AMT Office Hours

9/13/2024

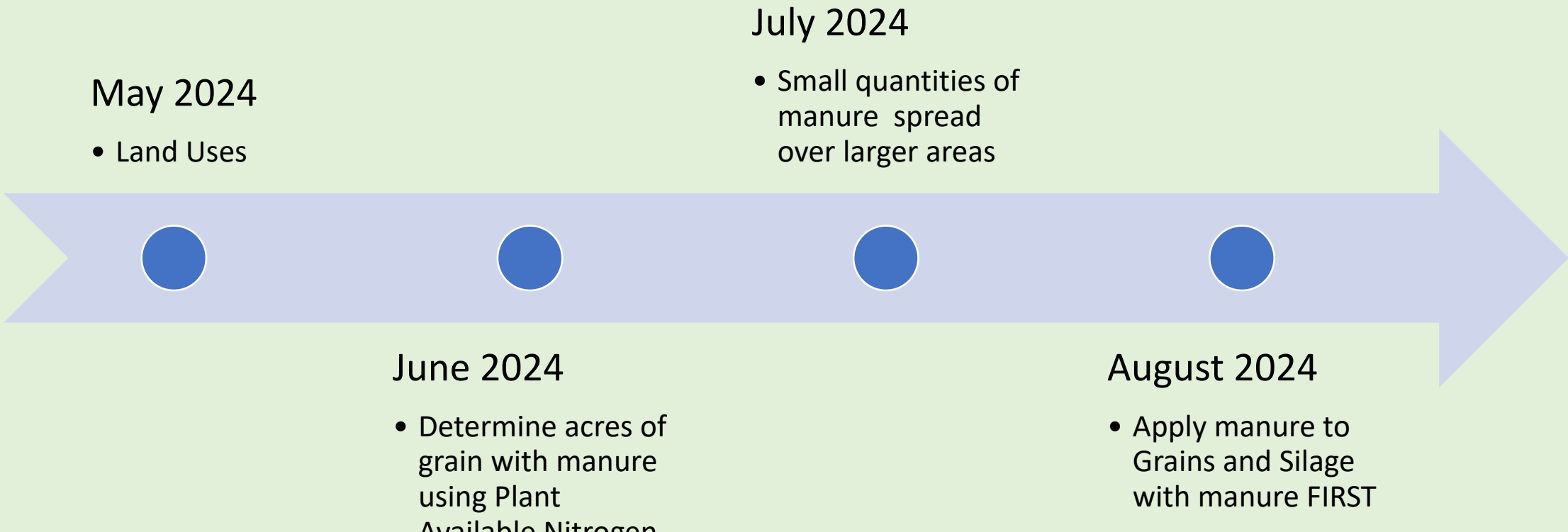
Tom Butler, EPA

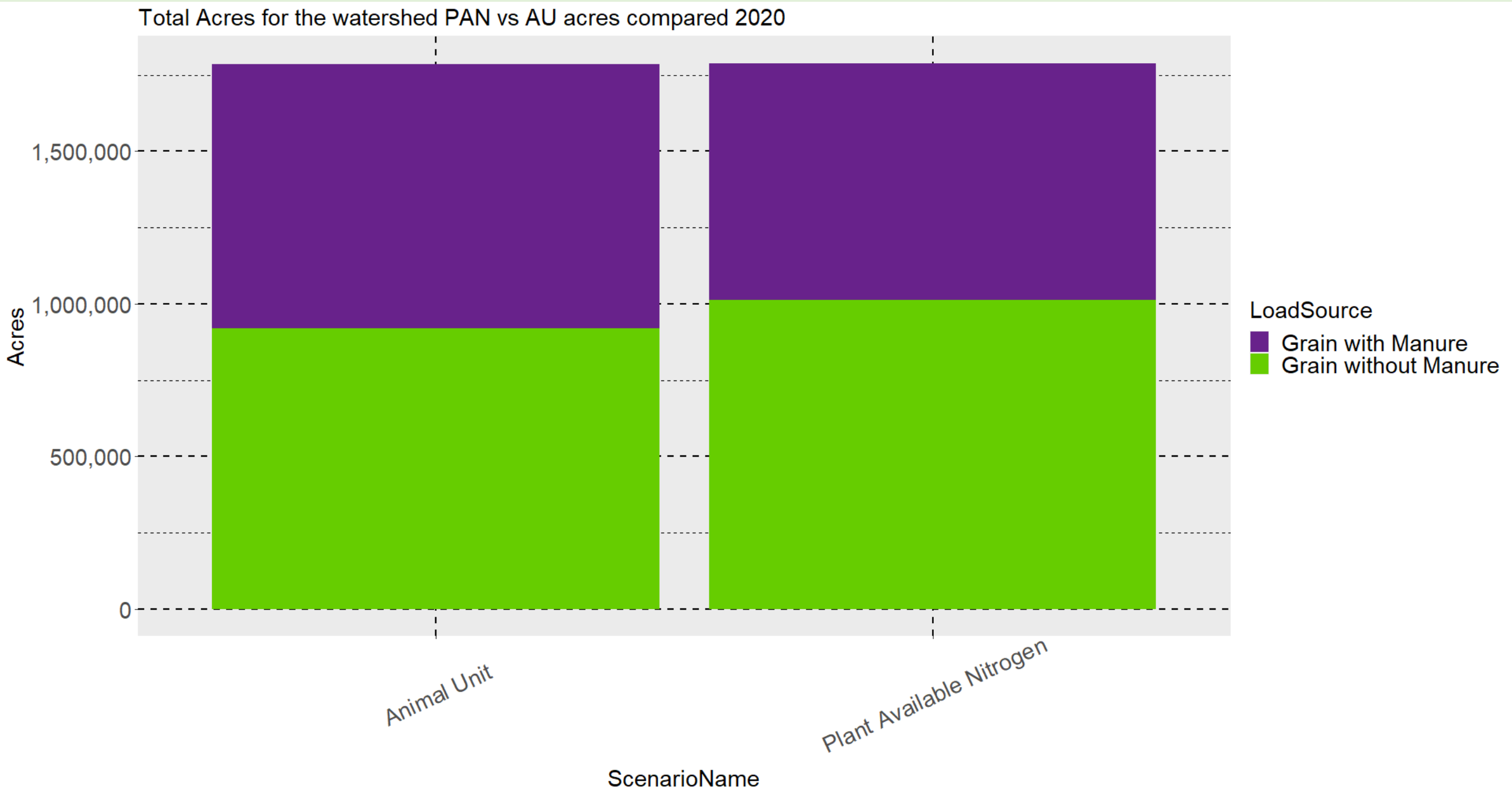
Three main topics

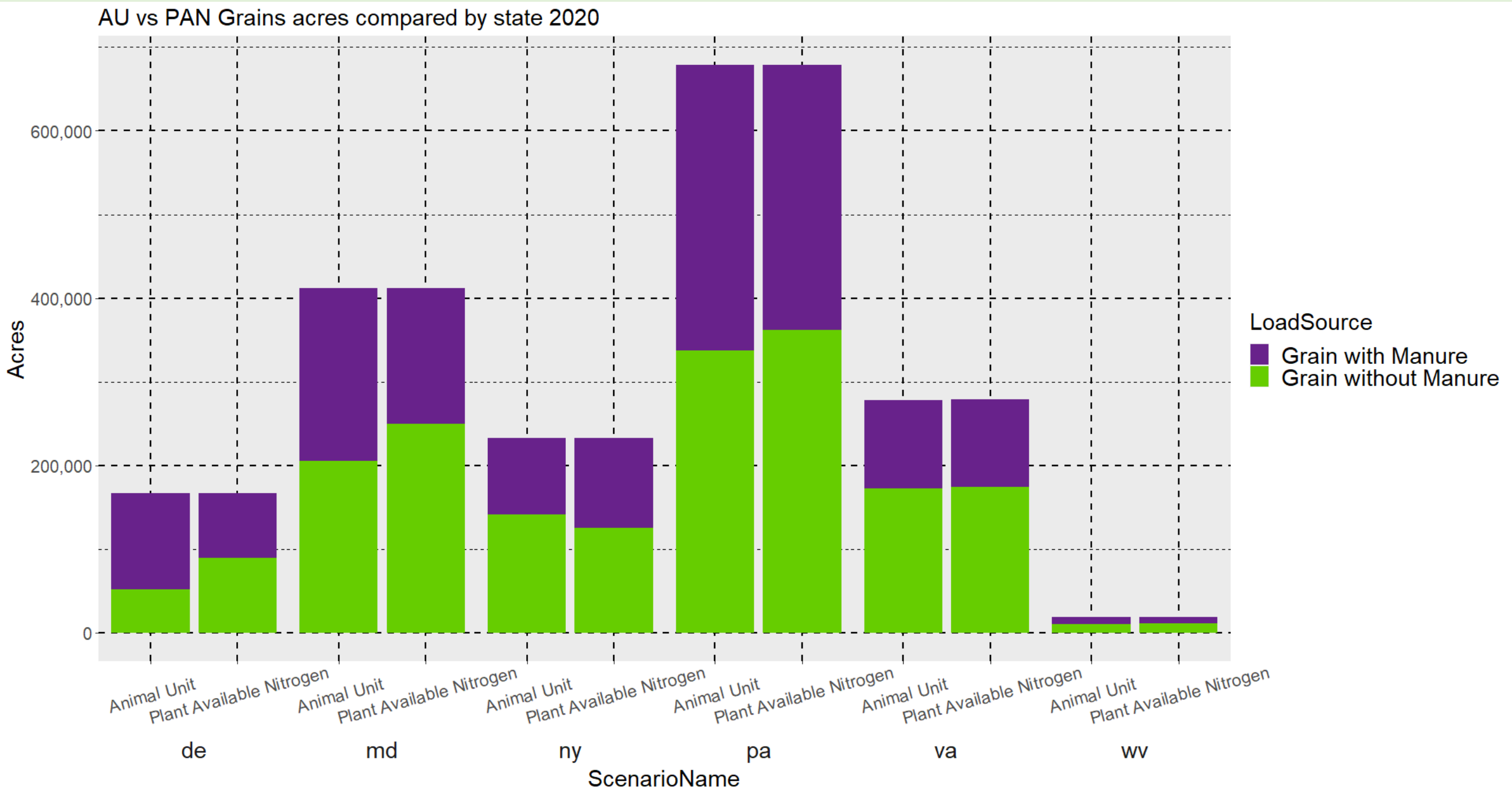
- Manure applications
- Crop Yields
- Mortality

Manure Applications

Setting the stage:




Total Acres for the watershed PAN vs AU acres compared 2020
1,500,000
1,000,000
500,000
0
Acres
Animal Unit
Plant Available Nitrogen
ScenarioName
LoadSource
Grain with Manure
Grain without Manure


AU vs PAN Grains acres compared by state 2020
Acres
600,000
400,000
200,000
0
Animal Unit
Plant Available Nitrogen
de
md
ny
pa
va
wv
ScenarioName
LoadSource
Grain with Manure
Grain without Manure

Recap:

Group 1

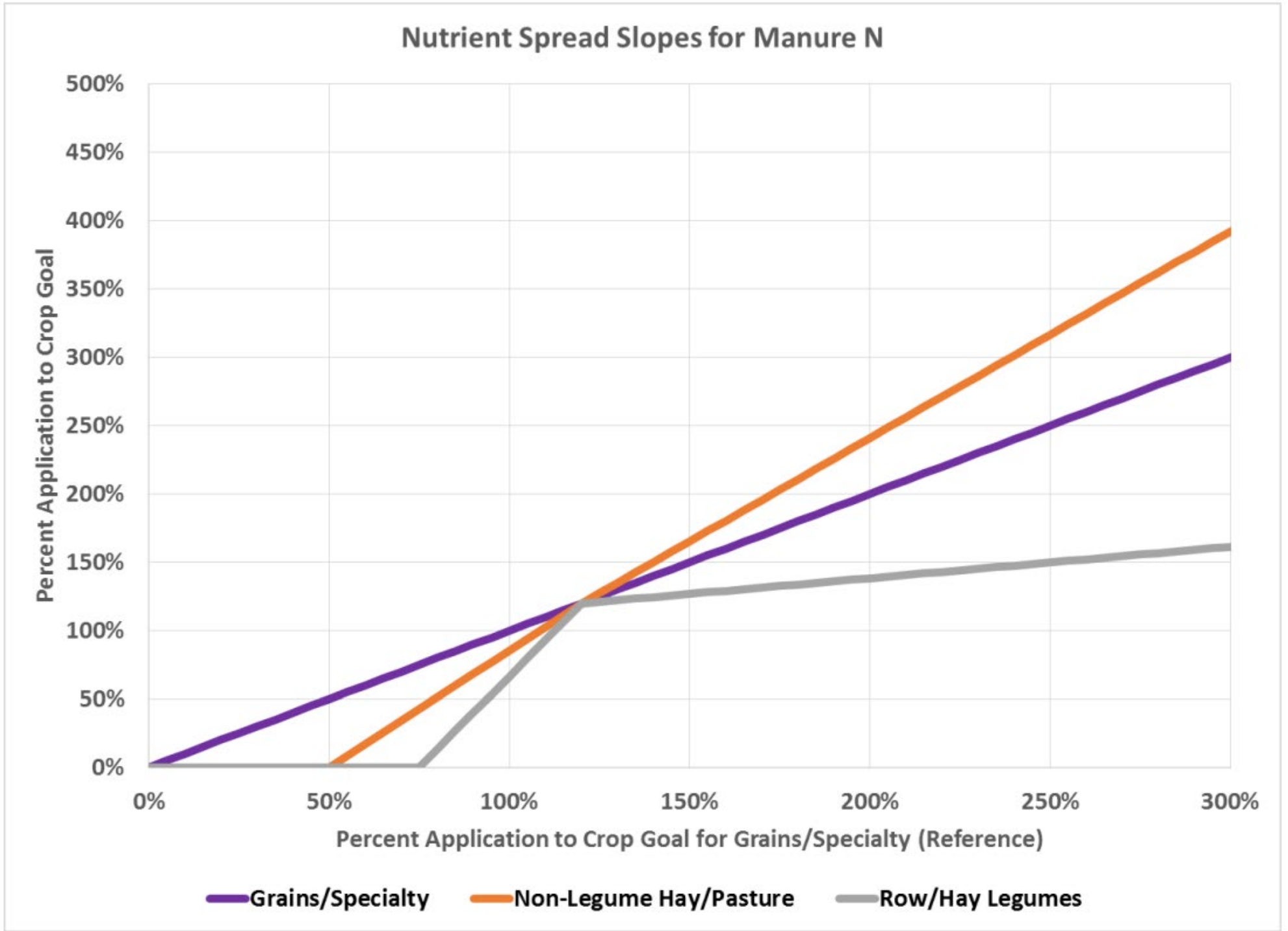
- Grain with manure
- Silage
- Small Grains
- Double cropped
- Other crops
- Specialty (high and low)

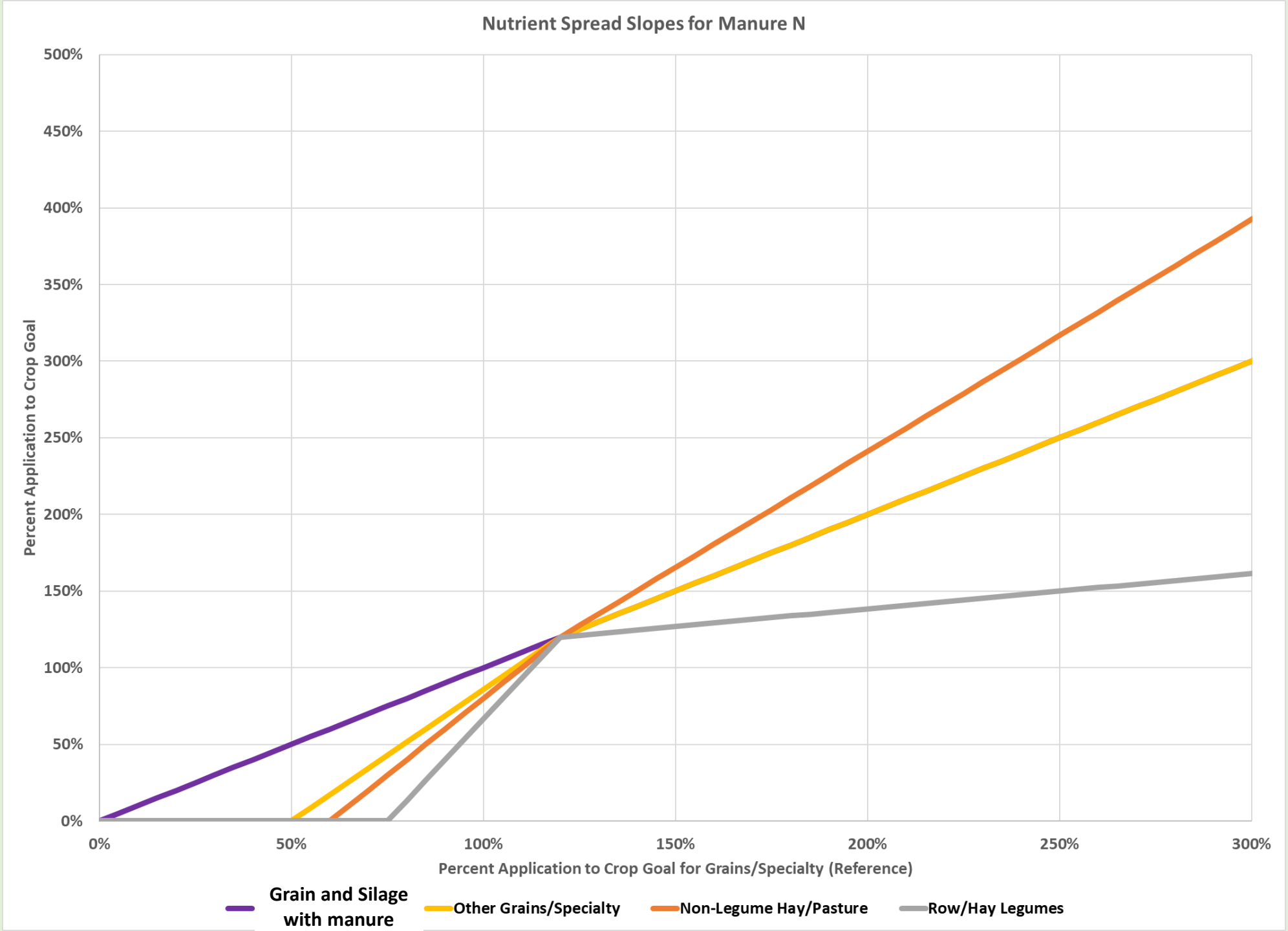
Group 2

- Other Hay
- Pasture

Group 3

- Soybeans
- Legume Hay


Nutrient Spread Slopes for Manure N
500%
450%
400%
350%
300%
250%
200%
150%
100%
50%
0%
Percent Application to Crop Goal
0%
50%
100%
150%
200%
250%
300%
Percent Application to Crop Goal for Grains/Specialty (Reference)
Grains/Specialty
Non-Legume Hay/Pasture
Row/Hay Legumes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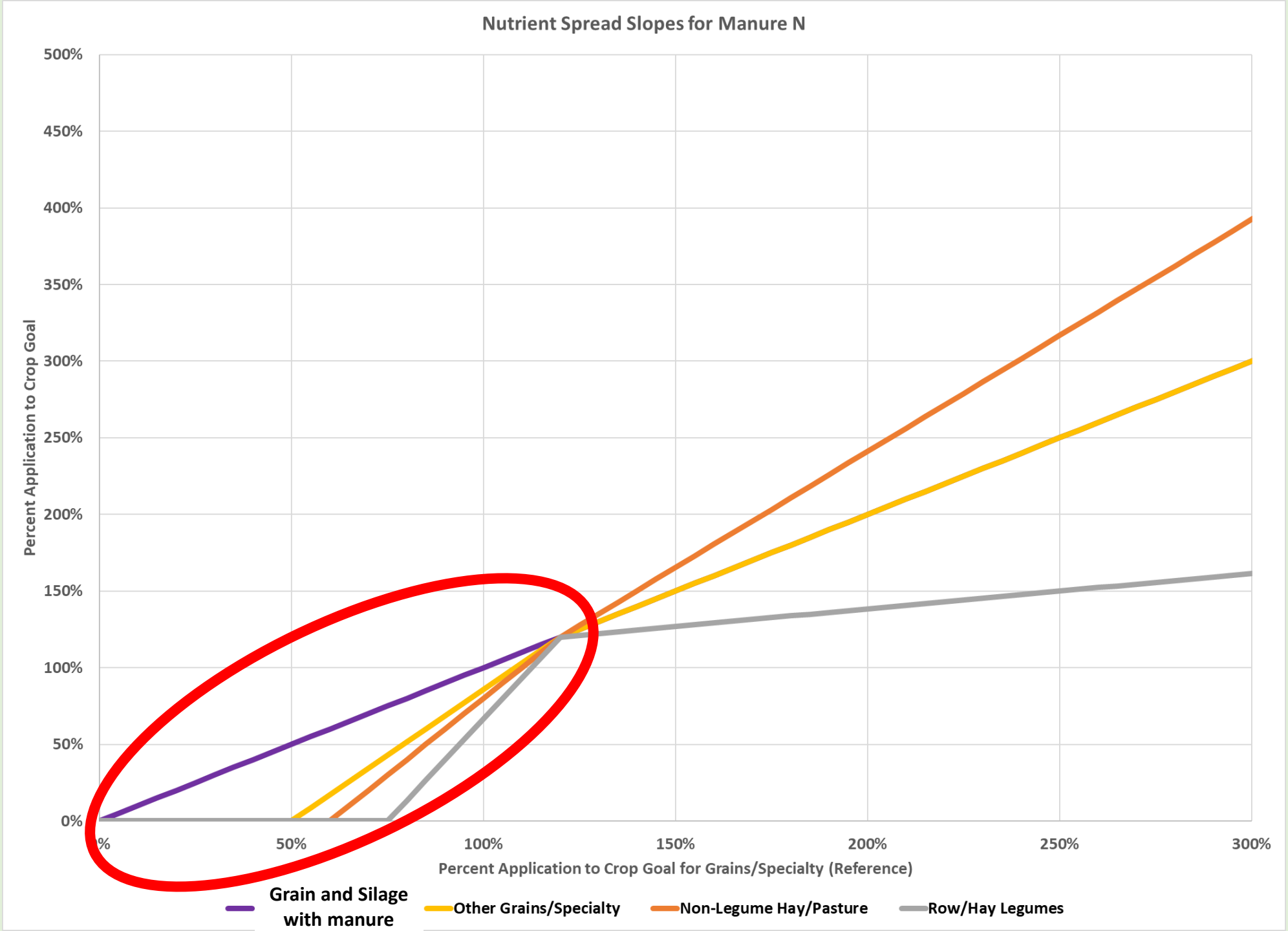
Percent Application to Crop Goal for Grains/Specialty (Reference)
Grain and Silage with manure
Other Grains/Specialty
Non-Legume Hay/Pasture
Row/Hay Legumes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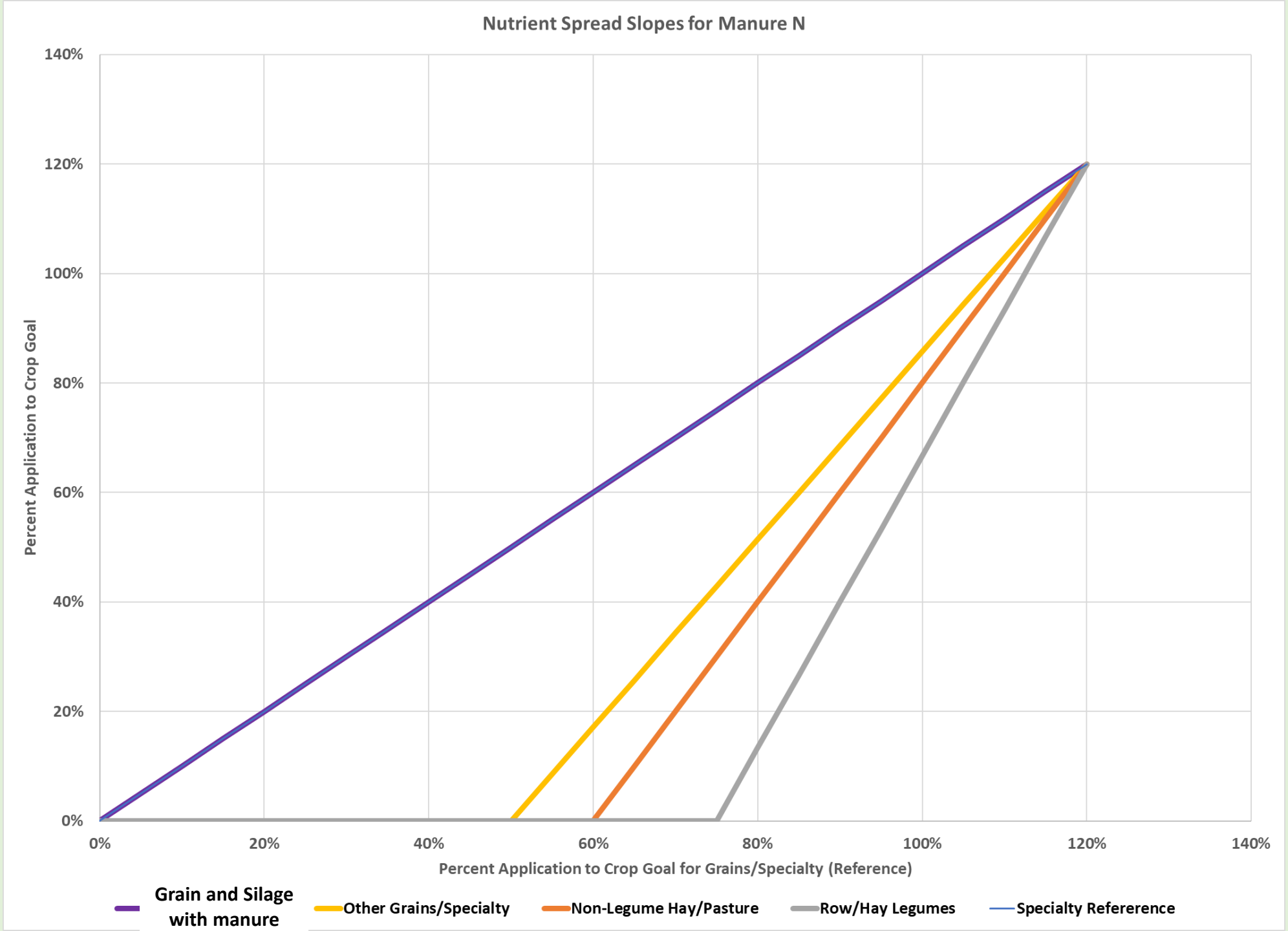

Nutrient Spread Slopes for Manure N
140%
120%
100%
80%
60%
40%
20%
0%
Percent Application to Crop Goal
0%
20%
40%
60%
80%
100%
120%
140%
Percent Application to Crop Goal for Grains/Specialty (Reference)
Grain and Silage with manure
Other Grains/Specialty
Non-Legume Hay/Pasture
Row/Hay Legumes
Specialty Refererence

Recap:

Group 1

- Grain with manure
- Silage
- Small Grains
- Double cropped
- Other crops
- Specialty (high and low)

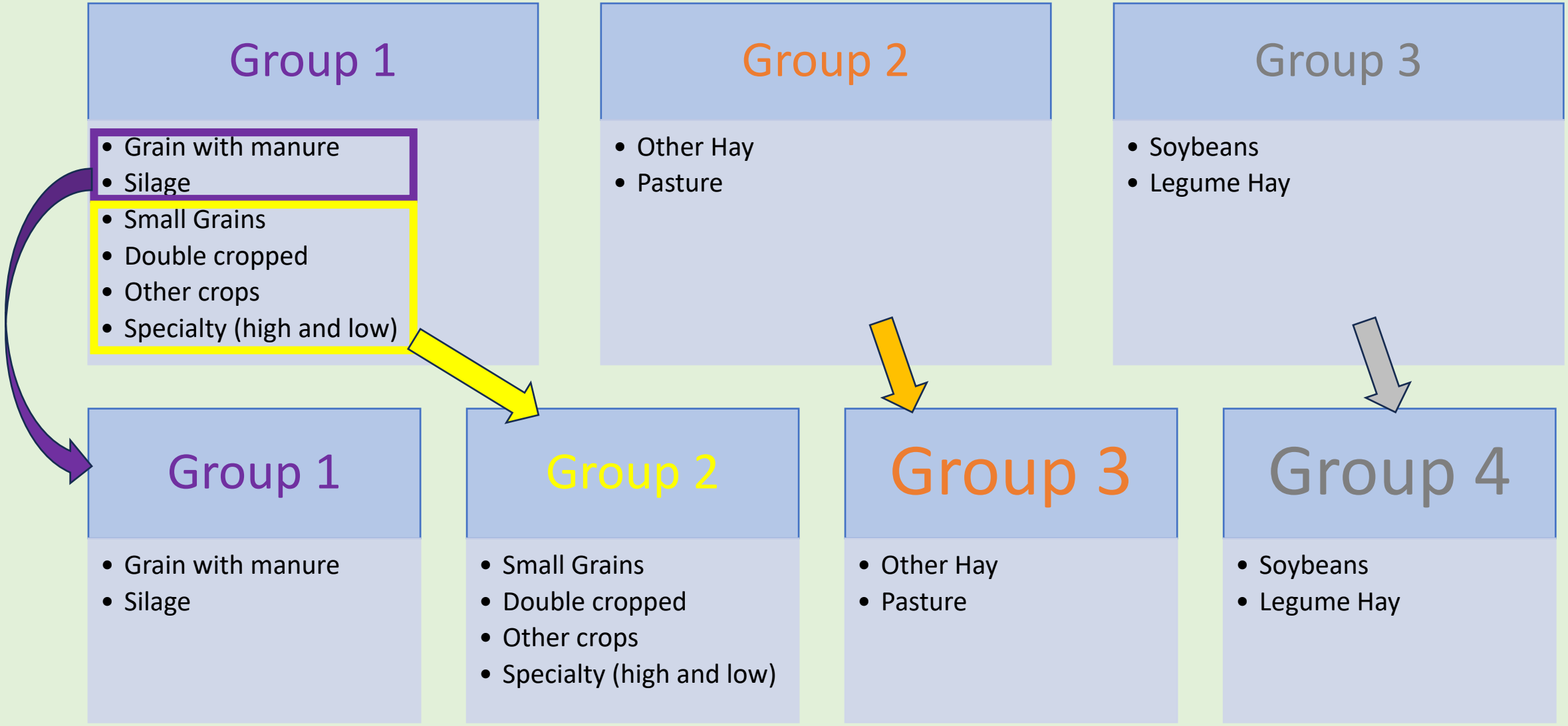
Group 2

- Other Hay
- Pasture

Group 3

- Soybeans
- Legume Hay

Recap: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Other Hay
Pasture
Group 4
Soybeans
Legume Hay

Recap: Final groupings

Group 1

- Grain with manure
- Silage

Group 2

- Small Grains
- Double cropped
- Other crops
- Specialty (high and low)

Group 3

- Other Hay
- Pasture

Group 4

- Soybeans
- Legume Hay

What is the goal for today?

Proposed decisions:	
The acres of Grains with Manure should be determined using Plant Available Nitrogen	Modify the manure spread algorithm to create a fourth group as shown in this presentation

What is your level of agreement?

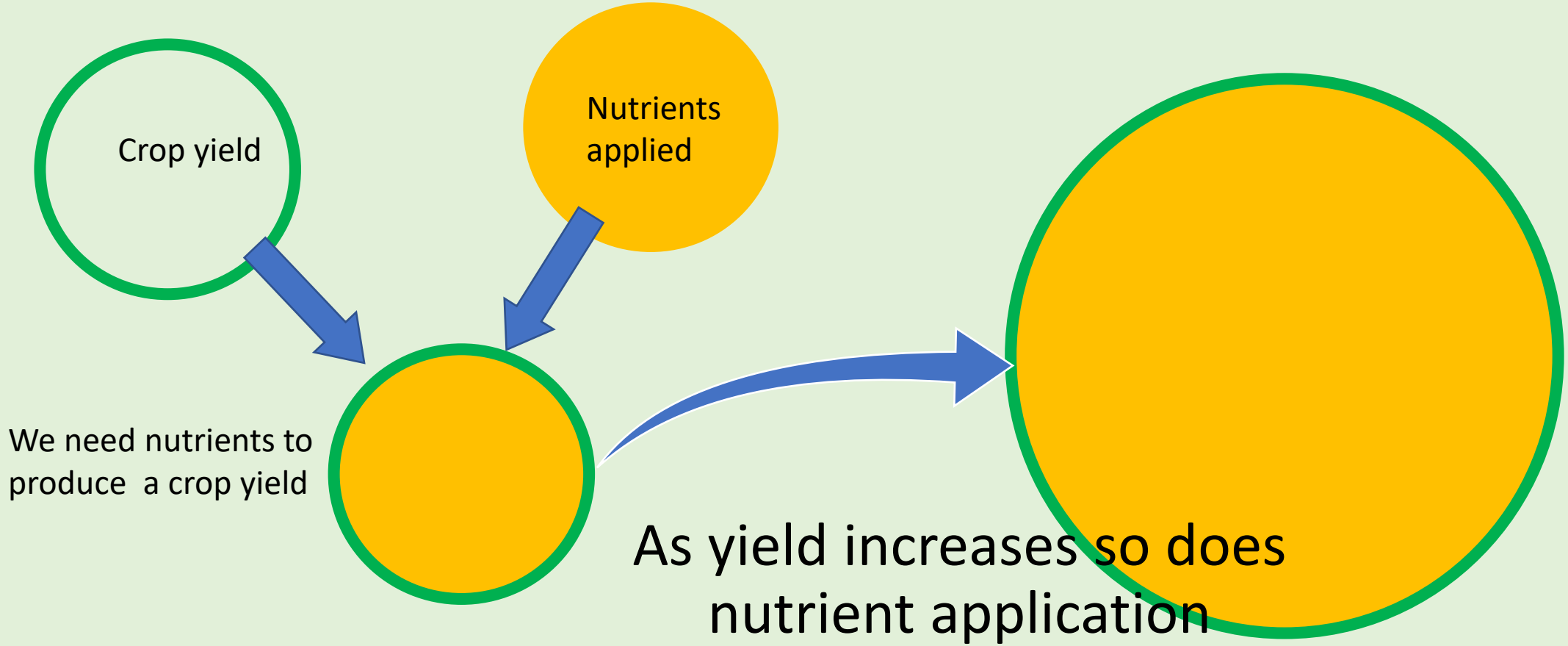
Questions?

Questions?

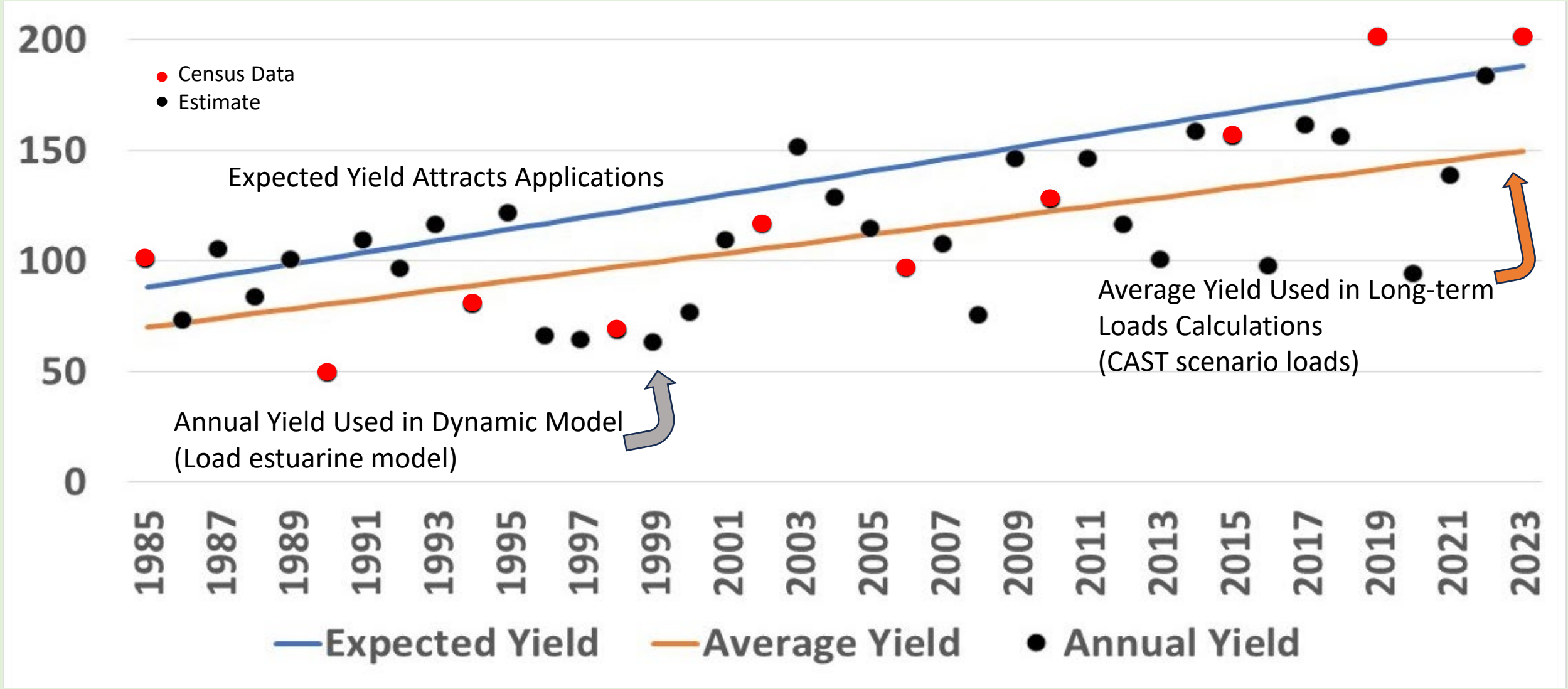
Crop Yields

Why crop yields matter

- Yields and nutrient applications are tied together



*EXAMPLE
DATA ONLY



*EXAMPLE
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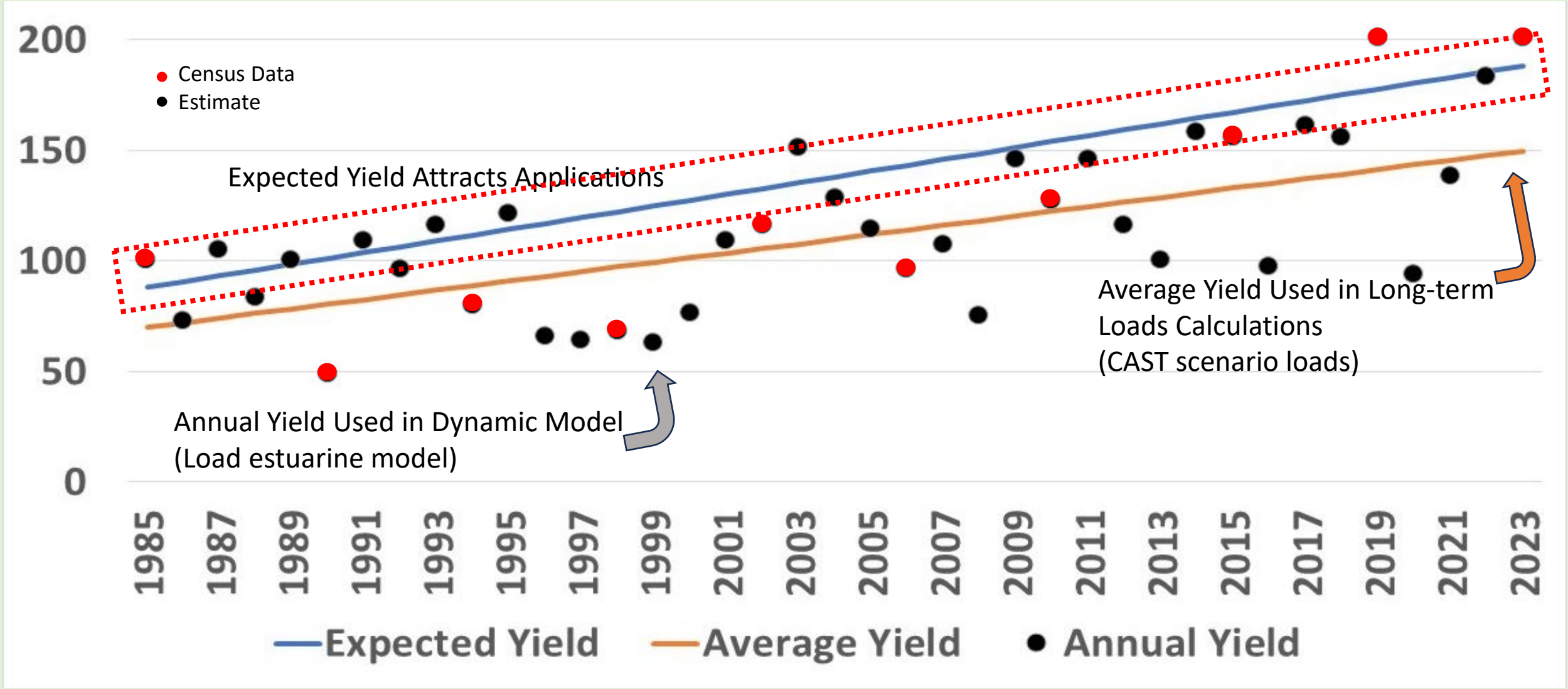


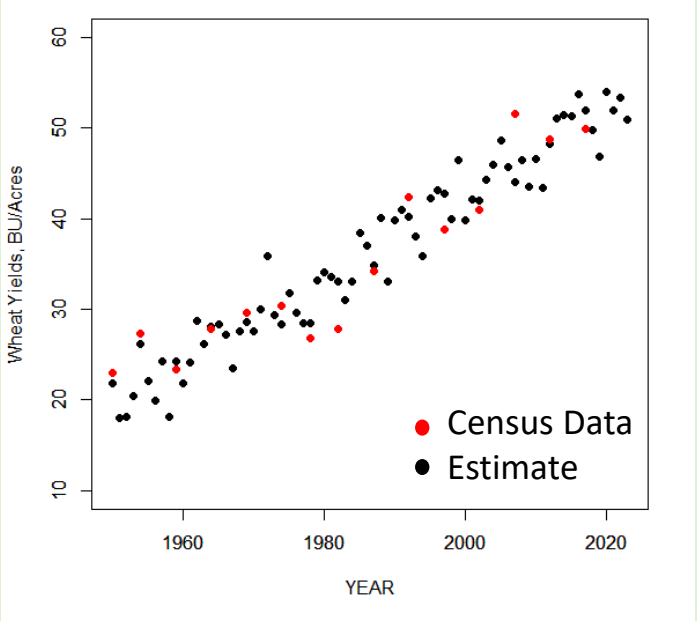
Path of investigation

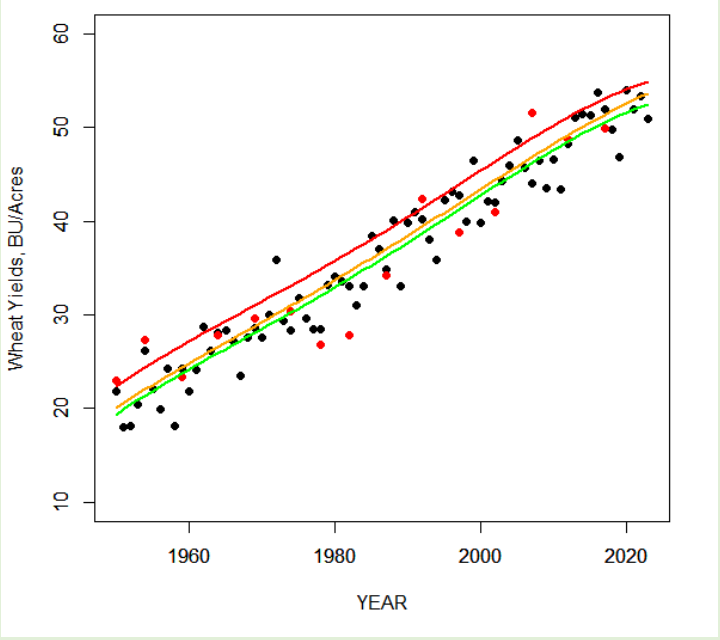
Goals:

- Estimate farmer yield expectations at the county level which drive the application of nutrients.
- Estimate various yield trends to support potential scenarios.

Collect crop yield data from 1950 to present → Estimate annual yields → Apply trend analyses

USDA Census and Survey data





Let’s look at some CAST scenarios:

Current – The current Phase 6 CAST method	***Proposed*** – Proposed updated Phase 7 method
• Yields are unchanged from P6.	• Yields are updated with Joseph’s work.

Mortality

What is animal mortality in CAST?

- Nutrients from dead animals
- Routine deaths NOT mass mortality events
  - i.e. avian flu
- Currently there is no independent pool of mortality nutrients

Context:

Why do this?

- Improve CAST simulation of mortality nutrients (Expert Pannel recommendation).

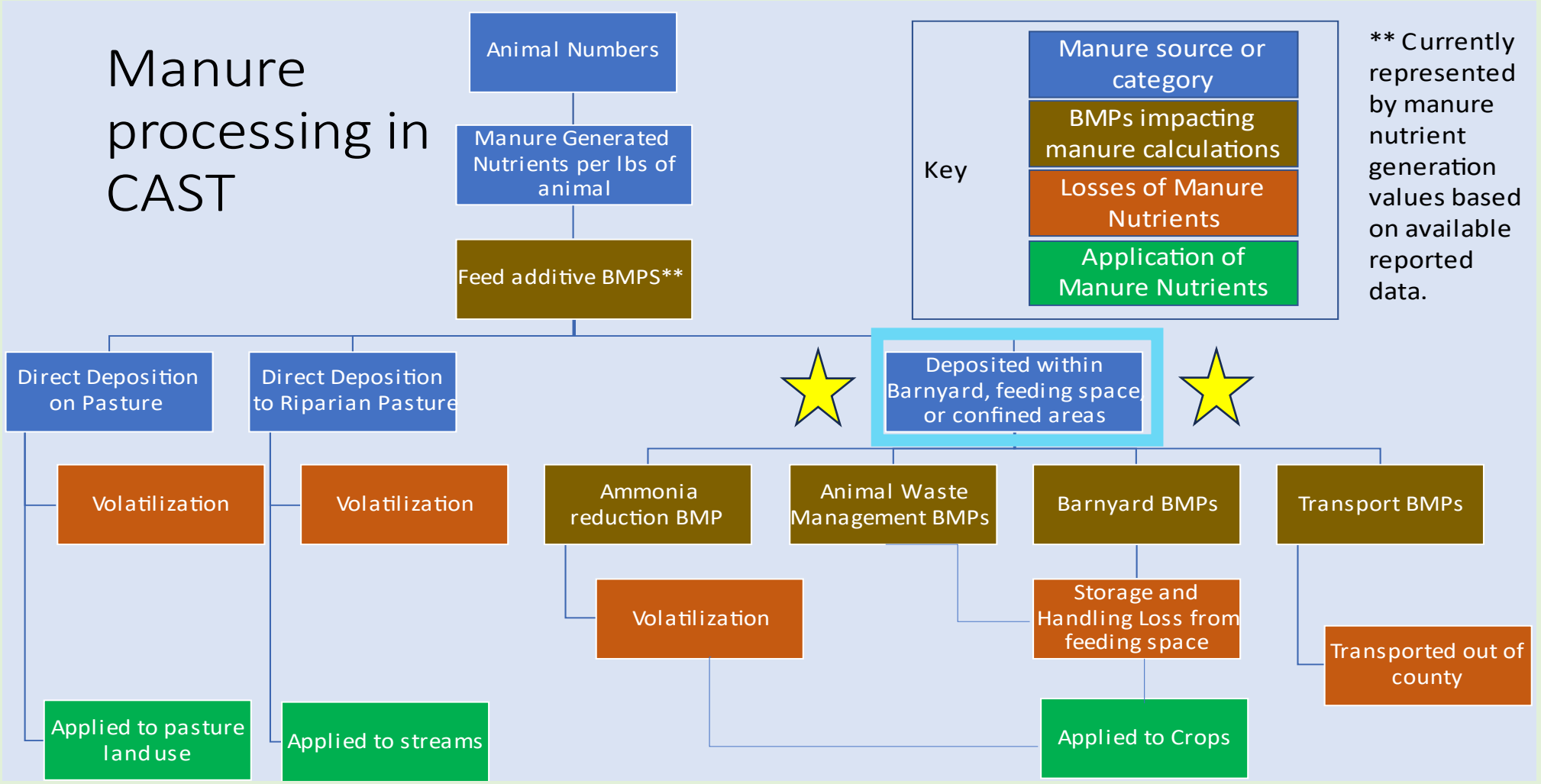
What are we expected to do?

- Decide if we should adopt a different methodology to simulate mortality nutrients.

Animal Mortality Management BMP Expert Panel

1. Routine Mortality Production
   - Mass of mortalities, N, and P per Animal Unit (AU, 1 AU = 1,000 pounds liveweight) per year produced by the most important animal agricultural practices in the Chesapeake Bay Watershed.
2. Disposal Methods
   - N and P reduction efficiencies of selected mortality disposal methods, and categorize the fractional masses of carcass nutrients removed from agricultural systems, recycled by producers in a Nutrient Management Plan (NMP), volatilized to the atmosphere, and leaving the practice by all other pathways (leaching, overland flow, etc.).

Phase 6 implementation



- Manure nutrients stay in their county of origin UNLESS they are transported

Contribution of mortalities to nutrients:

Table ES.1. Estimated weight of mortality nutrients produced by farms on a per AU (1,000 pounds liveweight) basis.

Type of Farm	Characteristic Animal(s)	Weight of Mortality Nutrients Produced per Farm (Lbs. AU^{-1} $year^{-1}$)	
		TN	TP
Poultry			
Broiler	6 lb. Market Birds	1.8	0.25
Layer	Laying Hens	2.2	0.40
Tom Turkey	48 lb. Market Toms	2.5	0.33
Hen Turkey	25 lb. Market Hens	2.5	0.32
Swine	270 lb. Market Hog	1.5	0.34
Cattle			
Cow-Calf Herd	Mother Cow	0.65	0.19
Cattle Feedlot	Heifer and Steer Capacity	0.47	0.14
Dairy	Mature Cows (Milking and Dry)	1.9	0.57
Equidae	1,150 lb. Horse	0.34	0.12

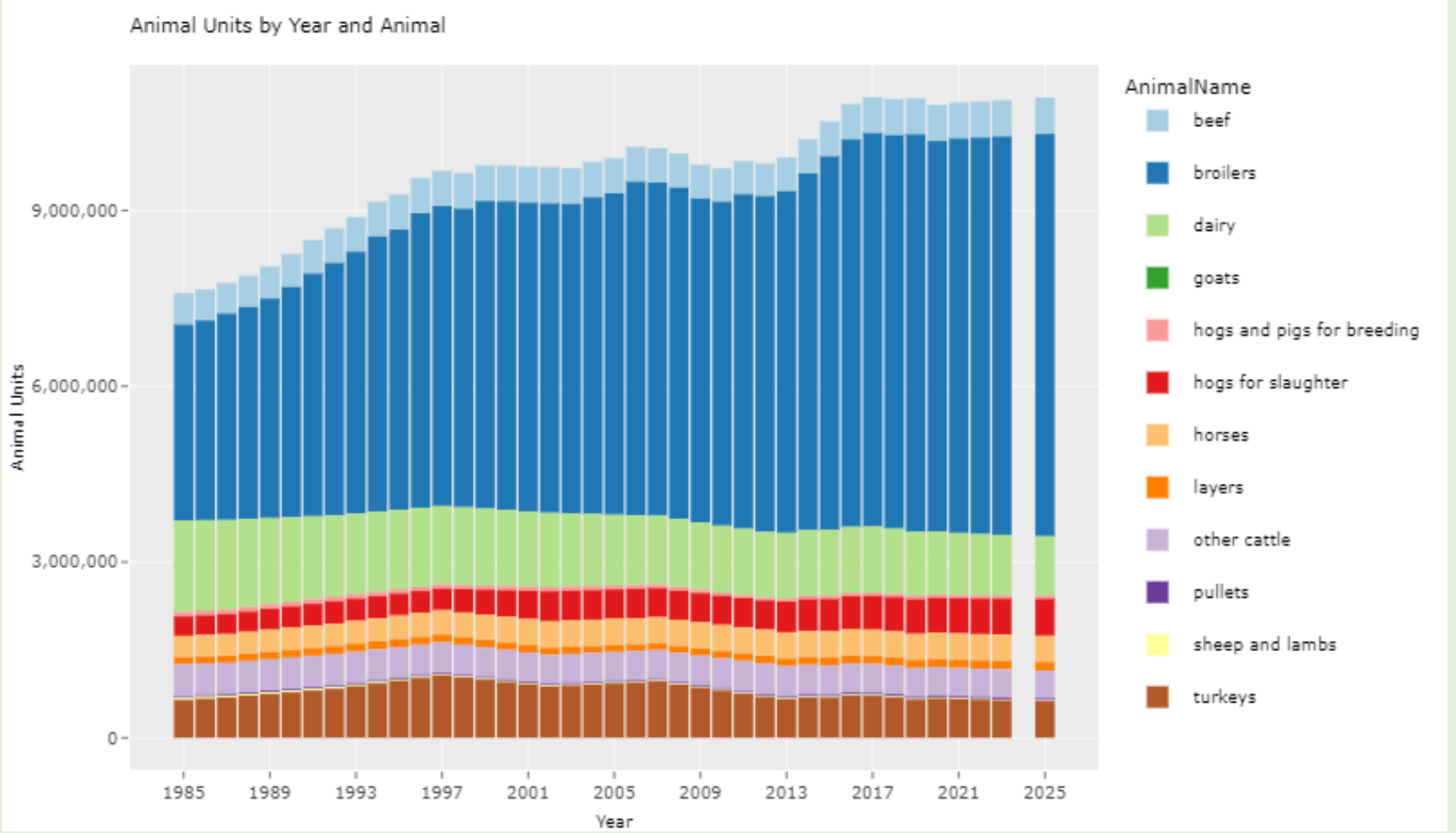
Contribution of mortalities to nutrients:

Table ES.3. Percentage of manure and mortality nitrogen and phosphorus contributed by mortalities for typical animal operations in the Chesapeake Bay Watershed.

Type of Farm	Percentage of Farm Nutrients (Manure and Mortalities) Originating with Mortalities	
	TN	TP
Poultry		
Broiler	1.3 - 2.4	0.65 – 1.2
Layer	0.70	0.40
Turkey	4.0	2.0
Swine	3.2	3.8
Cattle		
Cow-Calf Herd	0.45	0.58
Cattle Feedlot	0.26 – 0.32	0.45 – 0.75
Dairy	0.55 – 0.65	0.93 – 1.2
Equidae	0.30 - 0.52	0.51 – 1.5

Why does this matter?

- Animals exist
- Impact areas relying on mortality disposal



Phase 6 implementation: A problem

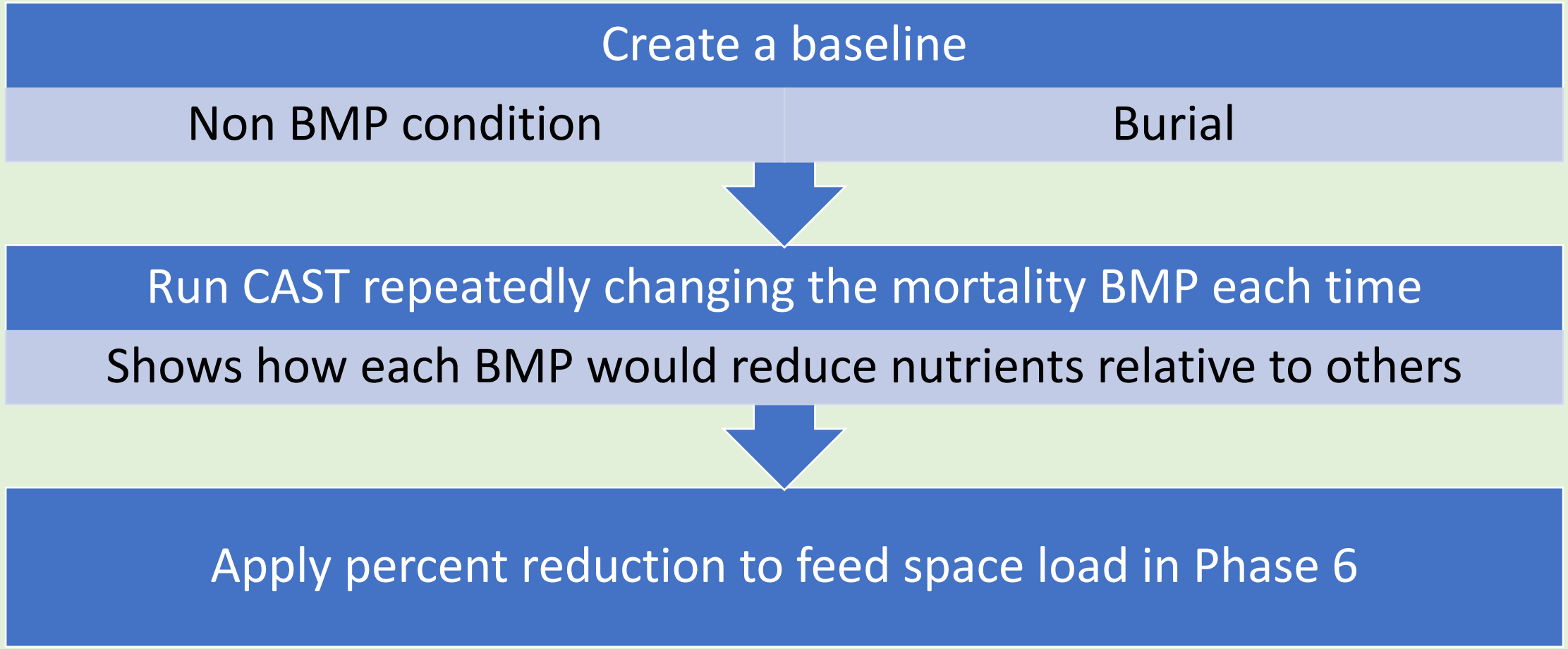
First tried to apply a reduction to CAST

There was no explicit load for mortality

Caused CAST to add in a load to be reduced by mortality BMPs

Caused an increase in overall loads

Phase 6 implementation: A solution



Efficiency Values for Practices

Pollutant	Burial	Compost	Incineration	Rendering
TN	0	0.124%	0.372%	0.372%
TP	0	0.059%	0.059%	0.059%
TSS	N/A	N/A	N/A	N/A

Questions?

Thank you for attending office hours!

- We will reconvene at the start of the main meeting
  - this link at 09:00