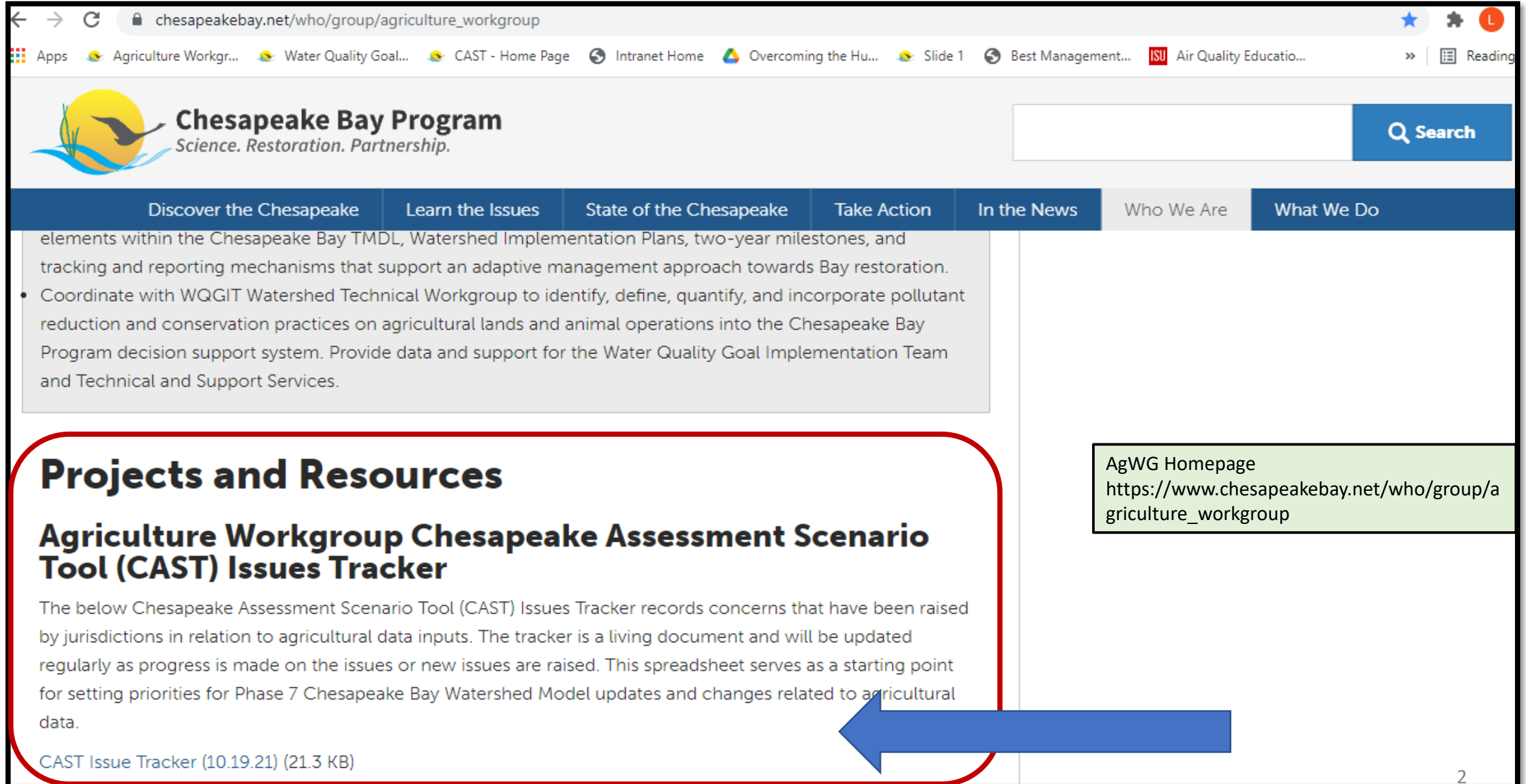


Looking Towards Phase 7: Ag Data Concerns

October 21, 2021

Prioritizing Concerns (Post- CAST-21)



chESAPEAKEbay.net/who/group/agriculture_workgroup

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elements within the Chesapeake Bay TMDL, Watershed Implementation Plans, two-year milestones, and 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.

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 (10.19.21) (21.3 KB)

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

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CAST Ag Issue Tracker

AutoSave Off CAST_Ag ISSUE_TRACKER_1019... Search Loretta Collins LC

File Home Insert Page Layout Formulas Data Review View Help Acrobat Share Comments

Default Keep Exit New Options Normal Page Break Preview Page Layout Custom Views Ruler Formula Bar Gridlines Headings Zoom 100% Zoom to Selection New Window Arrange All Freeze Panes Split Hide Unhide View Side by Side Synchronous Scrolling Reset Window Position Switch Windows Macros

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A2 Last Update 10/19/21

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

Last Update 10/19/21

*Items below in no particular order

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

Greyed - out items are withdrawn and/or resolved

BMP- Effectiveness, Tracking and/or	ORIGINAL APPROVAL	AgWG Priority Level	Potential TIMELINE	INTERESTED	LEAD	CBPO Contact	ACTION	NOTE	States
Dairy Precision Feeding (DPF)	Simpson & Weismert, 2003 https://archive.chesapeakebay.net/pubs/BMP_ASSESSMENT_REPORT.pdf	?	2022 Progress Reporting (not reliant on CAST changes)- 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 & Weismert (2003) report recommendations. Dr. Virginia Ishler (Penn State) and Dr. Kathy Soder (ARS), both involved in original recommendations, have more recent research 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 precision feeding. June 2020 Ag/WG presentation on MUN research. https://www.chesapeakebay.net/what/event/agriculture_workgroup_conference_call_june_2021 PA and CBPO working on proposal to present at future Ag/WG for 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 Ag/WG. 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	BMP Verification Ad Hoc Action Team determined that review of grass buffer BMP should go through the Ag/WG (September 2021). Item added to this list for consideration of the Ag/WG.

Table of Issues Acronyms +

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Water Quality Goal Implementation Team Meeting October 25 – 26, 2021

Purpose:

To discuss an initial set of Phase 7 Model update priorities that pertain to supporting and advancing the Chesapeake Bay Program partnership's water quality goals.

Objectives for Day 1 and Day 2:

- (1) Understanding of planned and proposed updates to the Phase 7 suite of modeling tools
- (2) Consensus on process for identifying Phase 7 priorities and initial prioritized list of updates to inform development and application of Phase 7
- (3) Initial feedback on partnership direction post-2025

Who can attend? → Anyone

Who is engaged in consensus process? → WQGIT Governance Members

Agenda:

https://www.chesapeakebay.net/channel_files/42030/wqgit_phase_7_final_agenda_10.25-26.2021.pdf

Current Watershed Model work plan based on feedback from other partnership groups

Watershed Model Workplan Options for 2025 (Draft)

o NHD-scale Phase 7 model

o Improvement of physical process simulation

o Uncertainty quantification

o Co-benefits

o Evaluation of all Bay TMDL water quality standards

o Changing nutrient input calculations

o Improvement of climate change simulation

NHD-scale Phase 7 model (Finer-Scale Modeling)

Upgrade the scale of the underlying processes simulated in the watershed model.

New segmentation would allow differentiation of load sources within counties.

- Finer-scale data improves load predictions at larger-scale (but not local-scale)
- Localized targeting of BMPs
- Differential BMP crediting potential (with additional work)

Questions about opportunities & constraints?

(Example: Some inputs remains available only at county-scale, how does the impact what we can track & report?)

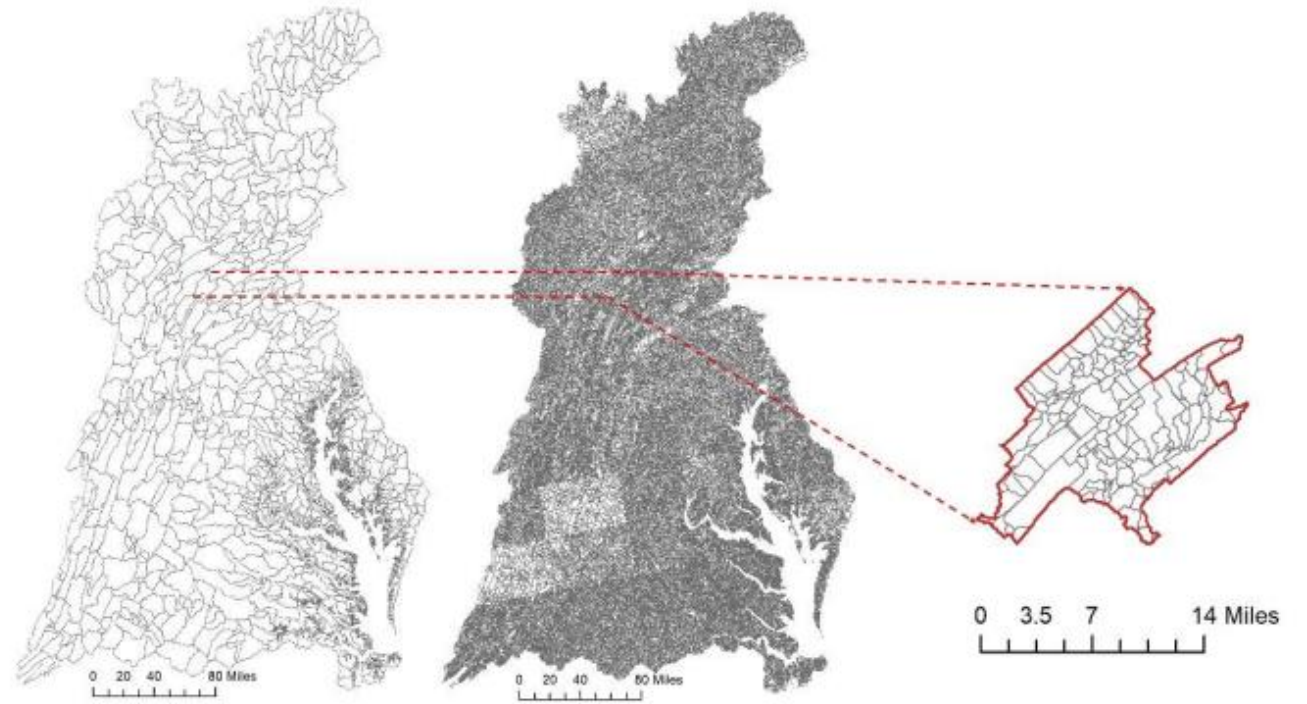


Figure 4: watershed scale in phase 6 and proposed phase 7 models.

Changing nutrient input calculations (Simplifying)

FEEDBACK RECEIVED (**FOR** SIMPLIFYING)

In terms of a planning tool...WIPs are at macro geographic scales for on future cropland. Unneeded complexity that is not justified.

- Rotations happen at the field scale
- NASS information is limited & interpreted by the CBP modelers
- Economic factors beyond anyone's predictive abilities

No one is collecting BMP reporting at a rotation-based scale. At best we will know if it is a BMP used on cropland situations versus pasture or grass and grazing livestock type BMPs.

- Complexity does not support planning or reporting
- Collapse all cropland rotations into a single load source of Cropland or CROP- something that supports our planning & reporting efforts

Changing nutrient input calculations (Simplifying)

FEEDBACK RECEIVED (***AGAINST*** SIMPLIFYING)

Many of the practices we use & give credit for only make sense if you include the crop.

- Example: Soybean acres are about half of row crop acres and generally receive no N applications

Producers and implementers think about every crop differently

- Mash everything together, in does not make sense

Giant step backwards given the advances in technology that give us 1 m resolution on land use.

Support targeting of practices to get the greatest reductions

- Needs a system that encourages states to do it
- Provide default options- states only provide unspecific data & get a low credit.



Winter 2021-2022 AgWG

- Prioritizing needs for Phase 7 Watershed Model
 - Formalize process and charge for addressing AgWG model needs for Phase 7
- Seek resolution on Hillandale data incorporation question for CAST-23 (Phase 6)
 - Broader questions on animal data sources (Phase 6 & Phase 7)
- Winter BMP question (incentivizing winter cover in dairy systems)

Oct 25/26 WQGIT

- Science needs for Phase 7

Animal Population Supplemental Data: CAST-23 & Beyond

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

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

Manure
Generated

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

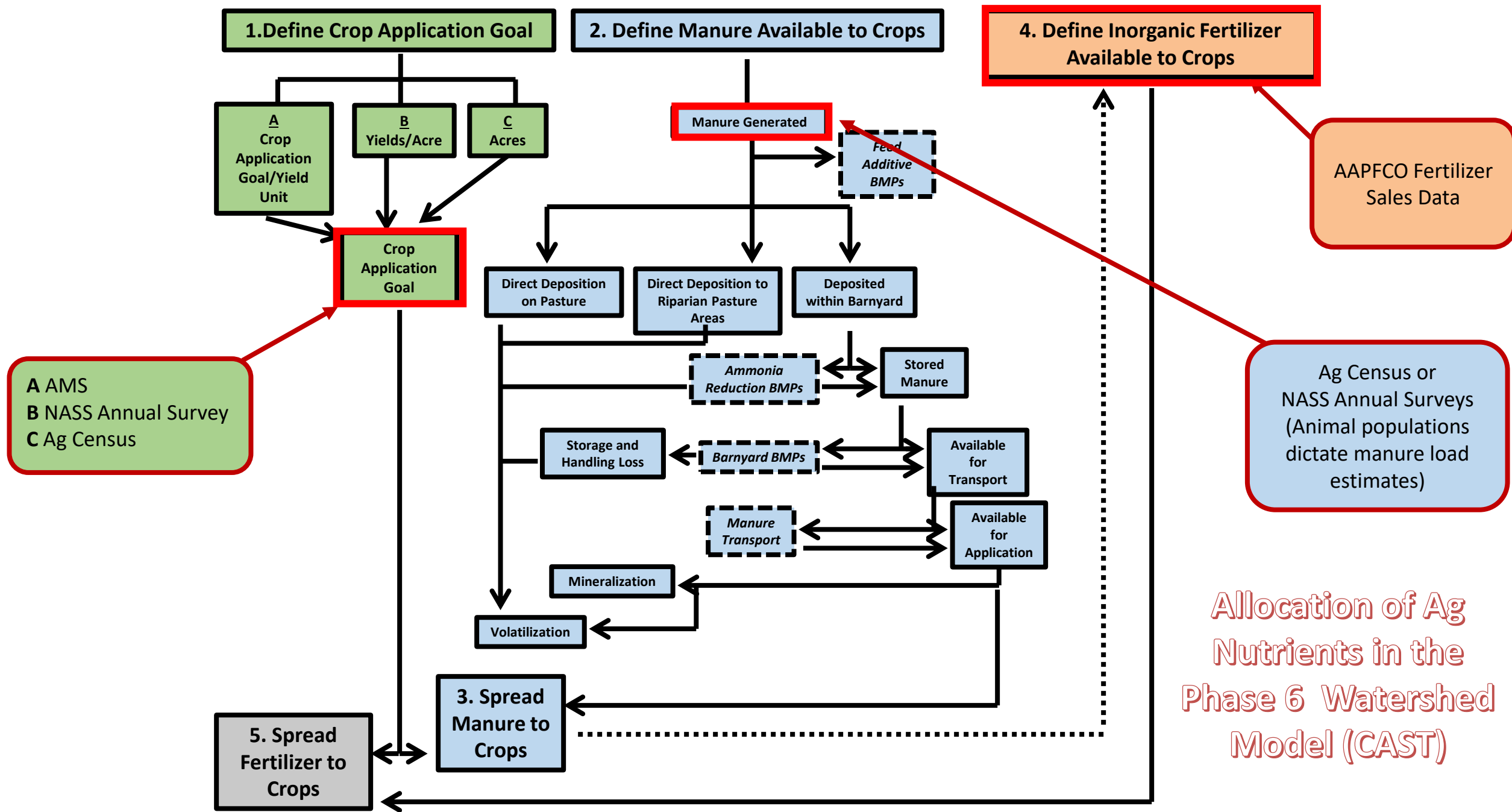
- Jurisdictions Can Provide Data to Allocate State Totals to Appropriate Counties
(contact CBPO staff for guidance)

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.

Right Now



Improving Ag Data

Crop Acreage Data

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?

Crop
Application
Goal

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 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

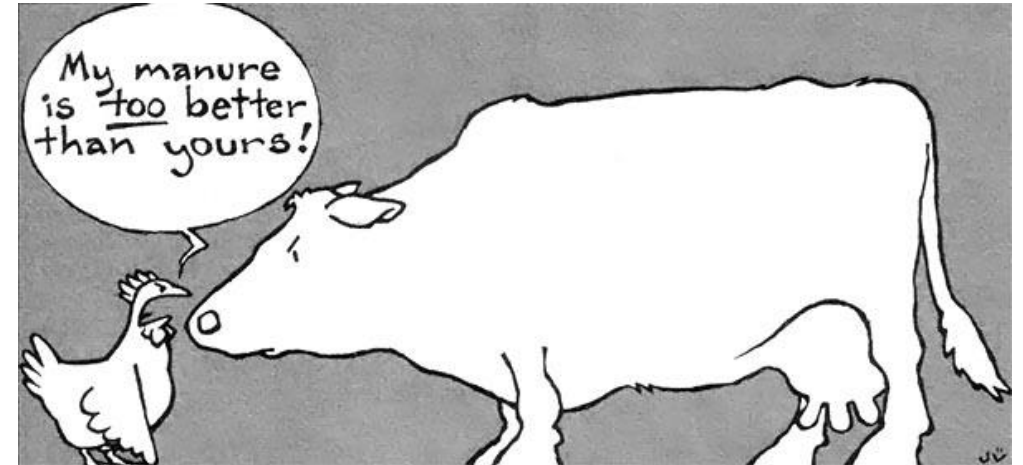
How Do We Use the 5-Year Ag Census Data?

- **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>

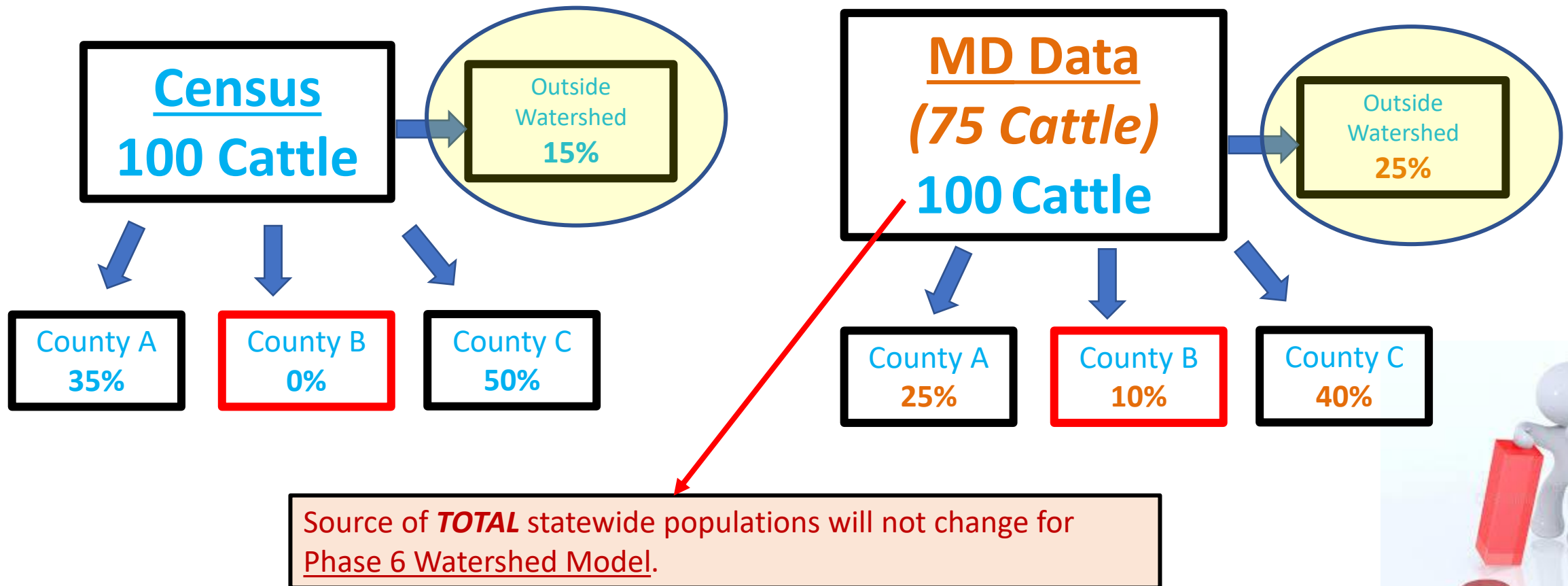
What About Annual Data?

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)

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.



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

Data Currently Used in the Phase 6.0 Model

Manure
Generated

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

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

*Now ASABE- American Society of Agricultural and Biological Engineers

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.