AgWG Ag Data Input Concerns

September 16, 2021

CAST-21 Workplan: Final Summary

Workplan for CAST 2021: Final Summary

Aug 23, 2021: The WQGIT approved by consensus all method and data changes indicated on the CAST-21 Workplan.

Goal: Accommodate new data and methods with CAST 2021 for changes that have been approved by the Partnership up until COB Sept. 1, 2021

Outcome: A Partnership approved CAST 2021 model that uses the best available science, data and information to inform and support our shared restoration efforts and collective decision-making processes, adhering to our principals of adaptive management

- The tasks and actions (Tasks 1-8) below represent the priority issues that have been identified by the Partnership and will receive primary focus by the participating entities. Other tasks and actions can be added to this work plan as time and resources allow, and with Partnership approval. Note that not all issues may be fully addressed by the Partnership-established deadlines for updating CAST 2021. Tasks and actions may be applicable to future versions of CAST.
- **Timelines are the estimated completion dates (month & year) for the investigating body (e.g., CBP office technical staff) to make final presentations about options for the relevant source workgroups to consider.** Agreement about what will be included and excluded from CAST21 depends on votes of members of the workgroups and WQGIT. Approved data and method changes for CAST21 need to be finalized through the WQGIT by Sept. 1, 2021.

— **As each key action is considered and signed off by workgroups and the WQGIT, there will be no determination where and to what degree nutrient and sediment loads would be higher or lower than CAST 2019.** Additional key actions may be added to this workplan if the addition is approved by the WQGIT. CAST 2021 will accommodate all method and data changes approved through the Partnership by COB Sept. 1, 2021 and will be available for review, including loads, Nov. 1, 2021. Comments and questions from jurisdictions are due Dec. 1, 2021 with the final release of CAST21 scheduled for Jan. 1, 2022.

CAST 21 Schedule:
September 1, 2021 – All data and methods approved
November 1, 2021 – CAST-21 Beta release
December 1, 2021 – Jurisdictional comments due
January 1, 2022 – Final CAST-21 release

CAST-21 Workplan (Working Draft)

Approved data and method changes need to be finalized through the WQGIT by Sept. 1, 2021

Questions/ Comments?

KEY ACTION	STATUS
Task 1: Updates to data & methods that typically occur every 2 years. ✓	• CAST Data Update Frequency spreadsheet on the CAST Progress Reporting webpage
Task 2: Investigate alternative forecasting methods for ag land uses & animals ✓	• Nov 19 AgWG: CBPO presentation on 4 methods of forecasting • Feb AgWG; See Mar AgWG decision
Task 3: Investigate 2012-2017 Ag Census change for fallow/idle acres ✓	• AgWG Sept 17; NASS consulted; no new information; No further action; See Jan AgWG decision
Task 4: Investigate use of latest landcover & LiDAR imagery to better define changes in total ag (& other land use) acres ✓	• Oct; Jan; Feb; Apr; New methodology approved, see May AgWG decision
Task 5: Investigate alternatives for double-crop acre estimates ✓	• Oct 15 AgWG; NASS consulted- no new information; no recommended change to methodology, see May AgWG decision
Task 6: Consider supplemental NM for soybeans ✓	• Dec/Jan/Mar/Apr Ad Hoc • Updates Jan/Feb/Mar/Apr/May; See June AgWG decision
Task 7: QA/QC'd historic & current layer pop. data for Hillandale Farms (PA) OUTSTANDING	• Feb Ad Hoc; July 1 WTWG; Aug 5 WTWG decision tabled; Aug 19 AgWG; Oct 21 AgWG
Task 8: Build-in Verification Ad Hoc Team products ✓	• Aug WQGIT approved extension of forest buffer credit duration to 15 years; Meetings continue to fulfill charge

Reminder - CAST 21 Schedule:

- Sept 1, 2021 - All data and methods approved
- Nov 1, 2021 - CAST-21 Beta release
- Jan 1, 2022 - Final CAST-21 release

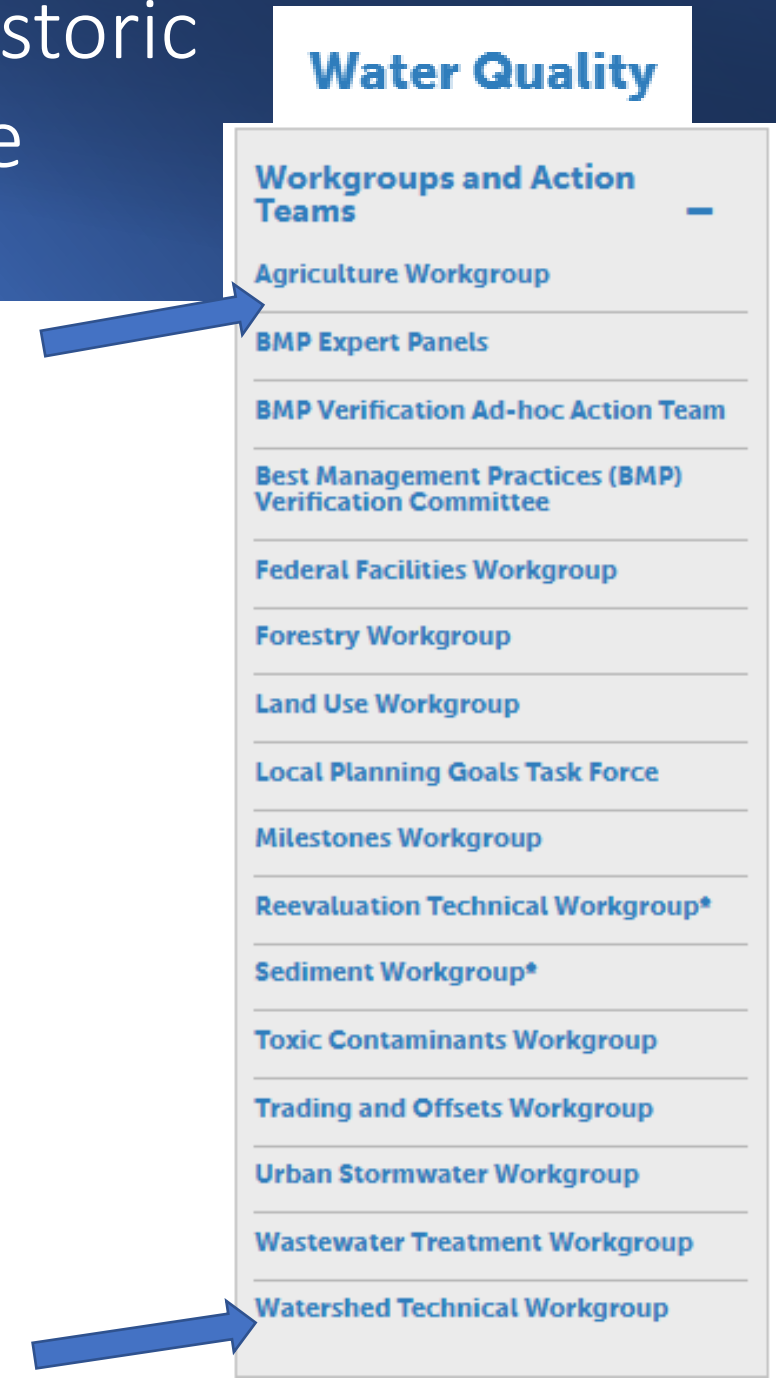
Task 7: Accommodate with CAST21 QA/QC'd historic and current layer population data for Hillandale Farms, Spring Grove, PA.

Participating Entities: Agriculture Workgroup, Watershed Technical Workgroup, WQGIT, CBPO technical staff

Timeline – Findings Presented to **Lead** Participating Entity for Decision:

- Outstanding: More Time Needed to Address Partner Inquiries

Task 7: Accommodate with CAST21 QA/QC'd historic and current layer population data for Hillandale Farms, Spring Grove, PA.



July 1 WTWG

July 15 AgWG

Aug 5 WTWG

Aug 19 AgWG

STATUS: No Resolution Before CAST-21 Deadline

- Resolution Needed at AgWG w/ WTWG Consultation
- Will Influence Usage & Application of Animal Pop. Data Sources in the Future

Animal Population Supplemental Data: CAST-23 & Beyond

Manure Generated

NASS Annual Survey Data to Inform Population Trends Between Census Years?

- Dairy, Beef Cattle, Layers, Swine…
- Partnership Approval Needed

Industry Data Can Inform Animal Population ***Trend***

- Requires Careful Cooperation
- QA/QC Needed
- Partnership Approval Needed

CAFO Permitting Data

- Indicates Max Capacity (not actual population)
- Collection/Use Methodology & QA/QC Needed
- Partnership Approval Needed

Population Distributions

- Jurisdictions Can Provide Data to Allocate State Totals to Appropriate Counties (contact CBPO staff for guidance)

Right Now

CRITICAL CONCEPT:

To maintain integrity of CBWM (CAST) there are two options for new data sets:

- Provide data all the way back through 1985.

OR

- Use the **trend** in new data sets for the years available.

Task 7: Accommodate with CAST21 QA/QC'd historic and current layer population data for Hillandale Farms, Spring Grove, PA.

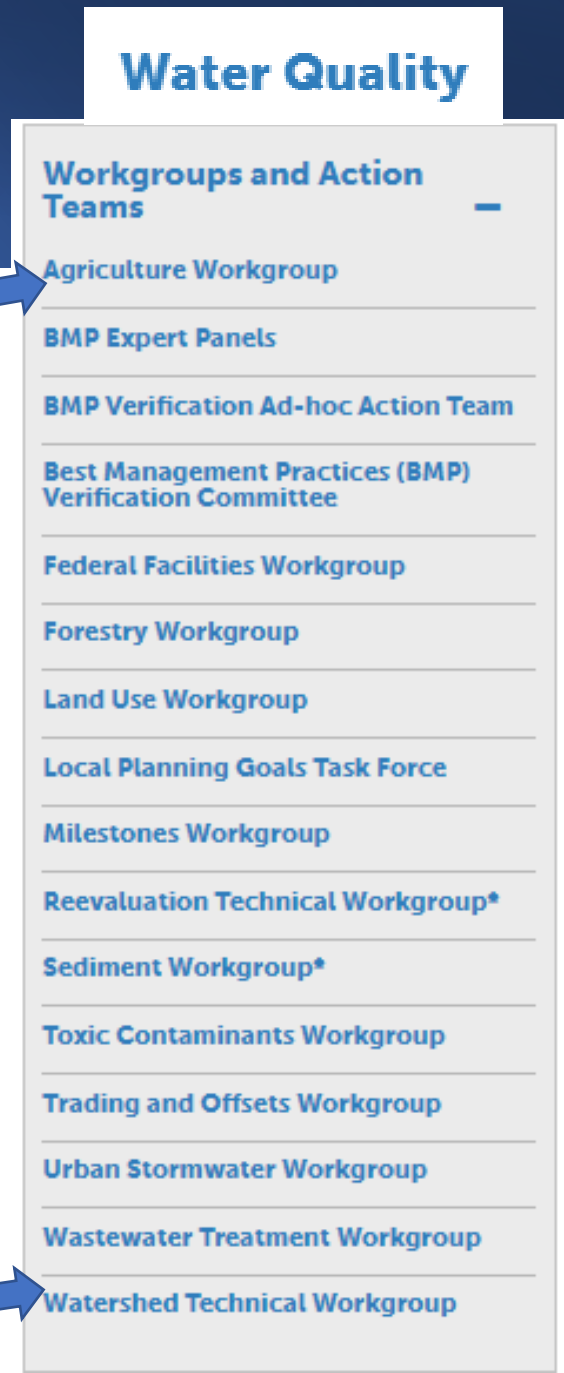
Oct 21 AgWG: Address Stakeholder Concerns

What Do You Want Addressed?

Contact Vanessa Van Note (VanNote.Vanessa@epa.gov)

Examples:

- How Have We Used Industry Data in the Past?
  - Ex: Poultry Litter Subcommittee
- What Causes Loads to Change in Other States/Counties?
- What Does this Mean for How We Use the Ag Census or Other Data Sources?
- How Far Does Issue Extend? Other Missing Populations?



Prioritizing Concerns (Post- CAST-21)

chesapeakebay.net/who/group/agriculture_workgroup

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tracking and reporting mechanisms that support an adaptive management approach towards Bay restoration.

- Coordinate with WQGIT Watershed Technical Workgroup to identify, define, quantify, and incorporate pollutant reduction and conservation practices on agricultural lands and animal operations into the Chesapeake Bay Program decision support system. Provide data and support for the Water Quality Goal Implementation Team and Technical and Support Services.

https://www.chesapeakebay.net/who/group/agriculture_workgroup

Projects and Resources

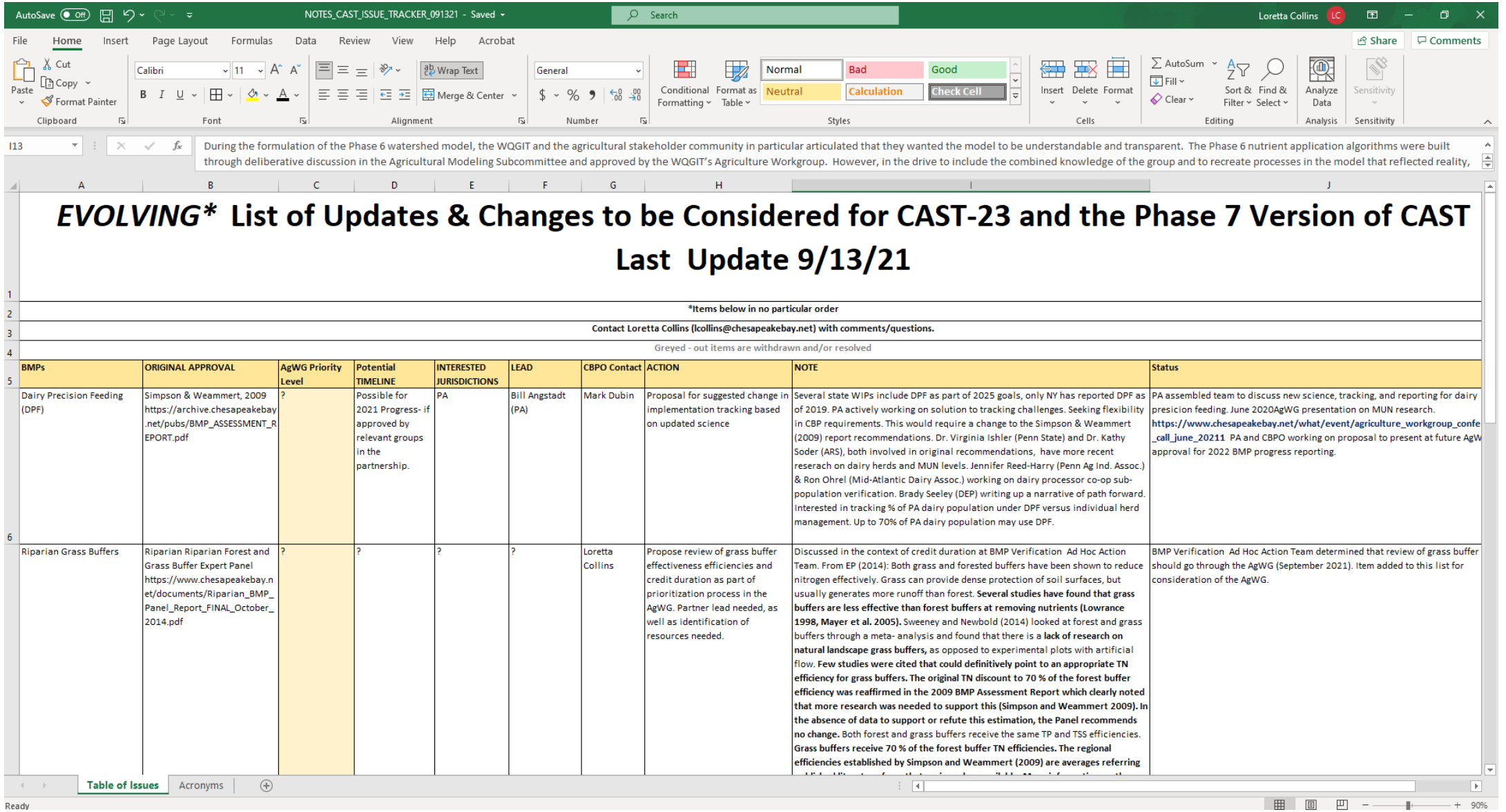
Agriculture Workgroup Chesapeake Assessment Scenario Tool (CAST) Issues Tracker

The below Chesapeake Assessment Scenario Tool (CAST) Issues Tracker records concerns that have been raised by jurisdictions in relation to agricultural data inputs. The tracker is a living document and will be updated regularly as progress is made on the issues or new issues are raised. This spreadsheet serves as a starting point for setting priorities for Phase 7 Chesapeake Bay Watershed Model updates and changes related to agricultural data.

CAST Issue Tracker (08.18.21) (15.84 KB)

Ad Hoc Nov 2020 Recommendation: Create a tracking mechanism for jurisdictions' wish list for 2-year CAST updates & the next model phase.

Additional Ag Data Concerns



NOTES_CAST_ISSUE_TRACKER_091321 - Saved

I13: During the formulation of the Phase 6 watershed model, the WQGIT and the agricultural stakeholder community in particular articulated that they wanted the model to be understandable and transparent. The Phase 6 nutrient application algorithms were built through deliberative discussion in the Agricultural Modeling Subcommittee and approved by the WQGIT's Agriculture Workgroup. However, in the drive to include the combined knowledge of the group and to recreate processes in the model that reflected reality,

*EVOLVING** List of Updates & Changes to be Considered for CAST-23 and the Phase 7 Version of CAST

Last Update 9/13/21

***Items below in no particular order**

Contact Loretta Collins (lcollins@chesapeakebay.net) with comments/questions.

Greyed - out items are withdrawn and/or resolved

BMPs	ORIGINAL APPROVAL	AgWG Priority Level	Potential TIMELINE	INTERESTED JURISDICTIONS	LEAD	CBPO Contact	ACTION	NOTE	Status
Dairy Precision Feeding (DPF)	Simpson & Weammert, 2009 https://archive.chesapeakebay.net/pubs/BMP_ASSESSMENT_REPORT.pdf	?	Possible for 2021 Progress- if approved by relevant groups in the partnership.	PA	Bill Angstadt (PA)	Mark Dubin	Proposal for suggested change in implementation tracking based on updated science	Several state WIPs include DPF as part of 2025 goals, only NY has reported DPF as of 2019. PA actively working on solution to tracking challenges. Seeking flexibility in CBP requirements. This would require a change to the Simpson & Weammert (2009) report recommendations. Dr. Virginia Ishler (Penn State) and Dr. Kathy Soder (ARS), both involved in original recommendations, have more recent reserach on dairy herds and MUN levels. Jennifer Reed-Harry (Penn Ag Ind. Assoc.) & Ron Ohrel (Mid-Atlantic Dairy Assoc.) working on dairy processor co-op sub-population verification. Brady Seeley (DEP) writing up a narrative of path forward. Interested in tracking % of PA dairy population under DPF versus individual herd management. Up to 70% of PA dairy population may use DPF.	PA assembled team to discuss new science, tracking, and reporting for dairy presicion feeding. June 2020AgWG presentation on MUN research. https://www.chesapeakebay.net/what/event/agriculture_workgroup_confe_call_june_20211 PA and CBPO working on proposal to present at future AgW approval for 2022 BMP progress reporting.
Riparian Grass Buffers	Riparian Riparian Forest and Grass Buffer Expert Panel https://www.chesapeakebay.net/documents/Riparian_BMP_Panel_Report_FINAL_October_2014.pdf	?	?	?	?	Loretta Collins	Propose review of grass buffer effectiveness efficiencies and credit duration as part of prioritization process in the AgWG. Partner lead needed, as well as identification of resources needed.	Discussed in the context of credit duration at BMP Verification Ad Hoc Action Team. From EP (2014): Both grass and forested buffers have been shown to reduce nitrogen effectively. Grass can provide dense protection of soil surfaces, but usually generates more runoff than forest. **Several studies have found that grass buffers are less effective than forest buffers at removing nutrients (Lowrance 1998, Mayer et al. 2005).** Sweeney and Newbold (2014) looked at forest and grass buffers through a meta- analysis and found that there is a **lack of research on natural landscape grass buffers,** as opposed to experimental plots with artificial flow. **Few studies were cited that could definitively point to an appropriate TN efficiency for grass buffers. The original TN discount to 70 % of the forest buffer efficiency was reaffirmed in the 2009 BMP Assessment Report which clearly noted that more research was needed to support this (Simpson and Weammert 2009). In the absence of data to support or refute this estimation, the Panel recommends no change.** Both forest and grass buffers receive the same TP and TSS efficiencies. **Grass buffers receive 70 % of the forest buffer TN efficiencies. The regional efficiencies established by Simpson and Weammert (2009) are averages referring**	BMP Verification Ad Hoc Action Team determined that review of grass buffer should go through the AgWG (September 2021). Item added to this list for consideration of the AgWG.

Table of Issues | Acronyms

Ready

Fall 2021 AgWG

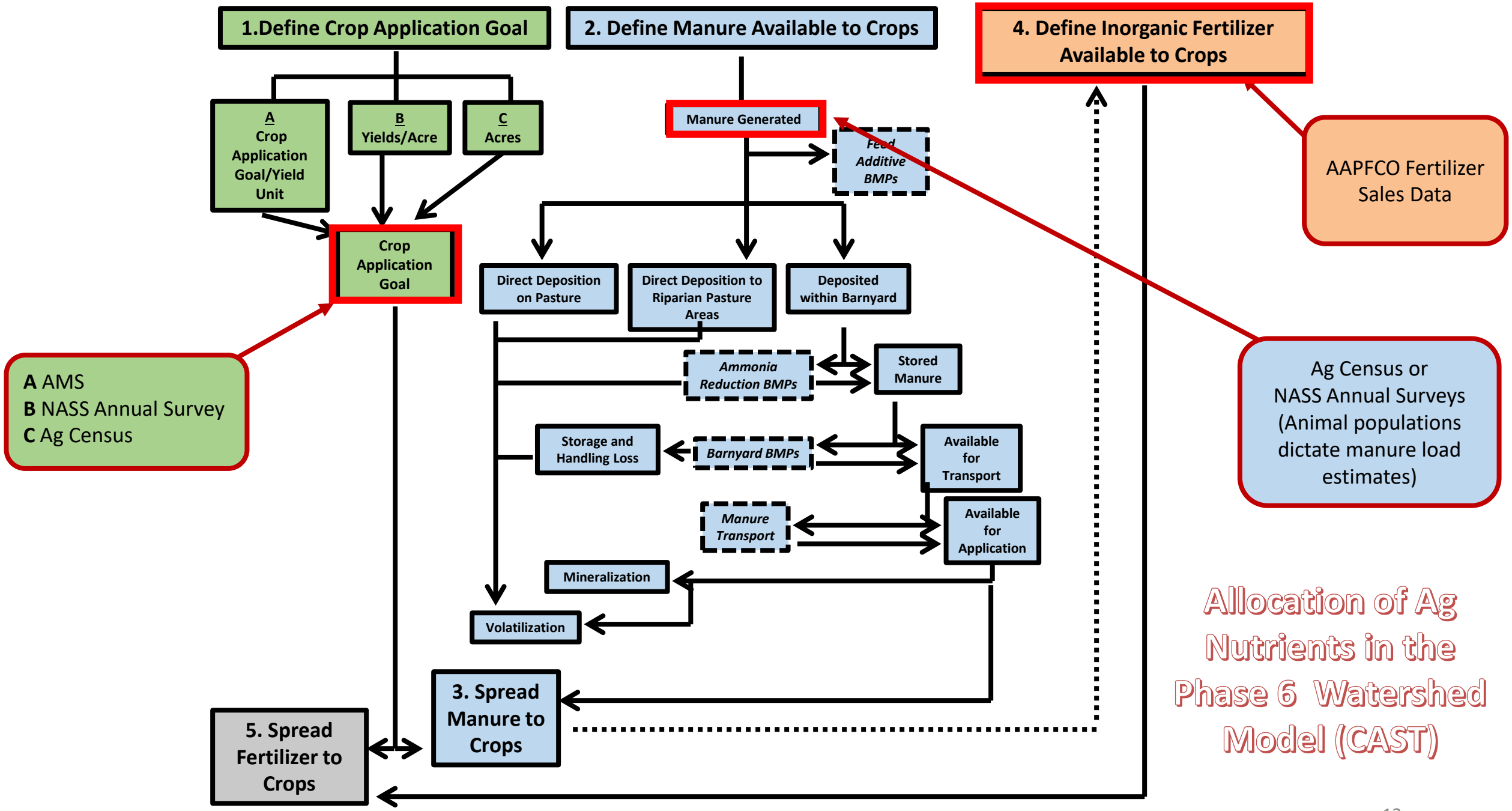
- Prioritizing needs for Phase 7 Watershed Model
  - Process for addressing AgWG model needs
- Task 7: Seek resolution on Hillandale data incorporation question for CAST-23 (Phase 6) and Phase 7
- Winter BMP question (incentivizing winter cover in dairy systems)

Oct 21 AgWG

- Animal Mortality Management Expert Panel Recommendations → Decision for Approval

Oct 25/26 WQGIT

- Science needs for Phase 7



Allocation of Ag Nutrients in the Phase 6 Watershed Model (CAST)

AMS= Agricultural Modeling Subcommittee; NASS= National Agricultural Statistics Service; AAPFCO= Assoc. of American Plant Food Control Officials

Improving Ag Data

Crop Acreage Data

Crop Application Goal

Alternative methods to account for fitting Ag Census data to CBP needs?

- Adjusting methods for estimating crop acres (e.g. double crops)

Alternative/supplemental data sets

- Other data sets at the state or federal level?

Animal Population Data

Additional NASS Annual Survey Data may be available to inform population trends between census years (incorporated every two years)

- Dairy, Beef Cattle, Layers, Swine…

Direct from industry data can inform animal population ***trends*** between census years.

- Requires careful cooperation
- Legal, privacy assurances

Manure Generated

Other Data Issues

Soil P data

- Gary Shenk Sept 2018 presentation to AgWG on data set incorporated into the CBWM
- **Additional soil P data is welcome and encouraged (NY & WV have made inquiries)**

Manure Nutrient Concentration Data

- Changes in management may result in changes in nutrient concentrations
- Additional manure concentration data is welcome and encouraged (see grant guidance)

Fertilizer Data

- More accurate allocation of fertilizer within the CBW?
  - **Jurisdictions working with state chemists**

Define Inorganic Fertilizer Available to Crops

CRITICAL CONCEPT:

To maintain integrity of CBWM (CAST) there are two options for new data sets:

- Provide data all the way back through 1985.

  OR
- Use the **trend** in new data sets for the years available.

CBWM= Chesapeake Bay Watershed Model

Crop Application Goal

Crop Acreage Data: Phase 6 Possibilities

Alternative methods to account for fitting Ag Census data to CBP needs?

- Adjusting methods for estimating crop acres

  *The AgWG supported adoption of the proposed land use methodology for determining the change in total agricultural area from 2013 to 2017.

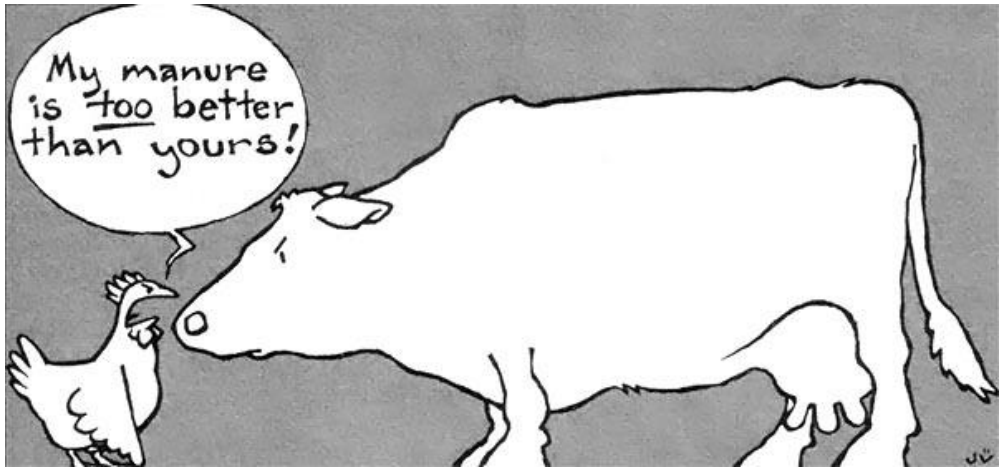
Alternative/supplemental data sets

- Other data sets at the state or federal level?

  Collaborate with fed & state agencies

How Do We Use the 5-Year Ag Census Data?

- **Animal Inventory & Sales**
  - Estimate Populations By County
  - Define Feed Space Acres
  - Estimate the “Manure Bucket” for the CBW
    - Manure nutrients applied to crops, directly deposited to pasture and riparian areas, and left in the feed space.
- **Crop Acres By County**
  - Used in Conjunction with
    - High-Resolution Mapped Land Cover Data to Improve Land Use Assumptions
    - Yield Data & Crop Application Goals to Allocate Annual Fertilizer & Manure Applications Across the Watershed



https://www.motherearthnews.com/homesteading-and-livestock/manure-fertilizer-zmaz83mazraw

What About Annual Data?

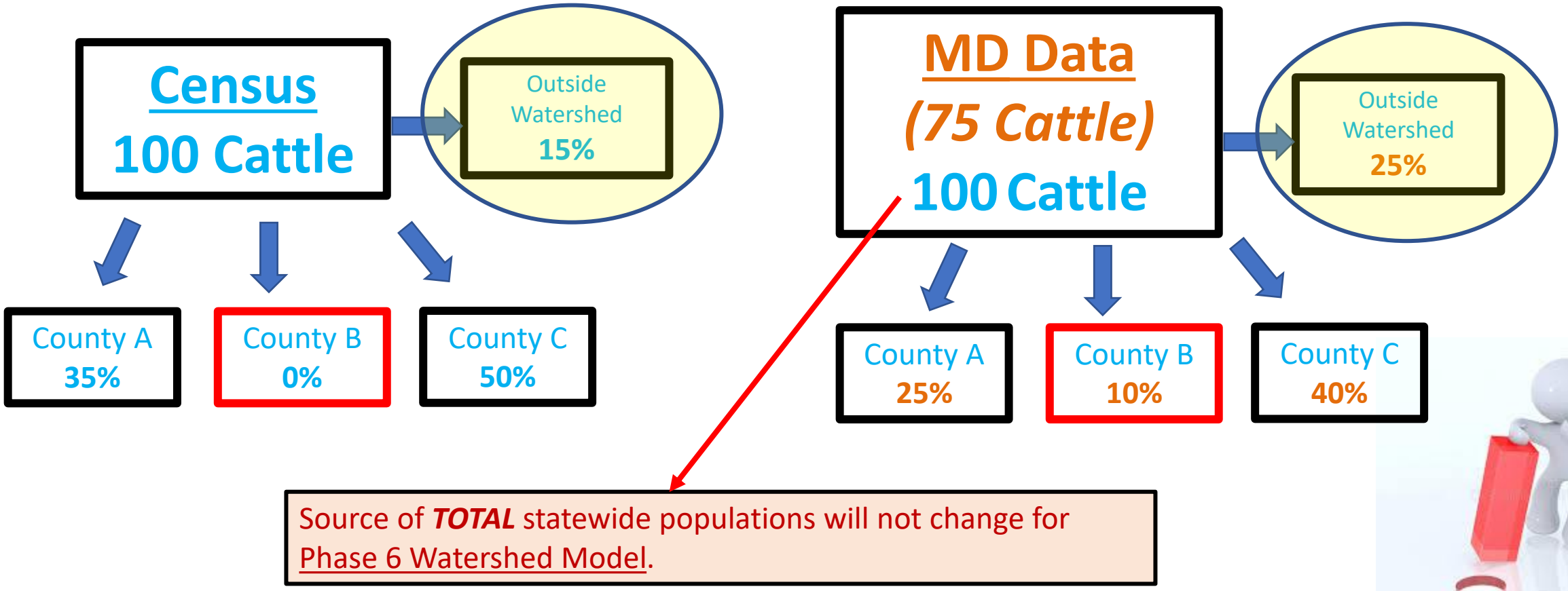
National Agricultural Statistics Service (NASS) Annual Surveys

- Incorporated Every Two Years (CAST-17, -19, -21, -23…)
  - When the watershed model “opens” for changes
- Yield data for the following major crops:
  - Alfalfa Hay; Barley; Buckwheat; Corn for Grain; Corn for Silage; Oats for Grain; Rye for Grain; Sorghum for Grain; Sorghum for Silage; Soybeans for Beans; and Wheat for Grain
- Broiler & Turkey Sales Data (state-level)

CRITICAL CONCEPT

Source for ***distribution*** of statewide populations can change.

Example: MD provides fraction of cattle in every county for the year 2020, and these fractions are used to distribute TOTAL statewide cattle populations from the Census of Agriculture.



Source of ***TOTAL*** statewide populations will not change for Phase 6 Watershed Model.

Other Data Issues

Soil P data

- Gary Shenk AgWG Sept 2018 presentation on Phase 6 Data

Additional Soil P Data Requested from State Jurisdictions

Manure Nutrient Concentration Data

- Change in Management → Changes in Nutrient Conc.

Recent Manure Conc. Data is Requested from State Jurisdictions (see EPA grant guidance- contact CBPO staff)

Fertilizer Data

- Improve Accuracy of Fertilizer Allocation within the CBW

Jurisdictions Working with State Chemists

4. Define Inorganic Fertilizer Available to Crops

CRITICAL CONCEPT:

To maintain integrity of CBWM (CAST) there are two options for new data sets:

- Provide data all the way back through 1985.

  OR
- Use the **trend** in new data sets for the years available.

Manure Generation – Nutrient Content

Manure Generated

Data Currently Used in the Phase 6.0 Model

Animal Type	Manure Source	Lbs Dry Manure/Animal/Yr	Lbs TN/Lb Dry Manure	LbsTP/Lb Dry Manure
Beef	Use Beef - Cow (confinement) from ASAE* 2005 for manure values	5,475.00	0.028788	0.006467
Dairy	Use Lactating Cow, Dry Cow and Heifer from ASAE 2005 for manure values	4,404.33	0.042221	0.006764
Other Cattle	Estimated based upon weighted average combination of Beef and Dairy from Census of Agriculture	1,605.07	0.035504	0.006616
Horses	Use average of Horse- Sedentary and Horse - Intense Exercise from ASAE 2005 for manure values	3,102.50	0.031672	0.005941
Hogs for Breeding	Swine Characterization Report;	220.62	.294653	Varies
Hogs for Slaughter	Swine Characterization Report;	97.09	0.106841	Varies
Sheep and Lambs	Use ASAE 2003 for manure values	240.9	0.038182	0.007909
Goats	Use ASAE 2003 for manure values	680.91	0.034615	0.008462
Pullets	PLS Report; See Appendix A	12.95	Varies	Varies
Layers	PLS Report; See Appendix A	17.89	Varies	Varies
Broilers	PLS Report; See Appendix A	Varies	Varies	Varies
Turkeys	Turkey Characterization Report;	7.62	Varies	Varies

*Now ASABE- American Society of Agricultural and Biological Engineers

3-year trends (up or down) can be applied to existing values in this table.

(requires 3 consecutive years of data)

Data must be collected in a similar fashion as was done for:

- Poultry Litter Subcommittee Report
- Swine Characterization Study
- Turkey Characterization Study

Available in Section 3 of Model Documentation

Chesapeake Bay Program Grant Guidance

Attachment 6: Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements (page 11)

Reporting Animal Information:

Animal data will be updated in the Phase 6 Watershed Model **every two years**.

- Reporting of permitted and unpermitted animals
  - Jurisdictions should provide the fraction of animal type by county that is considered "permitted" either through an EPA or state program. These data will be used to update the land use acres for permitted feeding operations and unpermitted feeding operations once every two years.

- Reporting of animal manure nutrient concentrations for poultry and swine
  - Data should be provided for the last three years, if possible, and updated each year to reflect new litter/manure samples. Jurisdictions who don't report volume data will receive default values according to rules established by the CBP Agriculture Workgroup. These data will be reviewed by the Partnership for use in estimating manure nutrients once every two years.