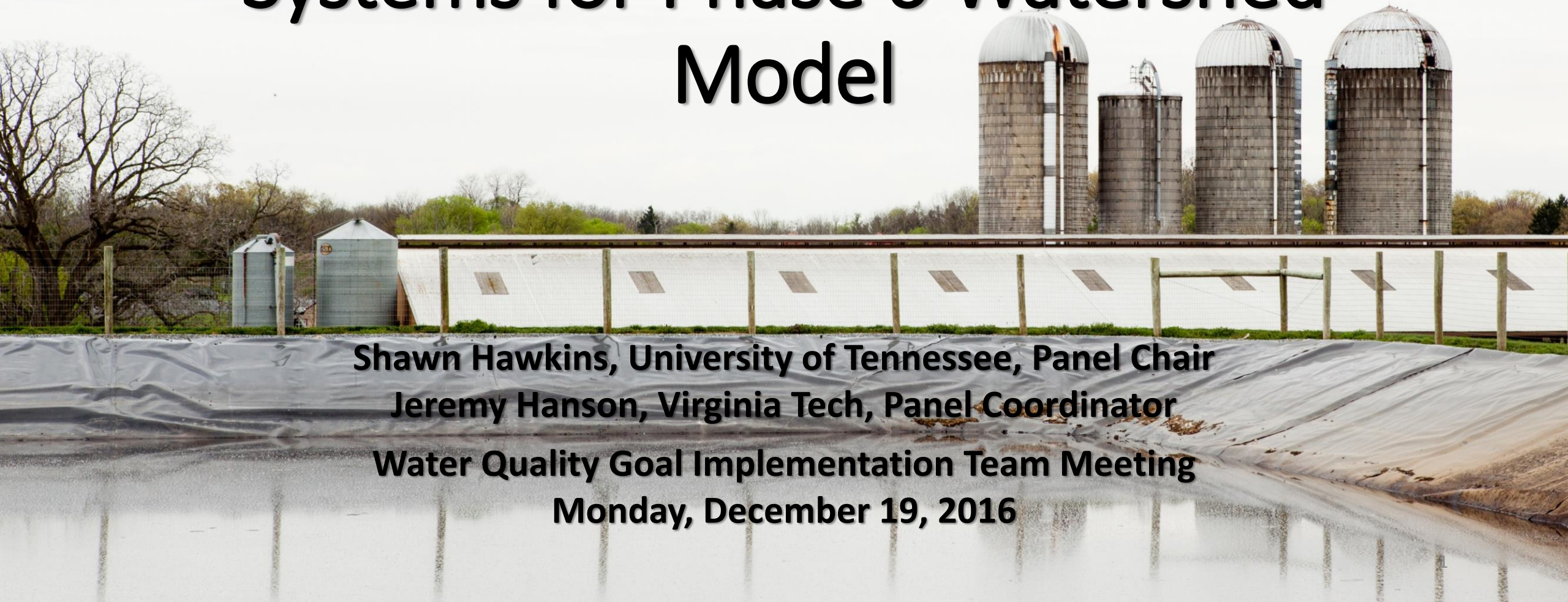
# Animal Waste Management Systems for Phase 6 Watershed Model



**Shawn Hawkins, University of Tennessee, Panel Chair**
**Jeremy Hanson, Virginia Tech, Panel Coordinator**

**Water Quality Goal Implementation Team Meeting**
**Monday, December 19, 2016**

# Panel Membership

- 6 voting members
  - 3 recognized panel topic experts: Biological/Biosystems [Agricultural] Engineers
  - 3 recognized experts in environmental and water quality-related issues
  - USDA representative familiar with USDA NRCS Conservation Practice Standards
  - Knowledge of AWMS – dairy & poultry required; swine, beef, & equine preferred
- 2 non-voting members from Watershed Technical Workgroup and Chesapeake Bay Program modeling team + Regulator Representative
  - Knowledge of how BMPs are tracked and reported
  - Chesapeake Bay Program modeling tools
- All members certified with no Conflicts of Interest

# Panel roster

| | |
|---|---|
| **Shawn Hawkins, Ph.D., P.E.**  | Panel Chair, Animal Waste Management Specialist<br>University of Tennessee |
| **Doug Hamilton, Ph.D., P.E.**  | Animal Waste Management Specialist<br>Oklahoma State University |
| **Jonathan Moyle, Ph.D.**  | Poultry Extension Specialist<br>University of Maryland Extension |
| **Pete Vanderstappen, P.E.**  | Pennsylvania Assistant State Engineer<br>USDA-NRCS-Pennsylvania |
| **Mark Risse, Ph.D.**  | Director of Marine Outreach<br>University of Georgia |
| **Bridgett McIntosh, Ph.D.**  | Equine Extension Specialist<br>Virginia Tech |
| **Matt Johnston** | University of Maryland, CBPO (Modeling Team Rep) |
| **Greg Albrecht** | NYS Dept. of Ag and Markets (WTG Rep) |
| **Ashley Toy** | EPA Region 3 (Regulatory Representative) |
| **Mark Dubin** | University of Maryland Extension, CBPO, AgWG coordinator |
| **Jeremy Hanson** | Virginia Tech, CBPO, Panel Coordinator |

# Panel Charge

- Review Phase 5.3.2 AWMS BMP:
  - Review definition
  - Consider different loss and recoverability factors for specific animal species
  - Definition and effectiveness of Poultry Heavy Use Area Concrete Pads
  - No consideration of treatment practices, only collection, handling and storage

- References:
  - Table 11-5, USDA-NRCS *Agricultural Waste Management Field Handbook Chapter 11, Waste Utilization*
  - Table B-3, 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*

# Timeline

- Convened for first call: March 2016
- Public stakeholder meeting: April 2016
- Preliminary recommendations approved by AgWG for beta-4: September 2016
- Draft report available December 6th, comments requested by COB December 12$^{th}$
- Draft report approved by AgWG + WTWG December 16
- Seek approval by WQGIT, December 19

# Phase 6 AWMS definition

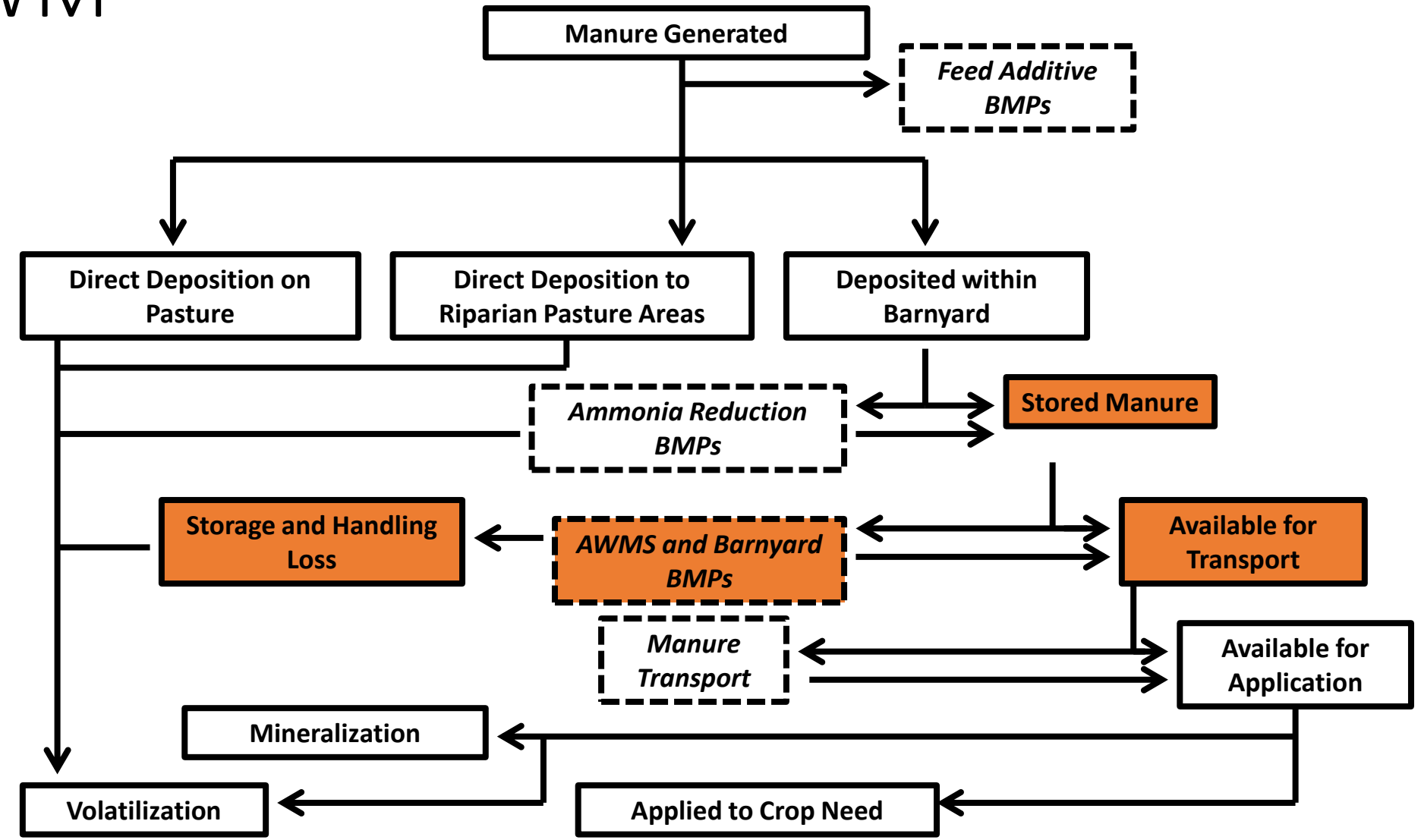
- September preliminary report had explicit definition, but it was not adapted into Dec. 5th draft. We've added it to Exec. Summary, Chapter 9, and Appendix A.
  - "…for annual BMP progress reporting in Phase 6, an Animal Waste Management System is any structure designed for collection, transfer, and storage of wastes generated from the confined portion of animal operations and complies with NRCS 313 (Waste Storage Facility) or NRCS 359 (Waste Treatment Lagoon) practice standards. Reduced storage and handling loss is conserved in the manure and available for land application or export from the farm."
- Credit duration in the model: 15 years (same as Phase 5.3.2)

# Important Panel Deliberations

- AWMS is a much broader system than simply USDA NRCS Conservation Practice Standard 313/359

- The panel focused on physical manure recoverability rather than nutrient loss
  - Atmospheric ammonia losses are not directly affected by AWMS BMP
  - Ammonia losses are modeled with an atmospheric management BMP

# Figure 2. Manure application processes in P6 CBWM

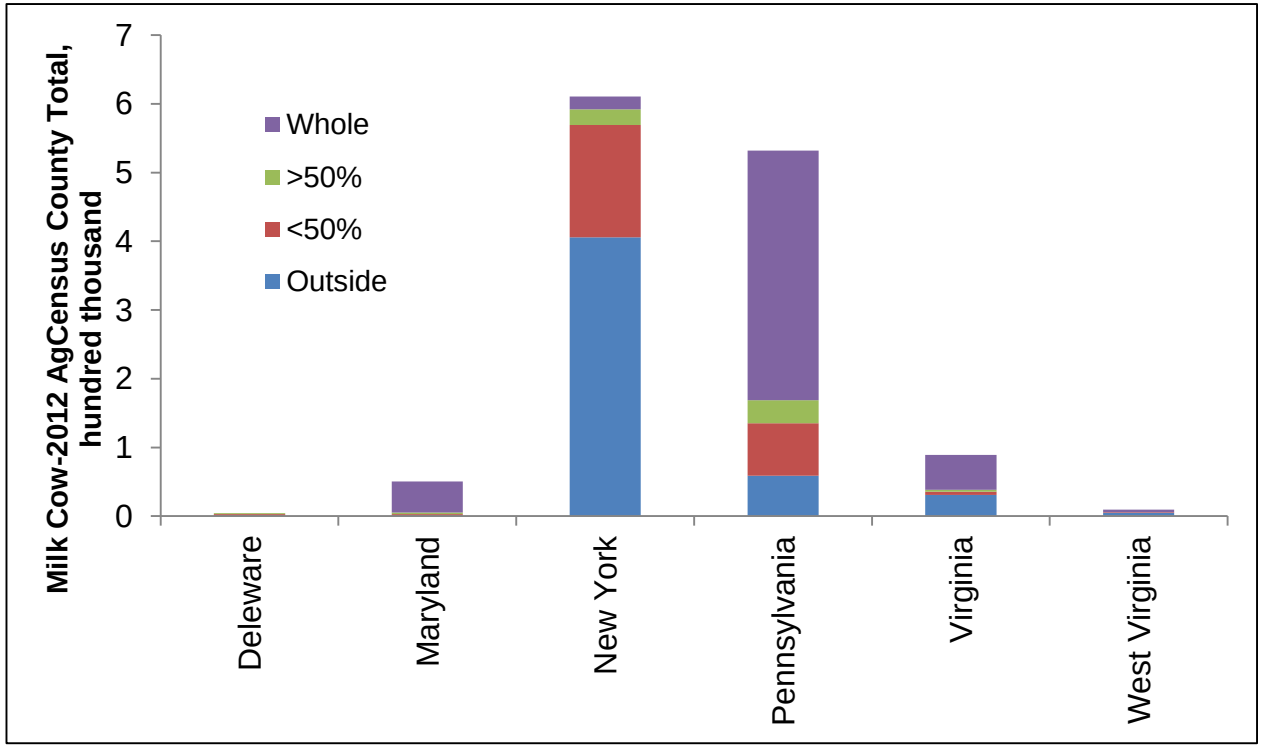


# Poultry Heavy Use Area Concrete Pads

- “Concrete pads at the primary doors of poultry housing facilities to reduce environmental litter handling losses … “
- Another use is to protect soil from damage during bird harvest and litter removal
- Not a BMP in Phase 5.3.2 model
- Manure recovered is < 0.1% of total removed
- EP does not recommend as model BMP

# Panel Research – Dairy Farm Example

- A model farm concept was adopted to set manure recoverability
- Research defined location and size of farm for each animal type




| Farm Size (# of dairy cows) | 2012 Ag Census Data | | | | | | 1987 Ag Census Data | |
|---|---|---|---|---|---|---|---|---|
| | Lancaster | | Franklin | | Statewide | | Statewide | |
| | # | % | # | % | # | % | # | % |
| 1-9 | 377 | 0 | 62 | 0 | 1,177 | 0 | 5,680 | 1 |
| 10-19 | 205 | 0 | 132 | 0 | 1,594 | 0 | 15,733 | 2 |
| 20-49 | 33,936 | 10 | 2,217 | 1 | 65,701 | 19 | 235,735 | 35 |
| 50-99 | 43,449 | 13 | 12,279 | 4 | 125,019 | 36 | 266,083 | 40 |
| 100-199 | 11,784 | 3 | 16,067 | 5 | 67,676 | 20 | 116,793 | 17 |
| 200-499 | 5,474 | 2 | 10,158 | 3 | 43,804 | 13 | 28,844 | 4 |
| 500+ | 15,580 | 5 | 5,489 | 2 | 37,765 | 11 | 4,686 | 1 |
| **Grand Total** | 110,805 | 32 | 46,404 | 14 | 342,736 | 100 | 673,054 | 100 |

# Model Farm Concept – Dairy Example

- “Before” Circa 1985 (representing all dairy farms)
  - Located in Lancaster County, herd size 20 - 99
  - Tiestall barn, gutter cleaner or freestall barn with alley scrapping
  - Direct loading to a manure spreader or into short-term storage
  - Open lots without proper curbing and drainage
  - Pasturing during permissible times year, significant nutrition from pasture
- “After” Circa 2016 (representing only “small” dairy farms)
  - Located in Lancaster County, herd size 20 - 199
  - Tiestall barn, gutter cleaner or freestall with alley scrapping
  - Direct loading to a manure spreader or into short-term storage.
  - Open lots with proper curbing and drainage
  - Pasturing during permissible times year, significant nutrition from pasture

# Expert Panel Consultations

- David Moffitt, primary reference co-author
- Bill Brown, University of Delaware Poultry Extension Specialist
- Bud Malone, University of Delaware Poultry Specialist (retired)
- Jennifer Rhodes, University of Maryland Extension Educator
- Tara Felix, Penn State University Extension Beef Specialist

| Animal Type | Robert L. Kellogg *et al.* (2000) | | | | | | | | | USDA Natural Resources Conservation Service (2003)[a] | | RECOMMENDED RECOVERABILITY FACTORS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Small Farm Head Count | Large Farm Head Count | Confined Manure % Recoverability | Overall manure Recoverability | | | | | | | | | |
| | | | | DE | MD | NY | PA | VA | WV | Before CNMP | After CNMP | Before AWMS BMP | After AWMS BMP |
| Beef cows | 20 | None | 98 | 10 | 10 | 10 | 5 | 10 | 0 | - | - | - | - |
| Confined Heifers | 20 | None | 98 | 70 | 70 | 70 | 65 | 70 | 70 | 60-65 | 80-85 | 60 | 99 |
| Fattened cattle | 15 | 200 | 90 | 85 | 85 | 85 | 85 | 85 | 98 | 60 | 75 | 60 | 99 |
| Milk cows & calves | 20 | None | 98 | 80 | 80 | 80 | 80 | 60 | 80 | 45-60 | 50-75 | 75 | 95 |
| Hogs, breeding | 10 | 50 | 95 | 80 | 80 | 80 | 80 | 80 | 75 | 80 | 97 | 90 | 99 |
| Hogs, slaughter | 50 | 450 | 95 | 80 | 80 | 80 | 80 | 80 | 75 | 80 | 97 | 90 | 99 |
| Chickens, layers | 50 | 400 | 98 | 90 | 90 | 90 | 95 | 98 | 98 | 85 | 95 | 90 | 99 |
| Chickens, pullets | 25 | 400 | 98 | 90 | 90 | 90 | 95 | 98 | 98 | 85 | 95 | 90 | 99 |
| Chickens, broilers | 100 | 400 | 98 | 95 | 95 | 95 | 95 | 98 | 98 | 85 | 98 | 90 | 99 |
| Turkeys, breeding | 50 | 2,000 | 98 | 95 | 95 | 95 | 95 | 98 | 98 | 80 | 98 | 90 | 99 |
| Turkeys, slaughter | 50 | 5,000 | 98 | 95 | 95 | 95 | 95 | 98 | 98 | | | | |
| Equine, small ruminants | | | | | | | | | | | | 95 | 98 |

[a] Continuous loafing / grazing (0% recoverable).

[b] Continuous confinement with confined manure recoverability.

[c] **Confined Heifers** – Northeast (RF#1 - RF#2); **Fattened Cattle** – PA, NY, NJ, > 35 AU/farm (AF#1: feedlot scrape, stack); **Milk cows** –Northeast, > 35 AU/farm (RF#1-RF#4); **Breeding Hogs** – Northcentral, Northeast > 35 AU/farm (RF#2: confinement, liquid, no lagoon); **Hogs for Slaughter** – Northcentral, Northeast, > 35 AU/farm (RF#2: confinement, liquid, no lagoon); **Layers** – North Central & Northeast, > 35 AU/farm (RF#1 and RF#3); **Pullets** – North Central & Northeast, (RF#1 layer type confinement house); **Broilers** – Southeast, (RF#1: confinement, standard broiler house); **Turkeys** – East, <35 AU/farm (RF#1: confinement house).

# Overview of comments received

- Comments are being addressed with clarifying additions or edits
  - CD DOEE
  - Beth McGee, CBF
  - EPA Water Permits Division
  - PA DEP
  - MDA
- No comments required substantive changes, i.e. changes to key recommended values for AWMS manure recoverability.
- More minor editing is expected to improve grammar, formatting, picture selection. This will occur post-WQGIT approval.

# Timeline for CBP-approval

- December 12: Comments received by COB
- December 16: AgWG + WTWG approval
- December 19: Seek WQGIT approval

CENTER FOR LEADERSHIP & ORGANIZATIONAL CHANGE
PARTNERING FOR RESULTS

# Consensus Continuum

| Stop | Hold | Stand Aside | Agreement with Reservations | Endorsement |
|---|---|---|---|---|
| "I do not agree and feel the need to stand in the way of this decision" | "I believe more work is needed before we make a decision" | "I trust the group and will not block this decision but need to register my disagreement" | "I can live with it" | "I like it" |

# Questions or comments?

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