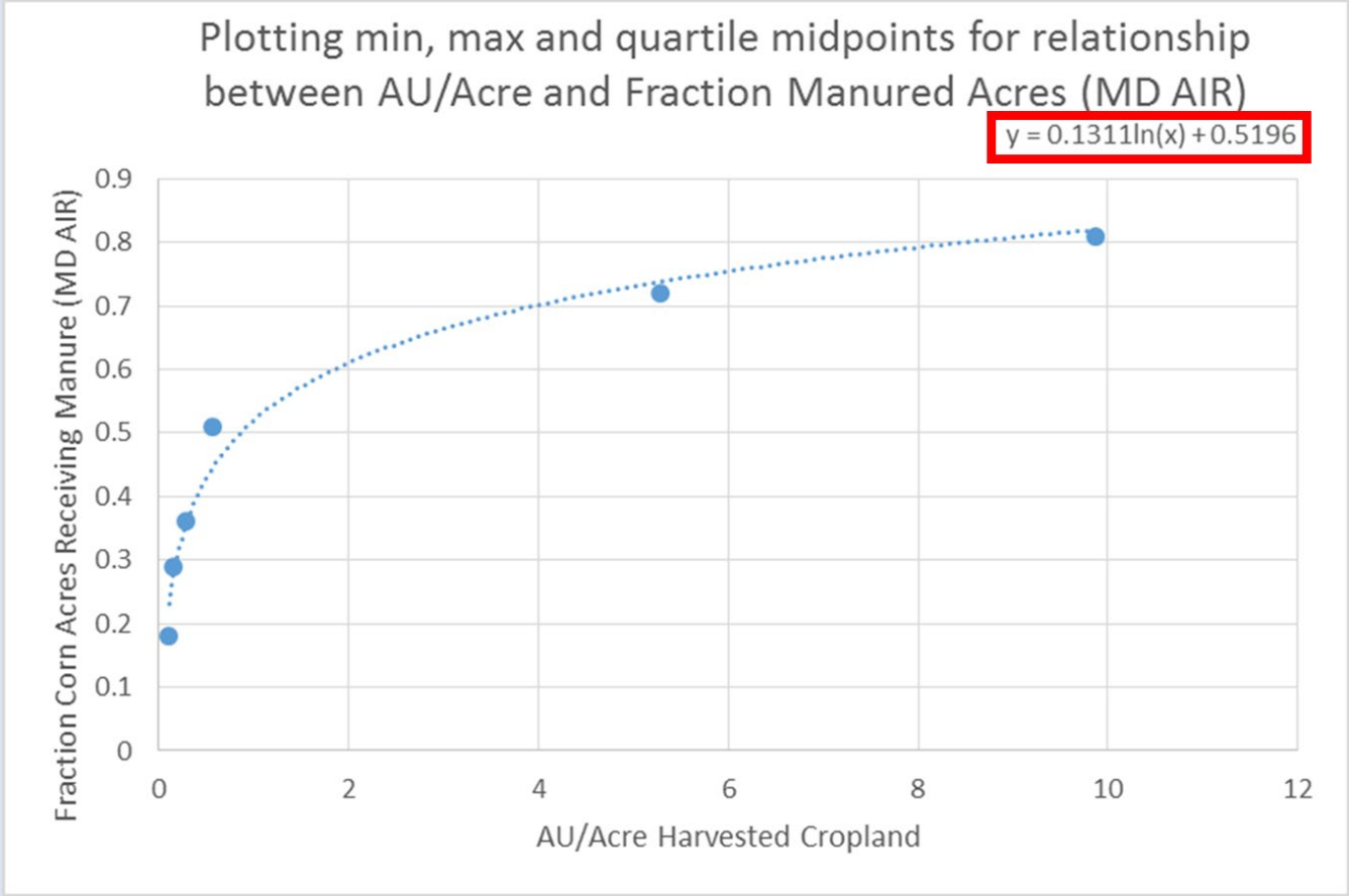
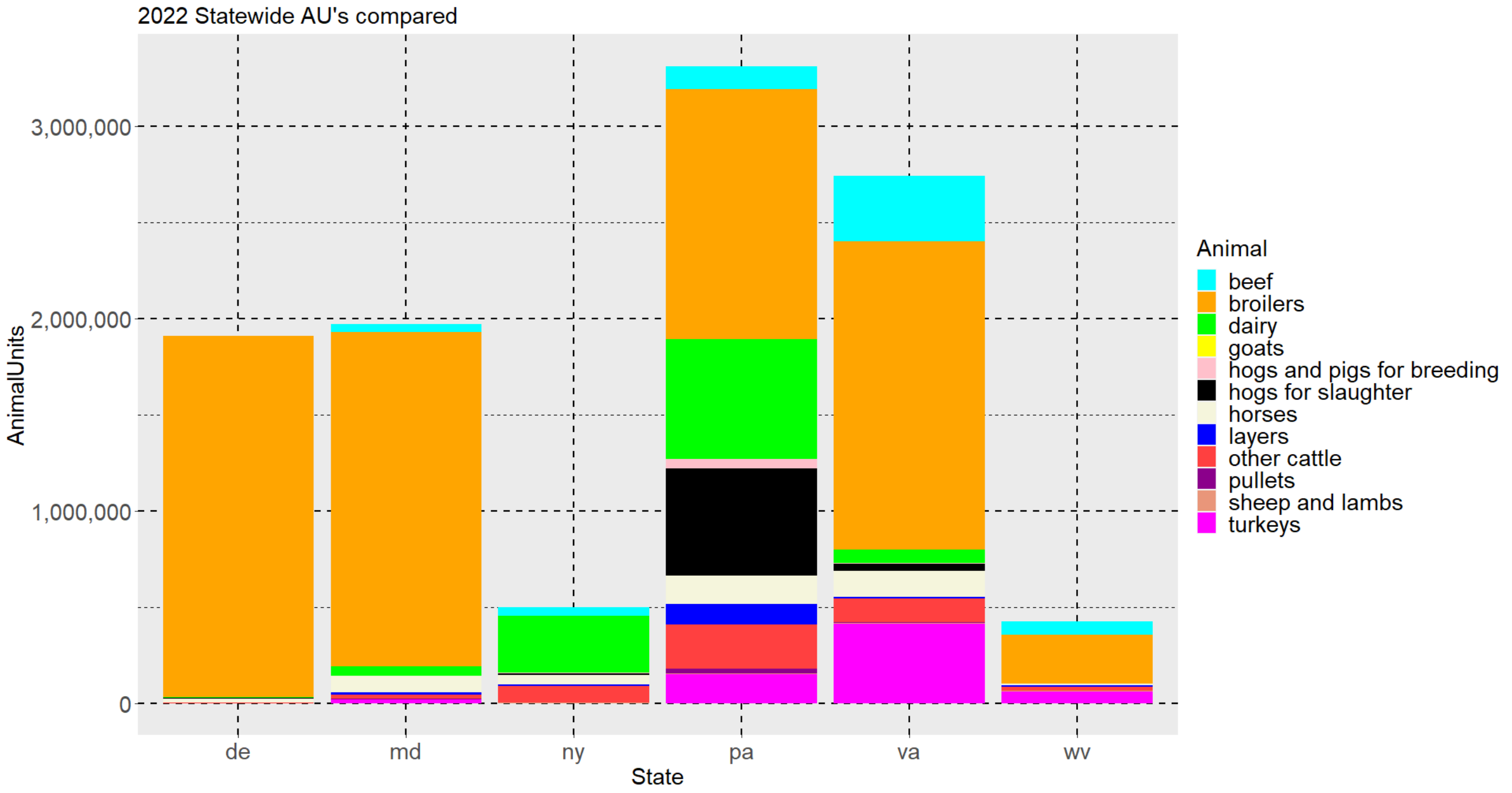
Manure Acres

6/14/2024

How did we get here? (OLD)

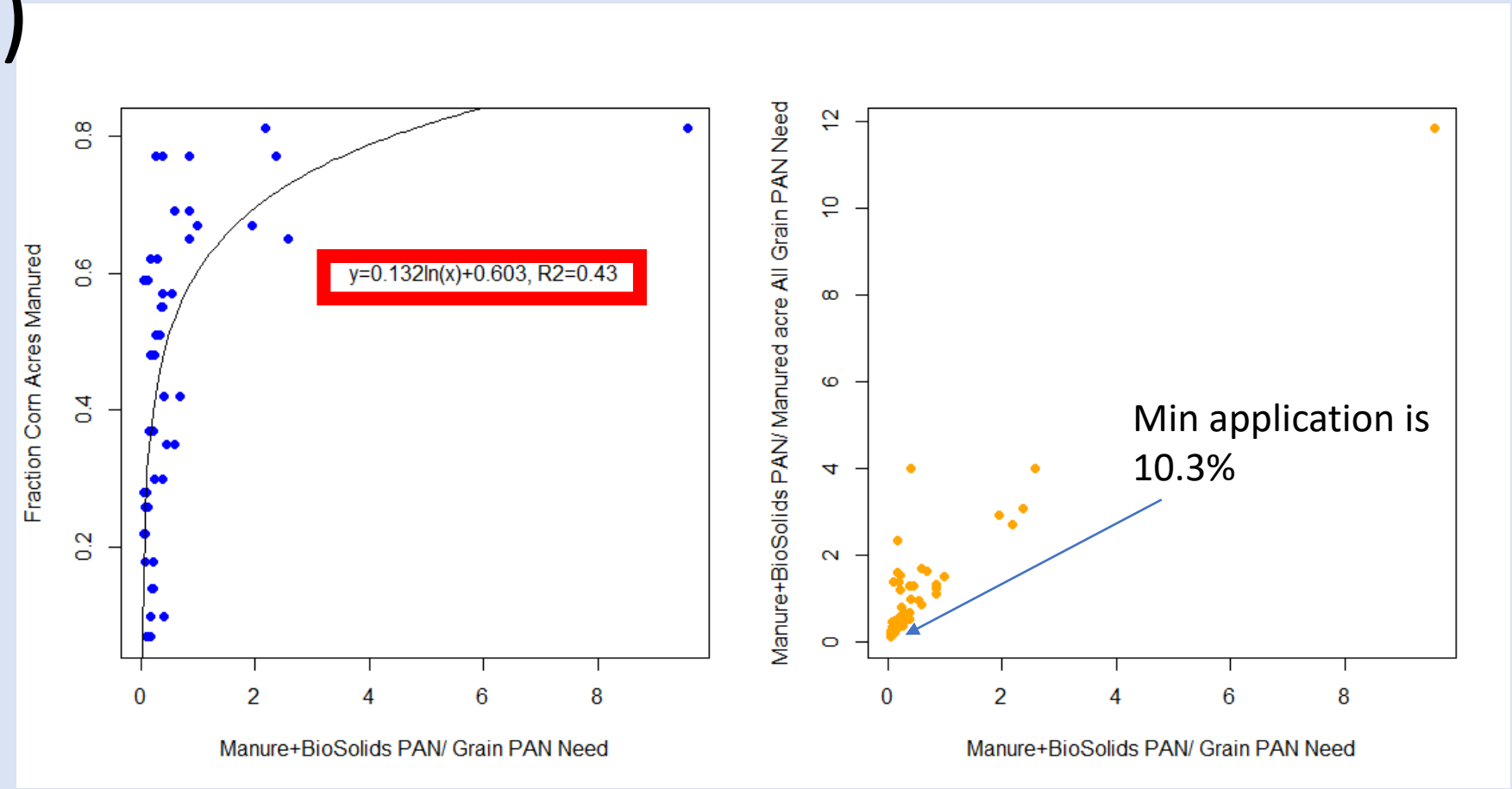
- Concerns with manure
- Grain
  - Fraction of acres receiving manure is constrained to be between 0.18 and 0.81.
  - Based on the total number of **Animal Units (AU)** in a county
    - (1000lbs animal = 1 Animal Unit)




2022 Statewide AU's compared
3,000,000
2,000,000
1,000,000
0
AnimalUnits
de
md
ny
pa
va
wv
State
Animal
beef
broilers
dairy
goats
hogs and pigs for breeding
hogs for slaughter
horses
layers
other cattle
pullets
sheep and lambs
turkeys

Group discussion: We made some changes (NEW)

- Switch to Plant Available Nitrogen (PAN) per unit of grain nutrient requirement (Crop need) on the X axis
- Pulled out grains

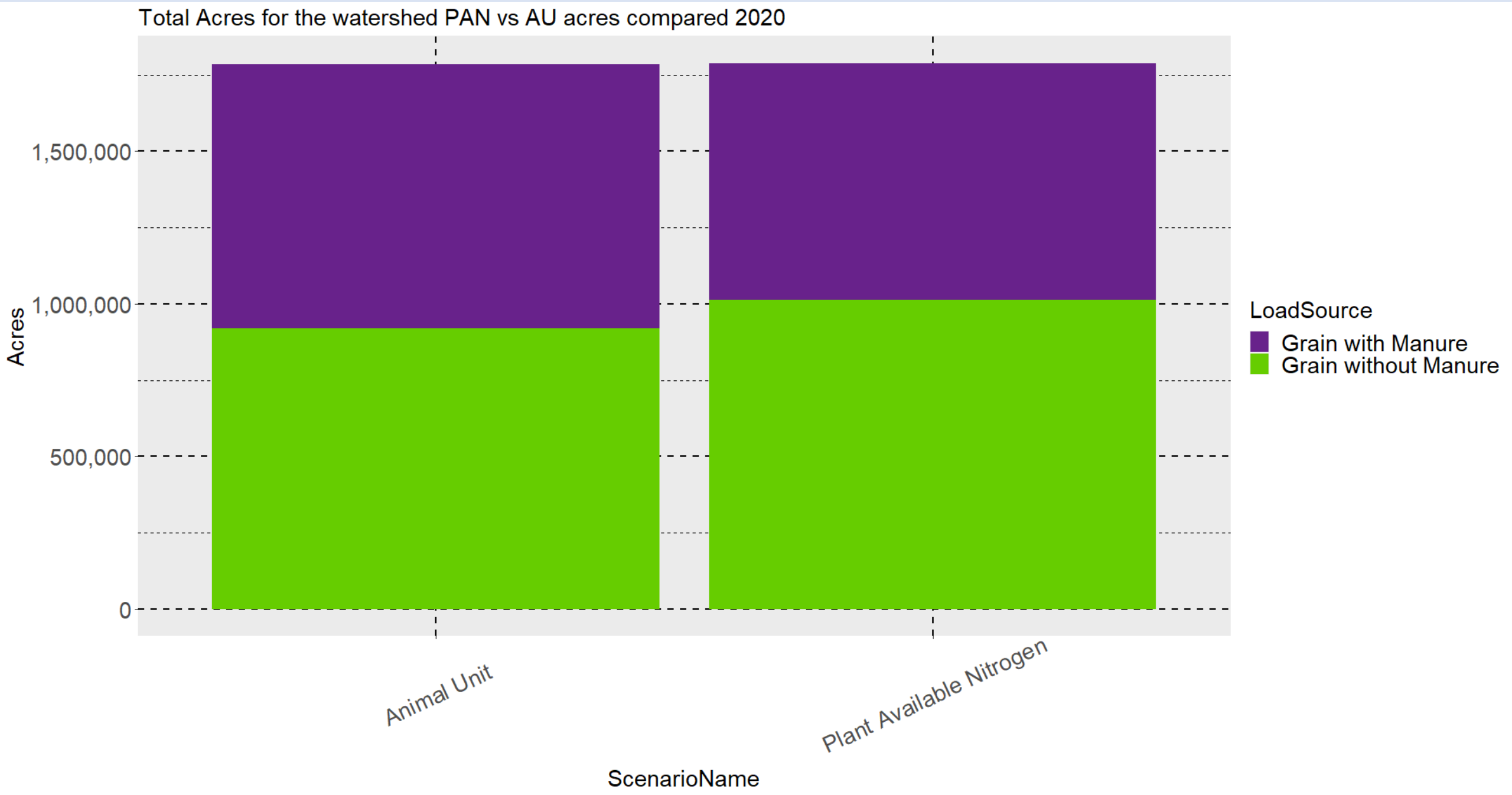


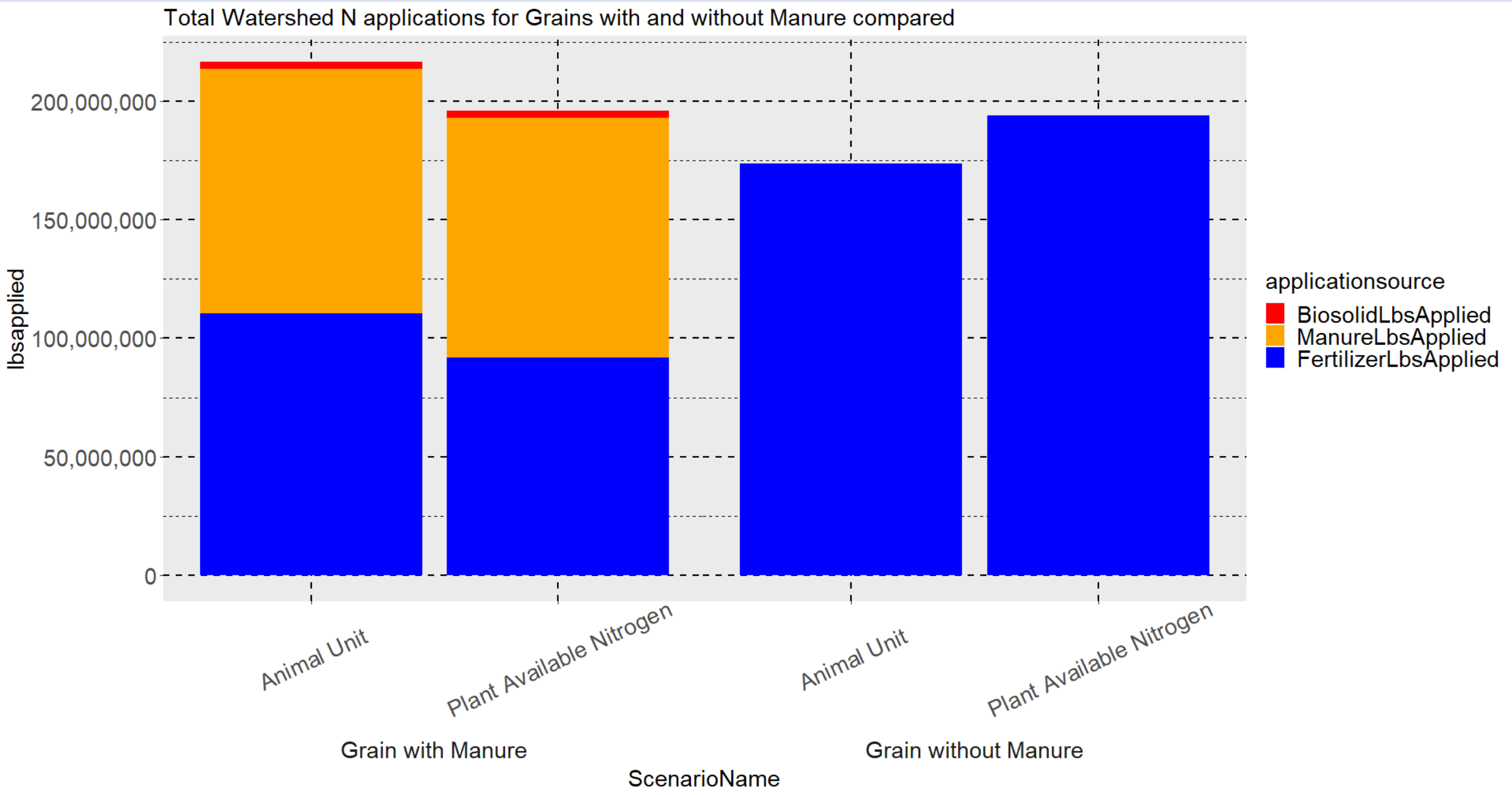
Just to summarize the differences:

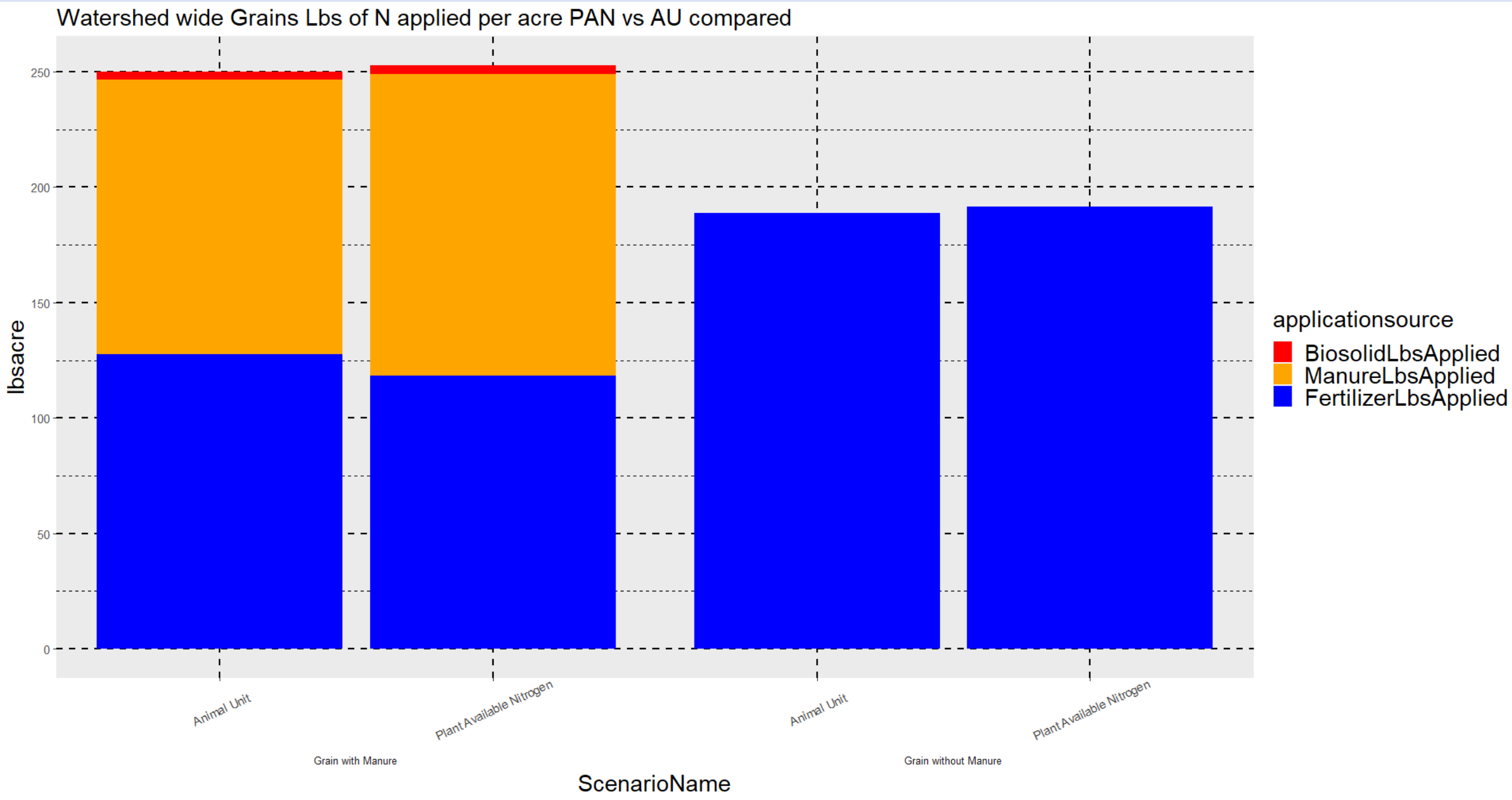
OLD	NEW
• Based on AU/ acre of harvested crop land	• Based on Organic PAN/ crop need • Separate Grains

Both still:
Use MD data for the fraction of corn acres that are manured

At the watershed scale


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


Total Watershed N applications for Grains with and without Manure compared
lbsapplied
200,000,000
150,000,000
100,000,000
50,000,000
0
Animal Unit
Plant Available Nitrogen
Animal Unit
Plant Available Nitrogen
Grain with Manure
Grain without Manure
ScenarioName
applicationsource
BiosolidLbsApplied
ManureLbsApplied
FertilizerLbsApplied


Watershed wide Grains Lbs of N applied per acre PAN vs AU compared
lbsacre
250
200
150
100
50
0
Animal Unit
Plant Available Nitrogen
Animal Unit
Plant Available Nitrogen
Grain with Manure
Grain without Manure
ScenarioName
applicationsource
BiosolidLbsApplied
ManureLbsApplied
FertilizerLbsApplied

At the watershed scale WITH PAN

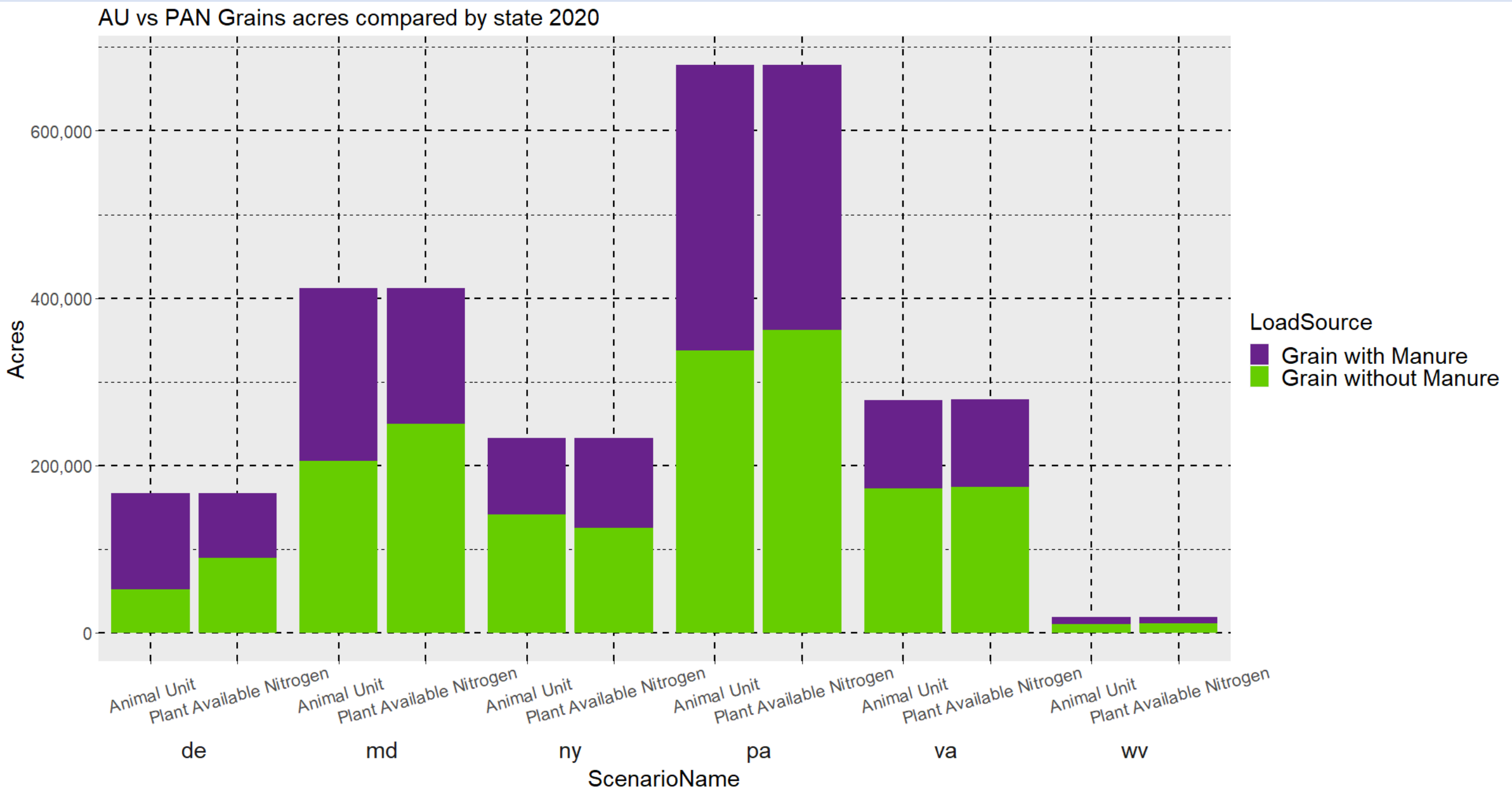
Fewer acres of grain with manure

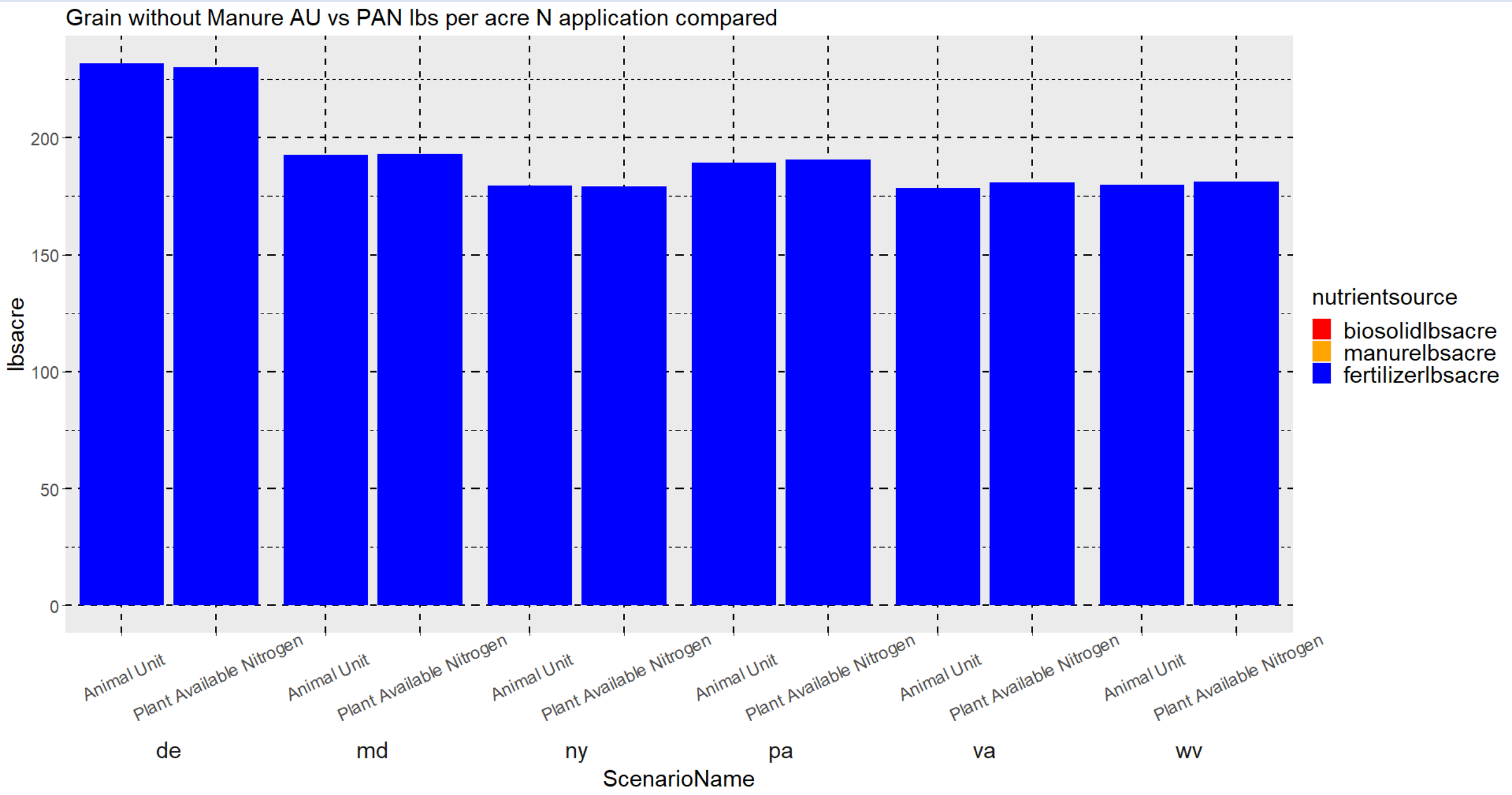
- Coinciding increase in acres of grain WITHOUT manure

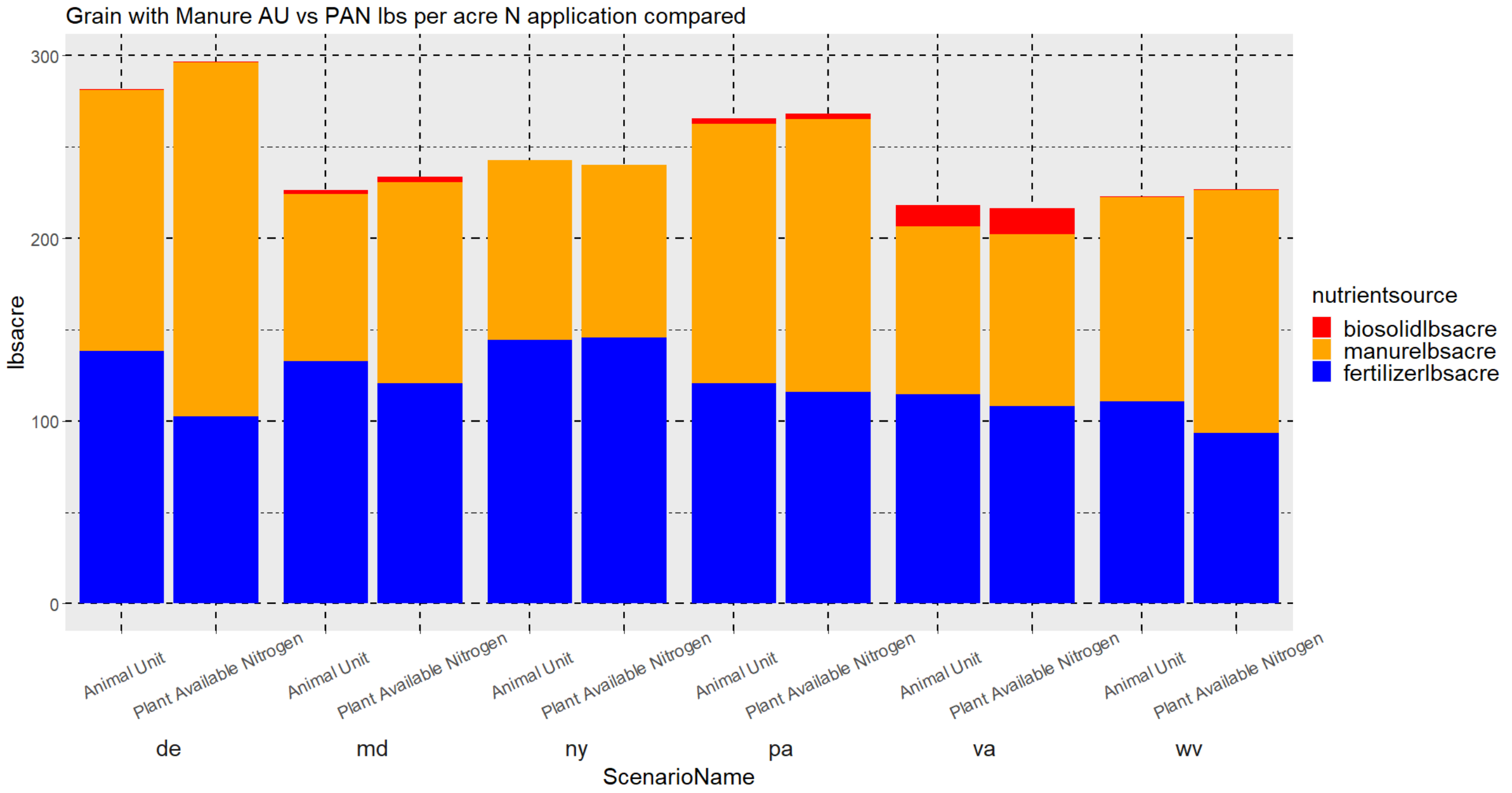
Change in composition of N applied

- Increased use of manure on eligible acres
- Increased application of fertilizer to manure ineligible acres

State Scale


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


Grain without Manure AU vs PAN lbs per acre N application compared
lbsacre
200
150
100
50
0
Animal Unit
Plant Available Nitrogen
de
md
ny
pa
va
wv
ScenarioName
nutrientsource
biosolidlbsacre
manurelbsacre
fertilizerlbsacre


Grain with Manure AU vs PAN lbs per acre N application compared
lbsacre
300
200
100
0
Animal Unit
Plant Available Nitrogen
de
md
ny
pa
va
wv
ScenarioName
nutrientsource
biosolidlbsacre
manurelbsacre
fertilizerlbsacre

At the state scale WITH PAN

Generally* fewer acres of grain with manure (*NY has more acres)

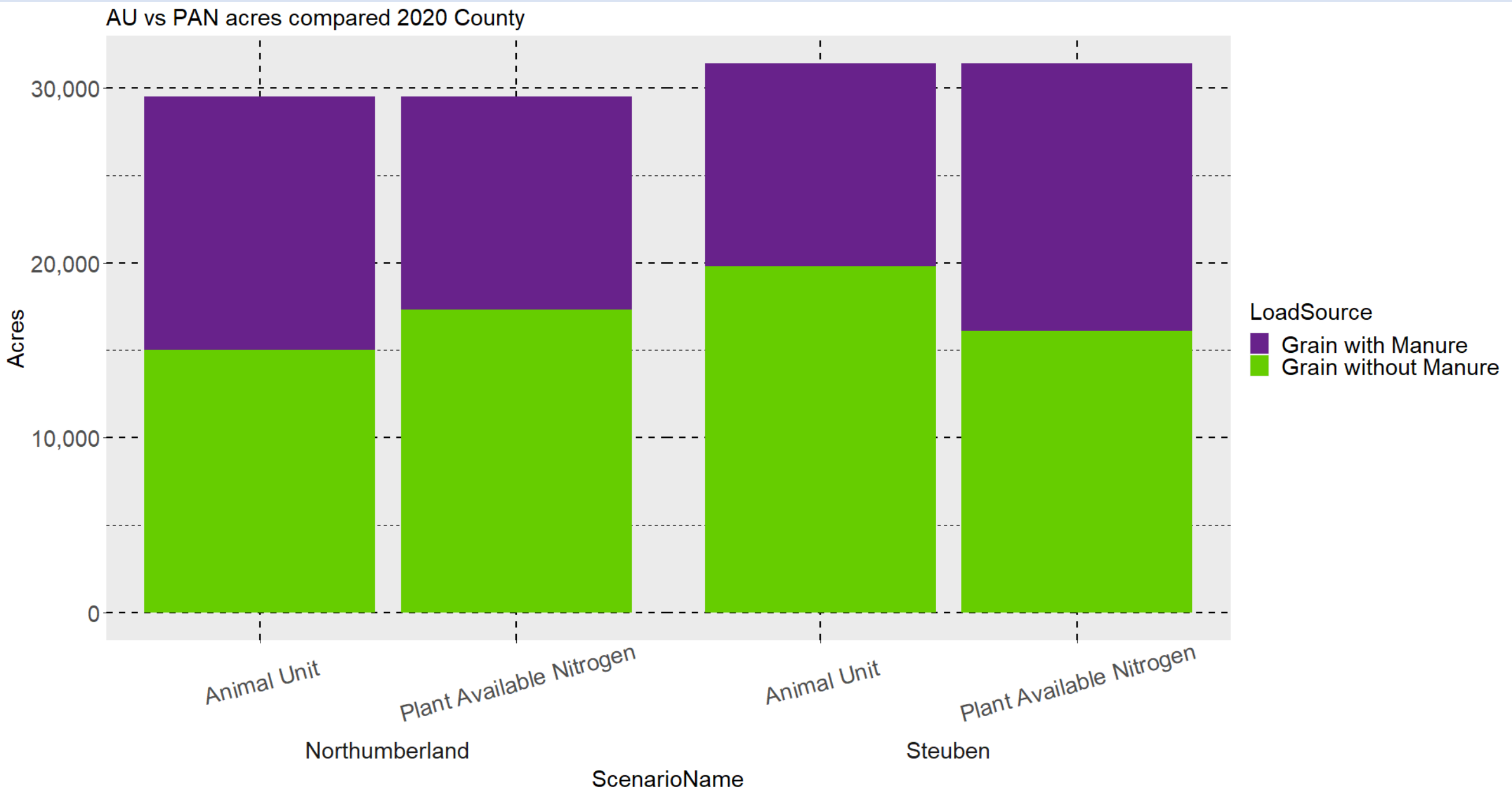
- Coinciding increase in acres of grain WITHOUT manure

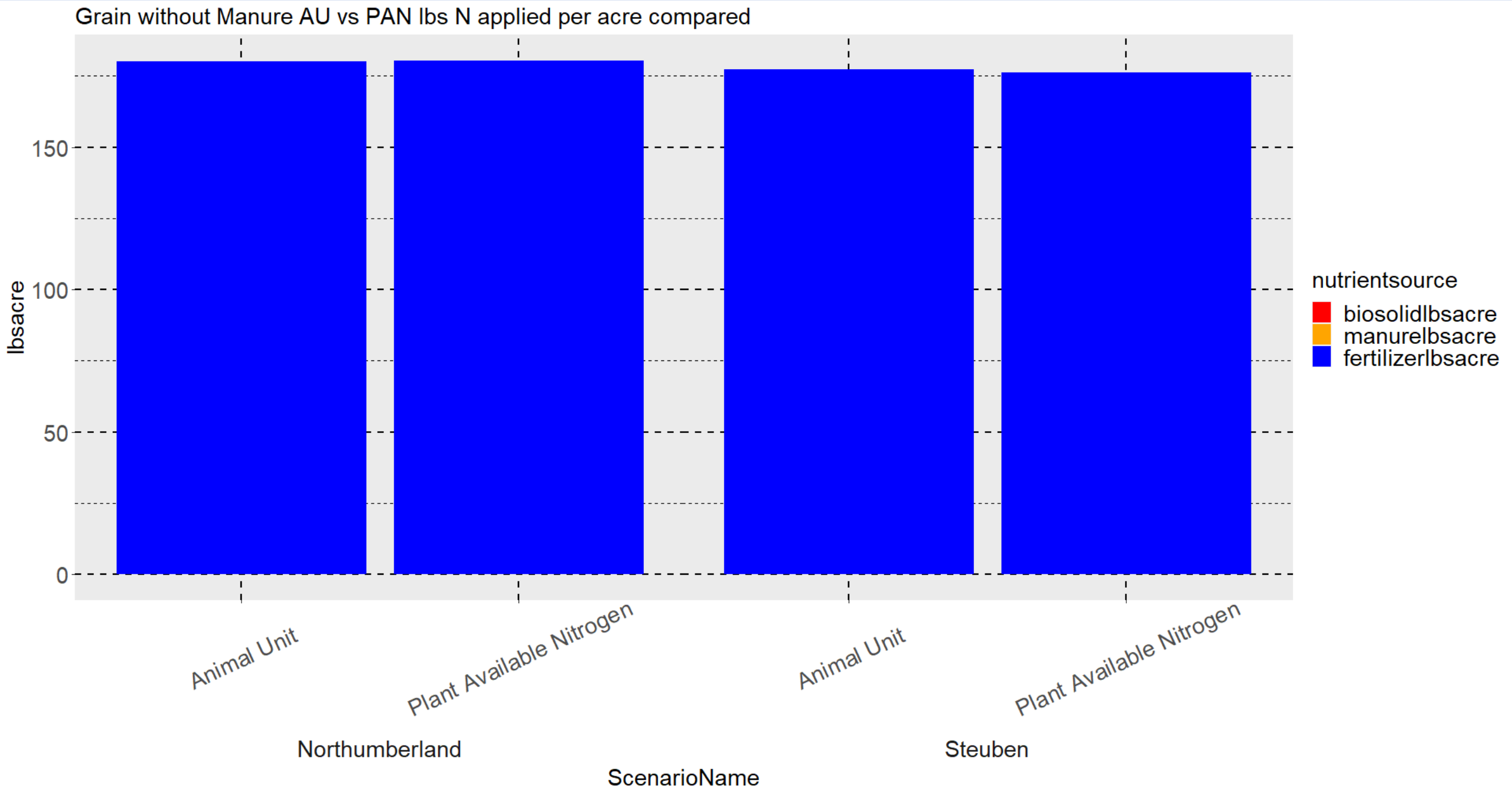
Grain with manure N sources change

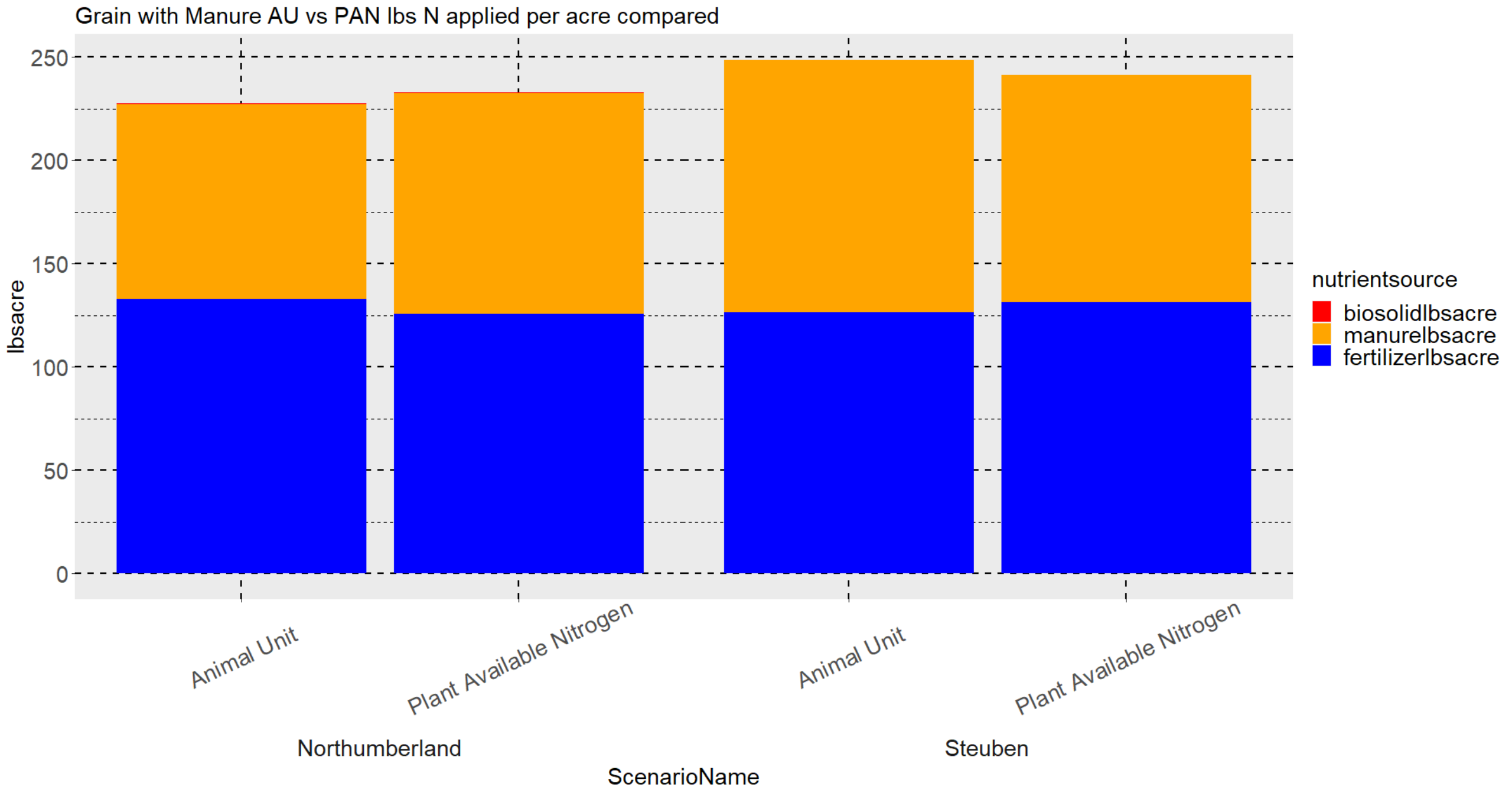
- Reduced N fertilizer
- Increased N from manure

What about a few counties?

Animal	Northumberland Animal Units	Steuben Animal Units	Northumberland Stored PAN Lbs	Steuben Stored PAN Lbs
dairy	5,820	28,608	166,795	880,136
layers	3,747	4,301	379,718	435,831
beef	2,133	8,191	14,768	111,974
broilers	27,785	2	252,542	23
goats	36	31	363	310
hogs and pigs for breeding	1,504	121	62,573	5,035
hogs for slaughter	9,216	4,749	101,947	52,539
horses	1,368	4,499	2,059	10,995
other cattle	4,710	13,409	38,187	339,599
pullets	270	329	24,439	29,717
sheep and lambs	136	351	978	2,528
turkeys	8,664	4	86,257	39
Total Value:	65,389	64,595	1,130,626	1,868,726


AU vs PAN acres compared 2020 County
30,000
20,000
10,000
0
Acres
Animal Unit
Plant Available Nitrogen
Animal Unit
Plant Available Nitrogen
Northumberland
Steuben
ScenarioName
LoadSource
Grain with Manure
Grain without Manure


Grain without Manure AU vs PAN lbs N applied per acre compared
lbsacre
150
100
50
0
Animal Unit
Plant Available Nitrogen
Animal Unit
Plant Available Nitrogen
Northumberland
Steuben
ScenarioName
nutrientsource
biosolidlbsacre
manurelbsacre
fertilizerlbsacre


Grain with Manure AU vs PAN lbs N applied per acre compared
250
200
150
100
50
0
lbsacre
nutrientsource
biosolidlbsacre
manurelbsacre
fertilizerlbsacre
Animal Unit
Plant Available Nitrogen
Animal Unit
Plant Available Nitrogen
Northumberland
Steuben
ScenarioName

The big picture

Changing to use Plant Available Nitrogen:

- Generally, reduces the acres of grain with manure
- Generally, increases the use of manure on a grain with manure eligible acres

More manure goes down on manure eligible acres which allows fertilizer to be used on grains where no manure can be applied.

Note*

- We have data for each county in the watershed
- Please submit a request and we can get relevant information to you

Questions?

Some things to keep in mind for next month:

- Do we have any new information to make improvements?
  - Need something that can act as a reasonable cross section for various places in the watershed.
- There is still manure application to the other agricultural Land Uses