AMS Update to Ag Workgroup

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Items for Final Phase 6 Model

- **Pending Approval by Ag Workgroup**
- **Ongoing Review by AMS**

- **Ammonium/Nitrate Split for Fertilizer**
- **Weighting Factors for Forecast**
- **Delivery of Nutrients from Riparian Pasture**
- **Responses to STAC Review**
- **Water Extractable P for APLE**
- **Acres of Corn Receiving Manure**
  - **Eliminate Silage without Manure**
- **Other Findings from Beta 4 Results**

Assess Assumption of 75/25 Ammonium/Nitrate Split in Inorganic Fertilizer

- AAPFCO provides tons of fertilizer sold by grade, and a nitrogen concentration for each grade.
- Available literature and industry values were used to define fractions of ammonium and nitrate in each grade. Examples:
  - DAP = 0/100
  - UREA = 100/0
  - Ammonium Nitrate = 50/50
- Tons of each grade sold in 2012 (most recent year of data) then multiplied by concentrations of ammonium and nitrate. Result:
  - 77% Ammonium/23% Nitrate

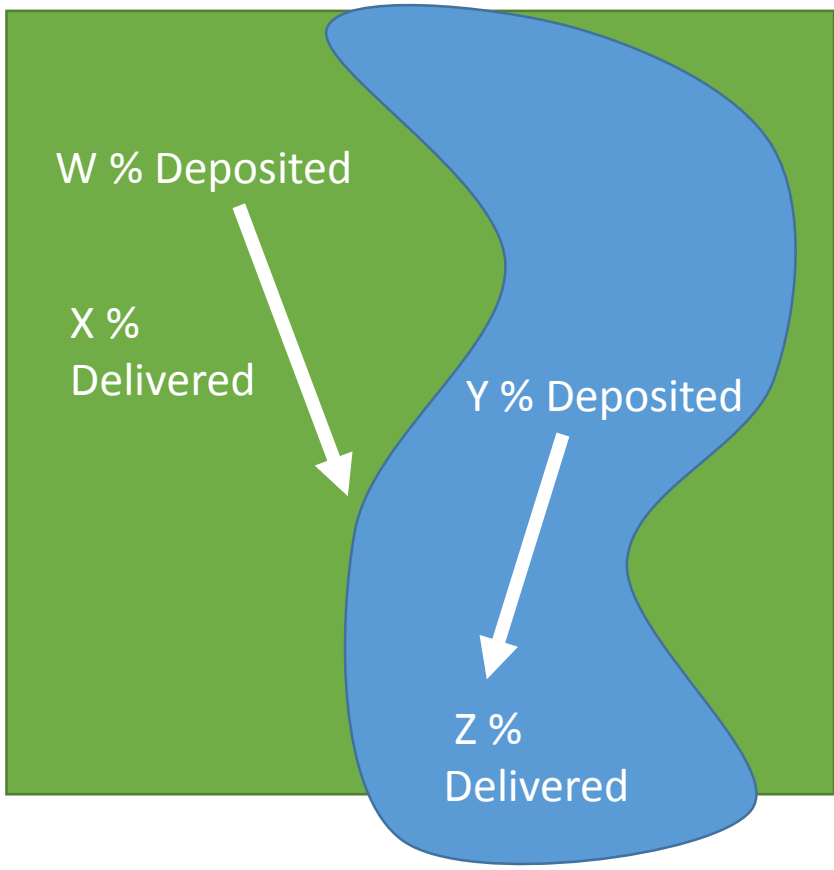
Assess Weighting Factors for Projections

- The agricultural forecast method requires weighting factors for combining a short-term and long-term trend in data.
- Current factors of 0.8 for short-term and 0.2 for long-term were found to best predict 2007 cattle and broiler populations.
- Tested combinations of factors to best predict 2012 data with the least variation across the watershed and in each county.

Category	Alpha Factor	Beta Factor
Harvested Cropland	0.6	0.4
Pasture	0.6	0.4
Cattle	0.6	0.4
Swine	0.8	0.2
Poultry	0.8	0.2

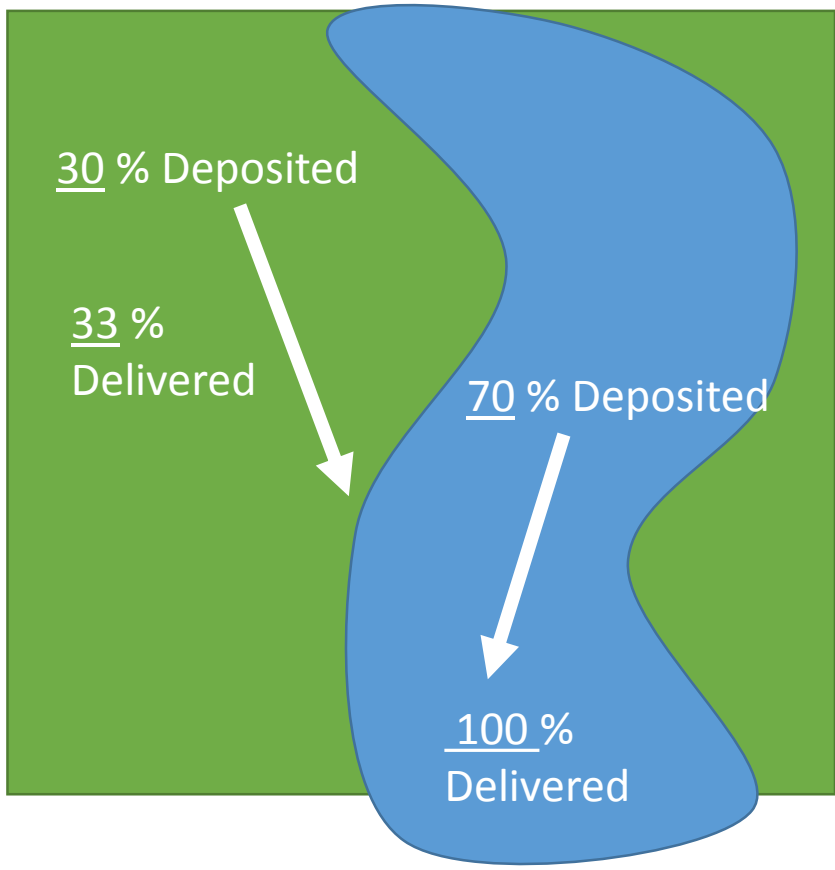
Assess Attenuation/Delivery Rates within Riparian Access Areas

- Current assumption is that 100 percent of nutrients applied within the pasture riparian area are transported to the edge of small streams. (1.0 delivery)
- In reality, only a portion is deposited in the stream, and only a portion is delivered from the land.



Riparian Access Area continued

- Average assumption across VA bacterial TMDL models is that 70 percent of manure is deposited within the stream, with 30 percent deposited in the riparian area adjacent to stream.
- Butler et. al, 2008 found that 33 percent of N and 34 percent of P deposited in nearby riparian zones was delivered to stream.
- Recommendation:
  - 80% TN Delivered = 30% X 33% + 70% X 100%
  - 80% TP Delivered = 30% X 34% + 70% X 100%



Manure water-extractable P (WEP) content

Animal Type	Mean WEP/TP (ranges)	Source
Beef	0.43 (0.15-0.94) 0.5	Kleinman et al., 2005[1] APLE User Manual, v2.4[2]
Dairy	0.6 (0.2-0.7) 0.5	Kleinman et al., 2005 APLE User Manual, v2.4
Other Cattle	0.515	Avg. Beef and Dairy
Hogs for Slaughter	0.37 (0.2-0.9) 0.35	Kleinman et al., 2005 APLE User Manual, v2.4
Hogs and Pigs for Breeding	0.37 (0.2-0.9) 0.35	Kleinman et al., 2005 APLE User Manual, v2.4
Broilers	0.2 (0.20-0.21) 0.2	Kleinman et al., 2005 APLE User Manual, v2.4
Layers	0.19 (0.12-0.21) 0.2	Kleinman et al., 2005 APLE User Manual, v2.4
Turkeys	0.34	Kleinman et al., 2005
Pullets	0.19	Kleinman et al., 2005
Sheep and Lambs	0.515	Avg. Beef and Dairy
Goats	0.515	Avg. Beef and Dairy
Horses	0.515	Avg. Beef and Dairy
Amended manures	0.1	APLE User Manual, v2.4

1. Kleinman, J.A., A.M. Wolf, A.N. Sharpley, D.B. Beegle, and L.S. Saporito. 2005. Survey of water-extractable phosphorus in livestock manure. J. Soil Science Society 69:701-708
2. Vadas, P.A. 2013. Annual Phosphorus Loss Estimator, version 2.4, User's Manual. https://www.ars.usda.gov/midwest-area/madison-wi/us-dairy-forage-research-center/docs/aple-homepage/

Manured Acres

County Name	FracManuredCornAIR	FracAgCensus
Allegany	0.37	0.09
Anne Arundel	0.28	0.06
Baltimore	0.22	0.07
Calvert	0.10	0.06
Caroline	0.67	0.35
Carroll	0.42	0.20
Cecil	0.30	0.15
Charles	0.18	0.06
Dorchester	0.69	0.22
Frederick	0.35	0.26
Garrett	0.77	0.16
Harford	0.48	0.07
Howard	0.26	0.09
Kent	0.62	0.22
Montgomery	0.07	0.06
Prince Georges	0.14	0.08
Queen Annes	0.55	0.14
Somerset	0.81	0.41
St. Marys	0.59	0.12
Talbot	0.51	0.18
Washington	0.57	0.33
Wicomico	0.65	0.29
Worcester	0.77	0.29

- Comparison of AIR % manured corn acres to current % manured acres indicated current method consistently under-estimated manured acres.
  - Recommend changing equation to estimate.
- AIR also indicated that nearly 100 percent of silage received manure.
  - Recommend eliminating the silage without manure land use.

Items for Phase 6 Model Needing Approval

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- **Weighting Factors for Forecast**
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Next Steps

- AMS to schedule meeting during first week of December to:
  1. Make final recommendations for
     - **Water Extractable P for APLE**
     - **Acres of Corn Receiving Manure**
  2. Thoroughly review Phase 6 Beta 4 inputs from Tableau
     - Issues will be characterized and prioritized by AMS and brought to the Ag Workgroup in December with the understanding that the deadline for approving changes is December 31.