.**

<b>Member</b>	<b>Affiliation</b>
Frank Schneider	PA State Conservation Commission
Chris Brosch	Delaware Department of Agriculture
Shelly Dehoff	PA Agricultural Ombudsman Program
Gary Felton	University of Maryland
George Malone	Malone Poultry Consulting
John Moyle	University of Maryland Extension
<b>EPEG Support Staff</b>	
Loretta Collins	University of Maryland
Mark Dubin	University of Maryland
Lindsey Gordon	Chesapeake Research Consortium
Jeremy Hanson	Virginia Tech

**Glossary of Terms**

**Farmstead:** Area on commodity and livestock operations that includes service buildings (e.g., headquarters), feed and commodity storage, and other pervious and impervious areas not already addressed by BMPs designed for production areas. This does not include barnyards, loafing lots, or other production areas which are represented

separately. Farmstead areas are not directly represented in the Phase 6.0 modeling support tools by a discrete agricultural land use.

**Feeding Space:** Livestock and poultry production and feeding areas associated with livestock operations which includes barnyards, loafing lots, and other pervious and impervious production areas. Feeding space areas are directly represented in the Phase 6 modeling support tools by a discrete agricultural land use for the application and crediting of BMPs designed for production areas (e.g., animal waste management systems).

**Animal Mortality Management:** This represents the management of routine agricultural animal mortality which protects ground and surface water from contamination by carcasses or runoff/leaching from areas containing carcasses. These practices can also prevent the spread of pathogens off the site as well as protect the biosecurity of the farm by preventing off-farm pathogens from being introduced during pickup or handling of carcasses by contractors or service providers. Mortality management can be accomplished by several methods, including composting, incineration or gasification, offsite disposal in permitted landfills, or on-farm freezing and removal for recycling or rendering to alternative uses.

**Mortality Burial:** Disposal method in which whole carcasses are buried underground and decompose via natural processes over a period of time, dependent on site conditions. Burial site factors such as distance from waterways and depth to groundwater are important considerations and are regulated in most states. Poor site selection can pose risks to water quality. Management by burial treats the whole carcass as a waste product, rather than a by-product with marketable value. Mortality burial is not recommended as a BMP for evaluation by the EP, but it may be considered a baseline from which to measure alternative mortality management practices.

**Mortality Composting:** Composting is a controlled, biological heating process that results in the natural degradation of organic resources (such as animal carcasses) by microorganisms. Microbial activity within a well-managed compost pile can generate and maintain temperatures sufficient to inactivate most pathogens. *Mortality composters* refer to specifically designed physical structures for composting routine mortality on the farmstead. Mortality composting can be applied to various species. The fate of the composted product is often land application under the guidance of a nutrient management plan. There is potential for the compost to be removed from the farmstead for use elsewhere as a value-added product.

**Mortality Freezers:** Routine mortality is temporarily stored in large on-farm freezer units for collection by a contractor or service-provider. Primarily used for smaller animal types like poultry, a bio-secure vehicle arrives between flocks to take the material off-site, presumably to a rendering facility.

**Mortality Incineration or Gasification:** The carcass is completely consumed by fire and heat within a self-contained incinerator utilizing air quality and emissions controls. Gasification is a high temperature method of vaporizing the biomass with no direct flame, with oxidation of the fumes in an after-burning chamber. Incinerators and gasifiers are subject to applicable state air quality/emissions requirements. The remaining solid by-product of incineration is ash, which should be spread in accordance with a nutrient management plan or disposed of by other means acceptable to water quality protection goals. Gasification by-products include syngas and char or ash, depending on the feedstock and design of the system.

**Mortality Landfill:** Off-site disposal of carcasses at a licensed and permitted landfill that accepts animal mortalities and is designed to be protective of surface and groundwater sources. Unlike mortality burial, appropriate landfilling removes nutrients associated with the carcass from the agricultural nutrient stream. Similar to burial, however, no valuable by-product is produced.

**Rendering:** Typically refers to the process of breaking down animal by-products (e.g., fat, bone, and hides) from animal processors and slaughter facilities. For the purposes of the EP, rendering would refer to the processing of animal mortalities via pick-up and removal of the remains from the farmstead by the rendering facility or an intermediary. The rendering industry as a whole reduces the burden on regional landfills that would otherwise serve as disposal sites for these products.

**Animal Groups:** The EPEG recommends to the AgWG that the forthcoming EP organize consideration of animal mortality practices and subsequent water quality benefits into two general groupings:

- Primary Animal Group (PAG): Swine and poultry.
- Secondary Animal Group (SAG): All other animal groups. It is left to the discretion of the EP to assess the BMP efficiencies and verification for these animal groups and/or group components.

## **Method**

The Animal Mortality Management EPEG developed its recommendations in accordance with the process specified by the AgWG in 2014<sup>5</sup>. 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. Several of the EPEG members have had experience on BMP expert panels or subcommittees. EPEG members and the technical support team also have knowledge and/or expertise in state and federal programs, the Chesapeake Bay model, and livestock and poultry mortality 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 Animal Mortality Management EPEG recommends that the AgWG establish an Expert Panel to evaluate routine animal mortality and associated mortality management practices currently being implemented in the Chesapeake Bay watershed by livestock and poultry operations, and develop a recommendation report of its findings following standard CBP partnership protocols.

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.

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 Mortality Management EPEG recommends that the Phase 6.0 Animal Mortality Management EP should include members with the following areas of expertise:

- Expertise in design/engineering/implementation of mortality management systems.
- Experience with carrying out scientific research projects relating to mortality management.
- Expertise in fate and transport of N and P from farmsteads.
- Knowledge of effectiveness of livestock and poultry mortality management practices implemented in the Bay jurisdiction(s).
- Knowledge of how BMPs are tracked and reported, and the Chesapeake Bay Program partnership's modeling tools.

<sup>5</sup> [http://www.chesapeakebay.net/channel\\_files/22323/january\\_8\\_2015\\_agwg\\_expert\\_panel\\_process.pdf](http://www.chesapeakebay.net/channel_files/22323/january_8_2015_agwg_expert_panel_process.pdf)

- Experience with verification of livestock and poultry mortality management practices used at farmsteads.
- Knowledge of and experience with relevant USDA-NRCS conservation practice standards and codes.

### **Expert Panel Scope of Work**

The general scope of work for the Animal Mortality Management EP will be to define and configure the Animal Mortality Management BMPs in the Phase 6 model. Specifically, the Animal Mortality Management EPEG recommends the following charge with associated tasks for the Phase 6.0 Livestock and Poultry Mortality Management EP:

4. Determine scope of the EP based on available data and impact on water quality
  - Animal groups and/or group components to be addressed
    - Definitions available on CBP's Chesapeake Assessment Scenario Tool (CAST)<sup>6</sup>
  - Mortality management practices to be addressed (Table 2)
5. Define load reduction efficiencies for N and P of selected practices for agricultural feeding space areas.
  - Consider fate of N and P across selected practices
    - Decomposition and mineralization
    - Leachate
    - Volatilization
    - Field application
    - Removal from agricultural system
6. Determine how the selected mortality management practices can be represented in the model.
  - Consider the information necessary to address Options 1 and 2 (Figure 1)
    - Option 1: applicable to 2020-2021 milestone planning
    - Option 2: applicable to post-Phase 6.0 Watershed Model

**Table 2. Data Needed for Animal Mortality Management Representation in the Phase 6.0 Watershed Model**

General Animal Group (defined by EPEG)	BMP Animal Groups	% N per Carcass	% P per Carcass	Mortality %	Avg. Dead weight?	Mortality Management Baseline (1984)	Mortality Management Today**	
Primary Animal Group	Poultry	?	?	?	?	Burial	Burial	Yes
							Freezer	Yes
							Compost	Yes
							Incineration	Yes
	Swine	?	?	?	?	Burial	Burial	Yes
							Freezer	Yes <sup>#</sup>
							Compost	Yes
							Incineration	Yes
Secondary Animal Group	Cattle	?	?	?	?	Burial	Burial	Yes
							Freezer	No
							Compost	Yes
							Incineration	No
	Equine*	?	?	?	?	Burial	Burial	Yes
							Freezer	No
							Compost	Yes
							Incineration	No
	Other? (e.g. Sheep, Goats)	?	?	?	?	Burial	Burial	Yes
							Freezer	No
							Compost	Yes
							Incineration	No

\*Direct-to-rendering also practiced

\*\* Current mortality management in the Bay watershed, as understood by EPEG members

<sup>#</sup>Piglets (nursery) only

<sup>6</sup><http://cast.chesapeakebay.net/Home/SourceData>

## Figure 1. Potential Crediting Mechanisms Presented to the AgWG on October 19<sup>th</sup>, 2017

### Potential Credit Mechanisms:

Option 1: If an EP finds a water quality benefit, that benefit could be added as a % reduction to feed space loads in a future milestone period.

Option 2: Ag Workgroup could request a change to the manure calculations from the Water Quality GIT and Modeling Workgroup in a future milestone period if an EP defines:

- % mortality
- nutrients available in carcasses
- water quality benefit

Consider incorporating relevant USDA-NRCS conservation practice standards and codes and other established practices in recommending BMPs for livestock and poultry mortality management practices, e.g., NRCS Conservation Practice Standard 316 (Animal Mortality Facility).

The following resources should also be considered by the EP as part of developing its recommendations in addition to any relevant peer-reviewed or gray literature identified and reviewed by the EP:

**File Resources accessible from:** Chesapeake Bay Program's OneDrive Cloud Storage. Access available upon request from AgWG Coordinator.

1. Previously approved CBP documents relating to animal mortality management
2. Mortality and carcass nutrient data
  - a. Poultry
  - b. Swine
  - c. Cattle

### Online Resources:

1. Spartan Compost Optimizer  
[http://www.canr.msu.edu/managing\\_animal\\_mortalities/composting\\_tools](http://www.canr.msu.edu/managing_animal_mortalities/composting_tools)

### Timeline and Deliverables

The Expert Panel project timeline for the development of the panel recommendations is based on reasonable expectations informed by previous CBP BMP Expert Panels.

- **Spring 2018** – EPEG recommendations approved by AgWG; Virginia Tech issues Request for Proposals (RFP) to solicit panel membership
- **Summer 2018** – Virginia Tech selects proposal and shares proposed panel membership with CBP partnership for feedback; final proposed panel membership brought to AgWG for approval
- **Fall 2018** – Panel hosts open stakeholder session and face-to-face meeting
- **Summer 2019 – Target date** for panel to release full recommendations and final report for approval by the AgWG, WTWG, and WQGIT. This process is expected to take three to six months.

- **Summer/Fall 2019** – If approved by the partnership, panel recommendations are final and will be represented in the Phase 6.0 modeling tools in 2019 as part of the model updates.

Separately, during spring and summer of 2018, CBPO staff and the AgWG will work to update the previously approved interim BMP for mortality management<sup>7</sup> to clarify the nutrient reductions that can be used for planning purposes.

#### **Phase 6.0 BMP Verification Recommendations:**

The panel will utilize the Partnership approved *Agricultural BMP Verification Guidance*<sup>8</sup>, 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 livestock and poultry mortality management practices in accordance with the Partnership's approved guidance.

#### **Attachment 1: Outline for Final Expert Panel Reports**

- Identity and expertise of Panel members
- Practice name/title
- Detailed definition of the practice
- Recommended nitrogen and phosphorus 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, unpublished, etc.)
  - Detailed discussion of how each reference was considered, or if another source was investigated, but not considered.
- Description of how best professional judgment was used, if applicable
- Land uses to which the BMP is 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 individual 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.
- Temporal performance of the BMP including lag times between establishment and full functioning (if applicable)
- Unit of measure (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 will 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
- 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

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<sup>7</sup> [https://www.chesapeakebay.net/channel\\_files/23293/mortality\\_management\\_interim\\_bmp\\_recommendation\\_04212016\\_5.pdf](https://www.chesapeakebay.net/channel_files/23293/mortality_management_interim_bmp_recommendation_04212016_5.pdf)

<sup>8</sup> <http://www.chesapeakebay.net/documents/Appendix%20B%20-Ag%20BMP%20Verification%20Guidance%20Final.pdf>

- 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 removes nutrients from the farmstead but moves the nutrient into subsurface water flow and/or groundwater via burial.

In addition, the Expert Panel will follow the “data applicability” guidelines outlined Table 1 of the Water Quality Goal Implementation Team Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model<sup>9</sup>.

## References

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<sup>9</sup> [https://www.chesapeakebay.net/documents/CBP\\_BMP\\_Expert\\_Panel\\_Protocol\\_WOGIT\\_approved\\_7.13.15.pdf](https://www.chesapeakebay.net/documents/CBP_BMP_Expert_Panel_Protocol_WOGIT_approved_7.13.15.pdf)