AgWG Ad Hoc CAST Issues

December 17th, 2020

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.	• On-going • In process: "Rules of the Road" document for data submissions
Task 2: Investigate alternative forecasting methods for ag land uses & animals	• Nov 19 AgWG: CBPO presentation on 4 methods of forecasting; **seeking feedback** • Return Mar 2021 for decision
Task 3: Investigate 2012-2017 Ag Census change for fallow/idle acres	• AgWG Sept 17; NASS consulted; no new information; No further action Seeking resolution in landcover data? Dave Montali, lead
Task 4: Investigate use of latest landcover & LiDAR imagery to better define changes in total ag (& other land use) acres	• Oct 15 AgWG: P. Claggett, USGS & J. Czawlytko, Chesapeake Conservancy; **seeking feedback** • Return in Jan/Feb 2021 for decision
Task 5: Investigate alternatives for double-crop acre estimates	• Oct 15 AgWG; NASS consulted- no new information; No further action
Task 6: Consider supplemental NM for soybeans	• In process • Dec Ad Hoc; More discussion needed
Task 7: QA/QC'd historic & current layer pop. data for Hillandale Farms (PA)	• In process • CBPO- future presentation to AgWG
Task 8: Build-in Verification Ad Hoc Team products	• In process

Nutrient Management on Soybeans

Concern there is an “uncontrollable N load” related to soybeans…

Still Unclear…

- What is driving change in N loads with full-season/double crop shifts
  - Trend not uniform across watershed
- Limitations of Nutrient Management BMP
  - Applicability to soybeans
  - Appropriateness of non-nutrient management multipliers
- Ag Census accuracy (data source of soybean acres)

Changing an approved EP recommendation must follow science/BMP protocol…

- Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model

Animal Data

Animal Populations: explore other estimating options (MD/NY; Task 1)

Crop Production/Acres

Crop Production Acres: improve annual estimates (MD; Task 1)

Nutrient Applications/Assumptions

Fertilizer Sales and Use Data (MD; Task 1)

BMP Tracking & Reporting

Dairy Precision Feeding (PA)

Heavy Use Area Protection- NRCS 561 (PA)*

BMP Effectiveness/Modeling

Winter Crop (NY/PA)

Manure Transport / Manure Treatment Technologies (PA)

Improving Ag Data? (TASK 1)

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 (new data incorporation every 2 years)

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 (MB Path Forward Soil P)**

Manure Nutrient Concentration Data

- Changes in management may result in changes in nutrient concentrations
- **Additional manure concentration data is welcome and encouraged**

Fertilizer Data

- More accurate allocation of fertilizer within the CBW?

4. Define Inorganic Fertilizer Available to Crops

KEY ACTION

Task 1: Updates to data & methods that typically occur every 2 years.

CRITICAL CONCEPT:

To maintain integrity of CBWM 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**

Updates

- **Fertilizer Sales and Use Data (MD; Task 1)**
  - MDA coordinating with state chemist and industry partners
- **Dairy Precision Feeding (PA)**
  - PA coordinating team including PA DEP, university, and industry reps to address tracking and reporting challenges; bring recommendations to AgWG
- **Proposed Winter Crop BMP (PA, NY, MD)**
  - January Ag Workgroup: Dr. Charlie White (PSU)
    - N scavenging by winter cover crops receiving fall manure.

Jan AgWG

- Charlie White, Penn State (Winter Crop BMP)

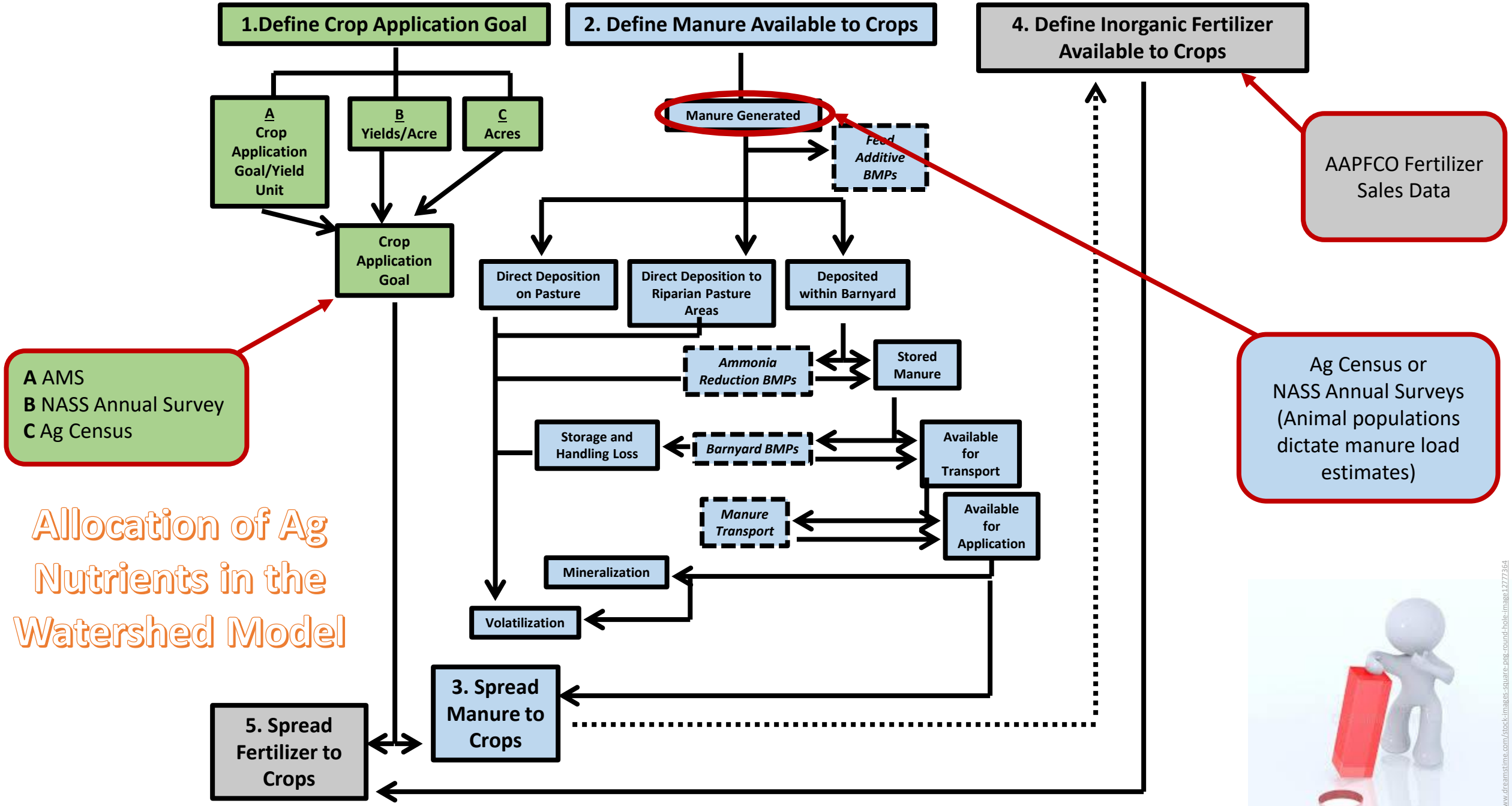
Feb/Mar AgWG:

- TASK 2: Decision Forecasting Ag Trends
- TASK 4: Decision Landcover/ LiDAR Data

BMP Concern	CBP BMP Effectiveness Source	Next Steps
Dairy Precision Feeding (PA)	Definitions and reductions approved by the WQGIT in **2009**	**PA Action Team**
Rotational/Prescribed Grazing (PA)	Definitions and benefits were reviewed and approved by the Agriculture Workgroup and WQGIT in **2010**	**RESOLVED**
Heavy Use Area Protection-NRCS 561 (PA)	Loafing Lot Management definitions and reductions approved by the Chesapeake Bay Program's Nutrient Subcommittee in **2003**.	**Ad Hoc- Review BMP documentation** **Invite NRCS for discussion (FALL 2020)**
Nutrient Management on Pasture (NY/PA)	Nutrient Management Practices for use in the Phase 6.0 Chesapeake Bay Program Watershed Model (**2016**)	**RESOLVED**
Commodity Cover Crops (NY/PA)	Cover Crops Practices for use in Phase 6 of the Chesapeake Bay Watershed Model (**2016**)	**AgWG- Invite EP Chair to present to AgWG (Jan-Feb 2021)**
Manure Transport / Manure Treatment Technologies (PA)	• *Manure Treatment Technologies*: Recommendations from the Manure Treatment Technologies Expert Panel to the CBP's WQGIT to define Manure Treatment Technologies as a Best Management Practice (**2016**) • *Manure Transport*: definition and benefits have remained in use **since review and approval by the CBP partnership's source sector workgroups for tributary strategy development**.	**Work with MWG**

[Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model]

Allocation of Ag Nutrients in the Watershed Model

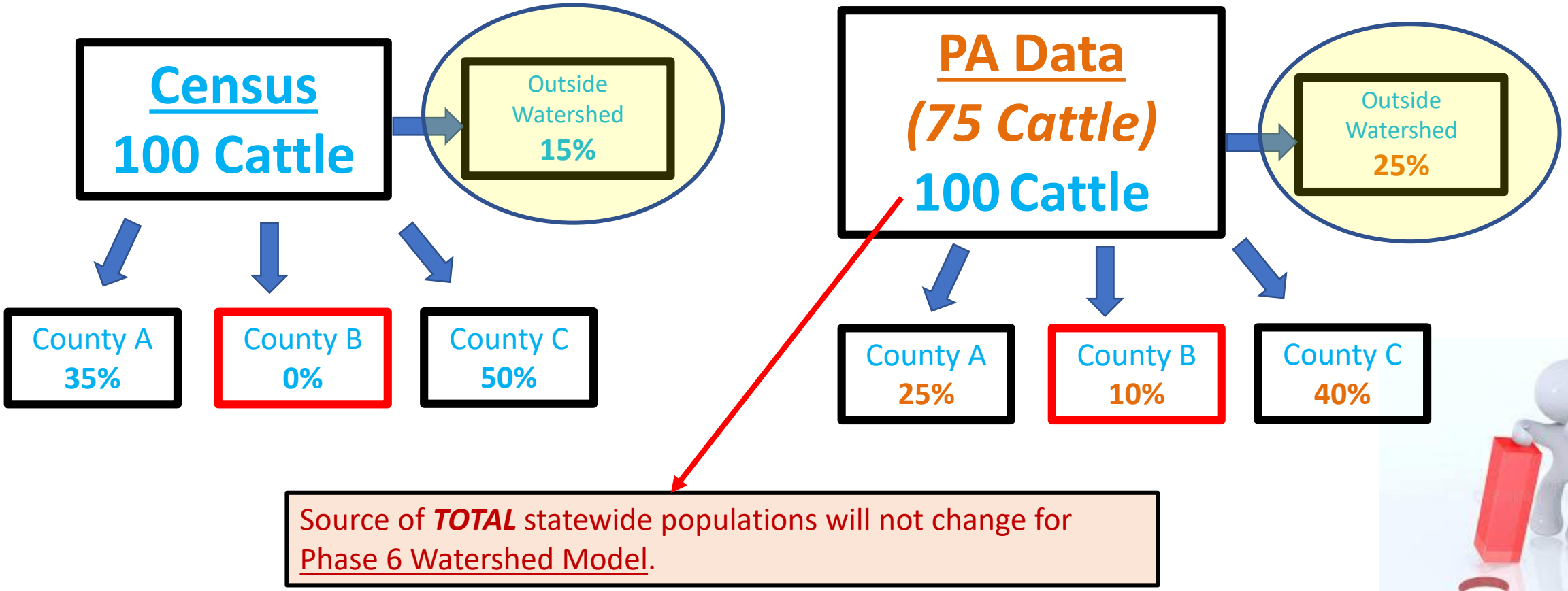


AMS= Agricultural Modeling Subcommittee

CRITICAL CONCEPT

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

Example: Pennsylvania provides fraction of cattle in every county for the year 2019, 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.

Concern:

Nutrient management on full-season soybeans?
YES: "core NM"
NO: "supplemental NM" for N rate, placement & timing
Why? NM on soybeans is controlling for P…

Given the same acreage…
A shift from double-crop to full-season soybeans will result in an increase in attributed N load.

CRITICAL CONCEPT:
N load attributed to soybean acres includes estimated leaching/runoff of residual N based on scientific literature review.

Ag Loading Rate Review Steering Committee
Agricultural Loading Rates

Model Assumption

Full Season (under Core NM):
Assume 40 bu/ac @ 100 ac

40 bu/ac x 0.12 lbs N/bu x 1.0 x 100 ac =

480 lbs N applied

Double-Crop
Assume 25 bu/ac @ 100 ac

25 bu/ac x 0 lbs N/bu x 1.0 x 100 ac

0 lbs N applied (on beans)
N applied to sm grain

Soybean Crop Application Goal

Full Season Soybeans

- 0.12 lbs N/bu (~5.7 lbs N/ac)
- CBW Average: (~3.58 lb/N ac)
- UME, Penn State, VT recommend zero N application

Double Cropped Soybeans

- Zero N applications
- UME, Penn State, VT recommend zero N application

Assumption: "Nitrogen application is not recommended for soybean production, however, **use of commercially available fertilizer formulations may result in application of up to 50 lb N / acre when fertilizer formulation and application rate is determined by crop P2O5, K2O, S, or other nutrient needs**. Organic waste nitrogen application to full-season soybean is not recommended because it is an agronomically inefficient use of applied nutrients. Organic wastes should only be applied to small grain - double-crop soybean rotations at rates and timings to supply the recommended nitrogen rate to the small grain crop." – UME SFM-1

Crop Application Goal on Major Crops

Crop Application Goal

*lbs of N/Year = State-Supplied lbs of N/Application Goal Yield Unit/Year X Yield/Year X 1.1**

Crop	DoubleCrop	Nutrient	Yield Unit	DE_1	MD_1	NY_1	PA_1	VA_1	WV_1
Alfalfa Hay Harvested Area	N	TN	dry tons	1	1	1	1	1	1
Alfalfa Hay Harvested Area	N	TP	dry tons	5	5	5	6	5	5
Corn for Grain Harvested Area	N	TN	bushels	0.92	0.92	0.92	0.92	0.92	0.92
Corn for Grain Harvested Area	N	TP	bushels	0.12	0.12	0.12	0.12	0.12	0.12
Corn for Grain Harvested Area	Y	TN	bushels	0.92	0.92	0.92	0.92	0.92	0.92
Corn for Grain Harvested Area	Y	TP	bushels	0.12	0.12	0.12	0.12	0.12	0.12
Wheat for Grain Harvested Area	N	TP	bushels	0.31	0.31	0.31	0.31	0.31	0.31
Wheat for Grain Harvested Area	N	TN	bushels	1.25	1.25	1	1	1.25	1.25
Wheat for Grain Harvested Area	Y	TP	bushels	0.465	0.465	0.465	0.465	0.465	0.465
Wheat for Grain Harvested Area	Y	TN	bushels	1.25	1.25	1	1	1.25	1.25
Pastureland and rangeland other than cropland and woodland pastured Area	N	TN	acres	15	15	15	15	15	15
Pastureland and rangeland other than cropland and woodland pastured Area	N	TP	acres	4	4	4	4	4	4
Soybeans for beans Harvested Area	**N**	**TN**	**bushels**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**
Soybeans for beans Harvested Area	**N**	**TP**	**bushels**	**0.33**	**0.33**	**0.33**	**0.33**	**0.33**	**0.33**
Soybeans for beans Harvested Area	**Y**	**TN**	**bushels**	**0**	**0**	**0**	**0**	**0**	**0**
Soybeans for beans Harvested Area	**Y**	**TP**	**bushels**	**0**	**0**	**0**	**0**	**0**	**0**

Data provided by states after consultation with nutrient management program staff.

Chesapeake Bay Program Phase 6 Beta 3 Watershed Model Webinar
July 11, 2016

*AMS elected to multiply yearly yield by 1.1 assuming farmers are optimistic, and average yields are often under-estimated.

CRITICAL CONTEXT:
"Crop Application Goal" assumes Core NM is in place

Full Season Beans receive
0.12 lb N/bu
&
0.33 lb P/bu

Double Crop Beans
0 lb N/bu
&
0 lb P/bu

NM on full season beans is controlling/managing for phosphorus!

Application Goal Multipliers

Land Use	Non NM N Multiplier	NM N Multiplier	Non NM P Multiplier	NM P Multiplier
Full Season Soybeans	**1.2**	**1.0**	1.5	1.0
Grain with Manure	1.3	1.0	3	1.0
Grain without Manure	1.2	1.0	1.5	1.0
Legume Hay	1.2	1.0	1	1.0
Silage with Manure	1.4	1.0	3	1.0
Silage without Manure	1.2	1.0	1.5	1.0
Small Grains and Grains	1.2	1.0	1.5	1.0
Small Grains and Soybeans	1.2	1.0	1.5	1.0
Specialty Crop High	1.3	1.0	2	1.0
Specialty Crop Low	1.2	1.0	2	1.0
Other Agronomic Crops	1.1	1.0	1.5	1.0
Other Hay	1	1.0	1	1.0
Pasture	1	1.0	1	1.0

Data provided by Phase 6.0 Nutrient Management Expert Panel

Full Season Soybeans:
40 bu/ac @ 100 ac

Core NM:
40 bu/ac x 0.12 lbs N/bu x 1.0 x 100 ac =
480 lbs N applied
40 bu/ac x 0.33 lbs P/bu x 1.0 x 100 ac =
1,320 lbs P applied

Non NM:
40 bu/ac x 0.12 lbs N/ac x 1.2 x 100 ac =
570 lbs N applied
40 bu/ac x 0.33 lbs P/bu x 1.5 x 100 ac =
1,980 lbs P applied

CRITICAL CONCEPT:
Multipliers are applied to Crop Application Goal

NM Supplemental Percent Reductions
(Only after Core NM is applied)

Land Use	Nutrient Management BMP			Nutrient Management BMP		
	N Rate Supplemental	N Placement Supplemental	N Timing Supplemental	P Rate Supplemental	P Placement Supplemental	P Timing Supplemental
Full Season Soybeans	0%	0%	0%	5%	10%	1%
Grain w/ Manure	15%	5%	10%	10%	20%	20%
Grain w/o Manure	5%	3%	5%	5%	10%	1%
Legume Hay	0%	0%	0%	1%	10%	1%
Silage w/ Manure	15%	5%	10%	10%	20%	20%
Silage w/o Manure	5%	3%	5%	5%	10%	1%
Small Grains and Grains	5%	3%	10%	5%	10%	1%
Small Grains and Soybeans	5%	3%	10%	5%	10%	1%
Specialty Crop High	15%	5%	5%	5%	10%	1%
Specialty Crop Low	5%	3%	5%	5%	10%	1%
Other Agronomic Crops	5%	3%	5%	5%	10%	1%
Other Hay	0%	3%	5%	0%	10%	1%
Pasture	0%	0%	0%	0%	0%	0%

Data provided by Phase 6.0 Nutrient Management Expert Panel

CRITICAL CONCEPT:
Supplemental NM is applied to Edge of Stream Delivery