CAST Manure generation follow-up

AMT

2/9/2024

Current CAST Ag Land Uses

- 14 total Land Uses
  - Important for multiple reasons:
    - Attributing loads to land use sources in greater detail than the sector
      - sector=agriculture
    - BMP reporting specificity
    - Nutrient application source (biosolid, manure, inorganic fertilizer)

Chesapeake Bay Average			
Land class	Land Use	Loading Rate Ratio	Loading Rate (pounds per acre per year)
Cropland	Double Cropped Land	0.79	30.9
	Full Season Soybeans	0.71	27.7
	Grain with Manure	1.4	54.7
	Grain without Manure: **Reference land use**	1	39.1
	Other Agronomic Crops	0.45	17.6
	Silage with Manure	1.62	63.3
	Silage without Manure	1.16	45.3
	Small Grains and Grains	0.84	32.8
	Specialty Crop High	1.34	52.4
	Specialty Crop Low	0.31	12.1
Pasture	Ag Open Space	0.43	5.1
	Legume Hay	0.74	8.7
	Other Hay	1.04	12.3
	Pasture: **Reference Land Use**	1	11.8

Land Uses: What is our focus?

- We need to decide this

Grain with Manure
Grain without Manure: **Reference land use**

Stay the same

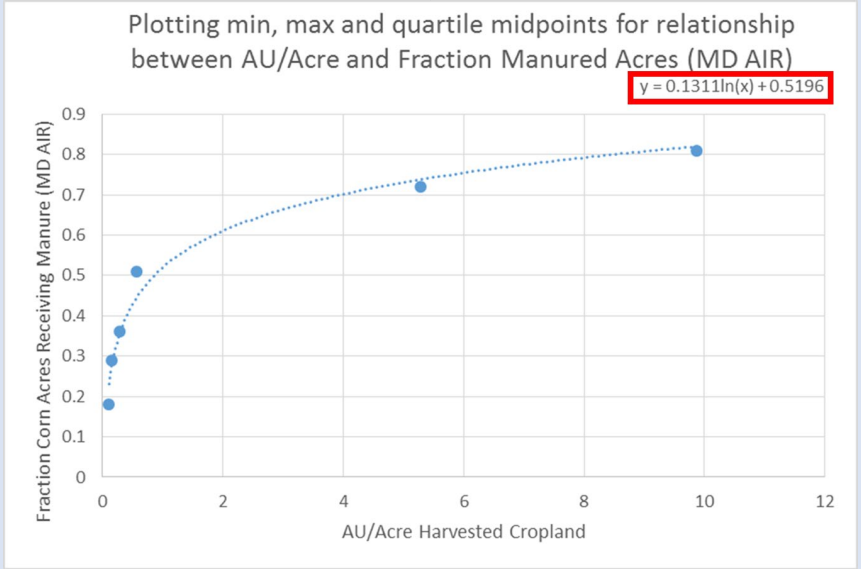
Change

Grain with Manure
Grain without Manure:
Reference land use

Grains

- Before we discuss this

Grain with Manure
Grain without Manure: **Reference land use**



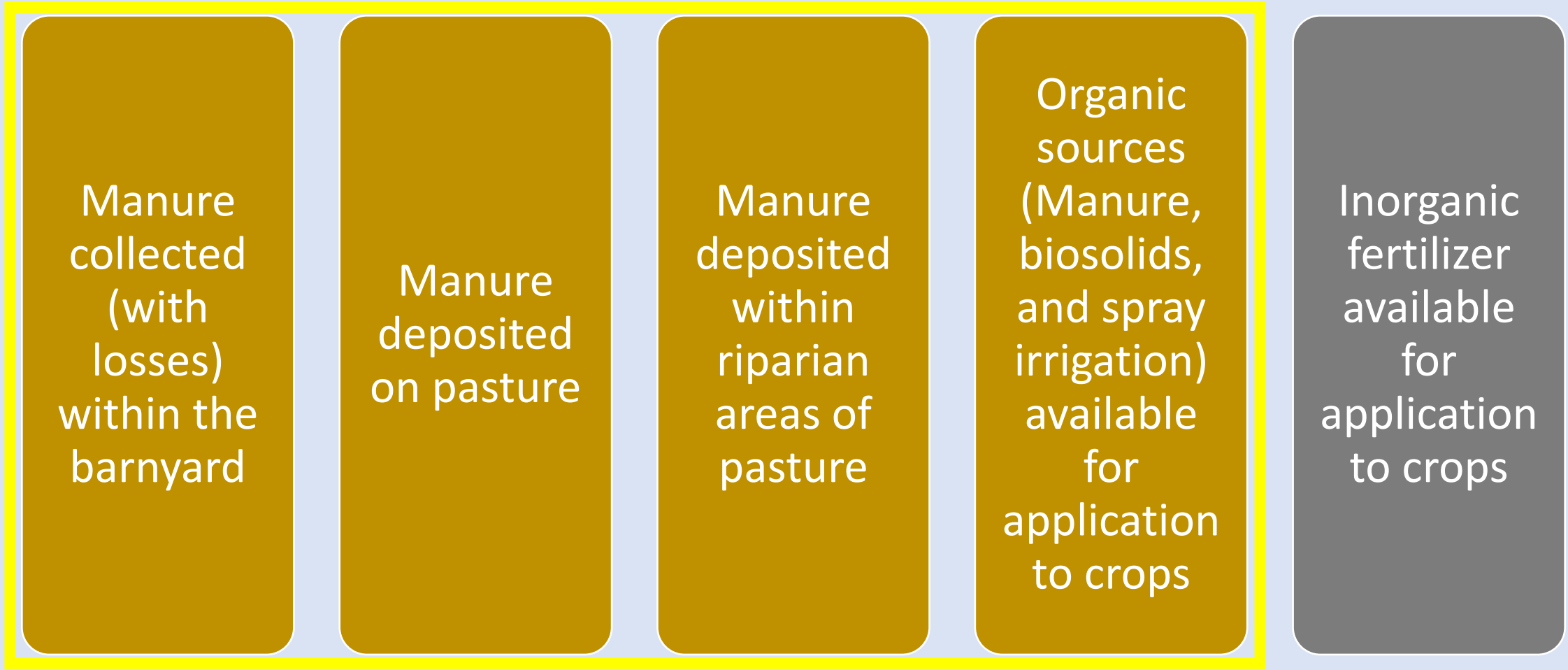
There is another side to this:

<u>11 EXISTING Land Uses</u> are still **<u>ELIGIBLE</u>** to receive **<u>manure nutrients</u>**.

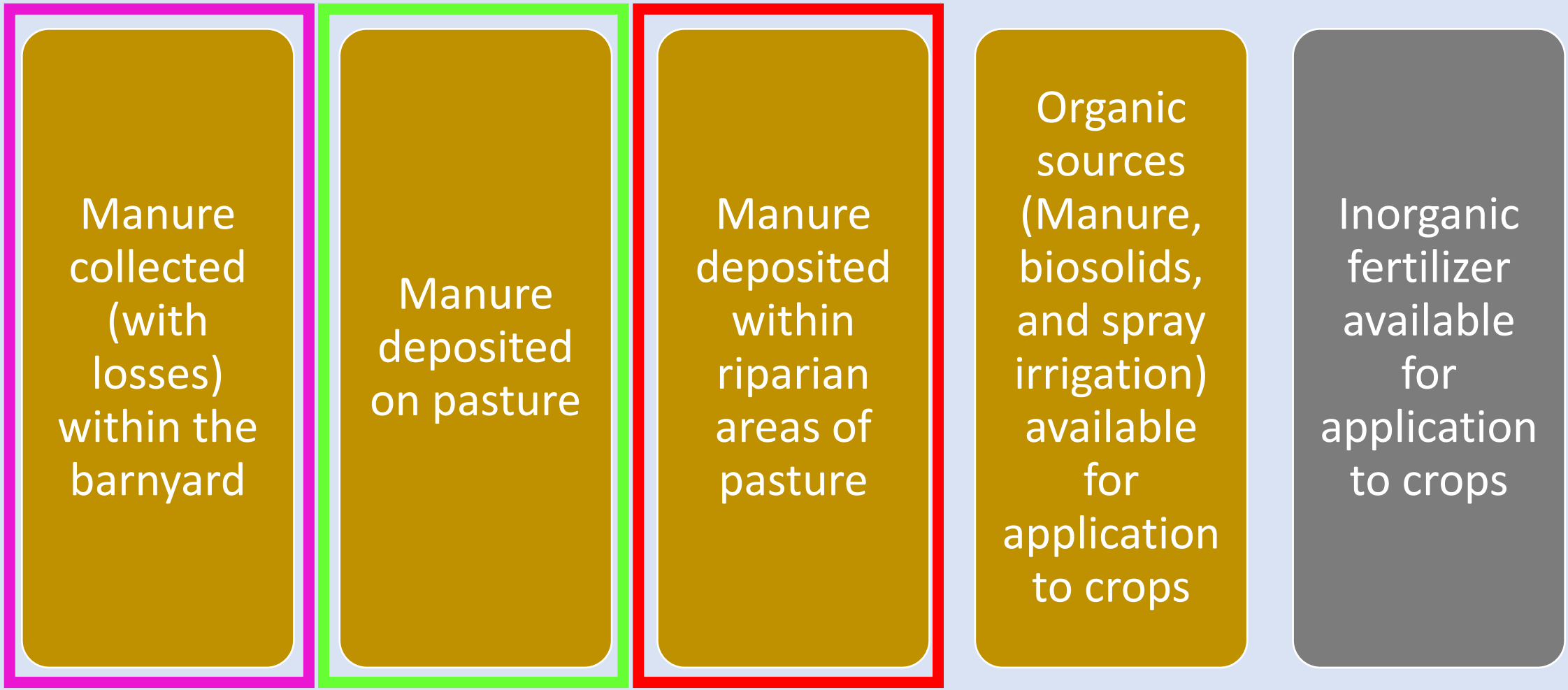
We need accurate manure nutrient values to “feed” these Land Uses.

<u>Begs the question:</u> **Do our current methods for calculating manure nutrients pass the sniff test?**

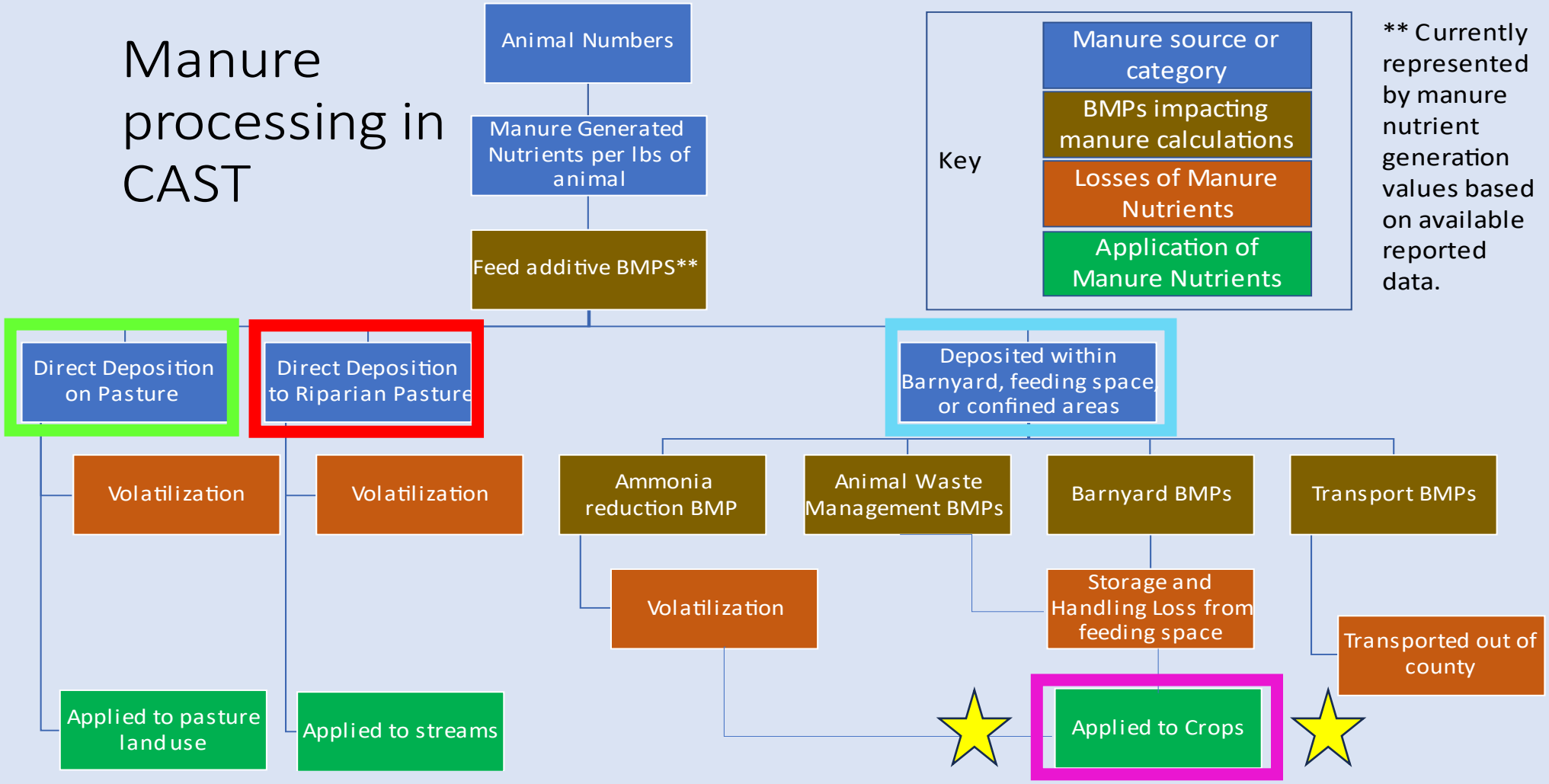
Recap CAST Agriculture nutrient categories



Recap CAST Agriculture nutrient categories



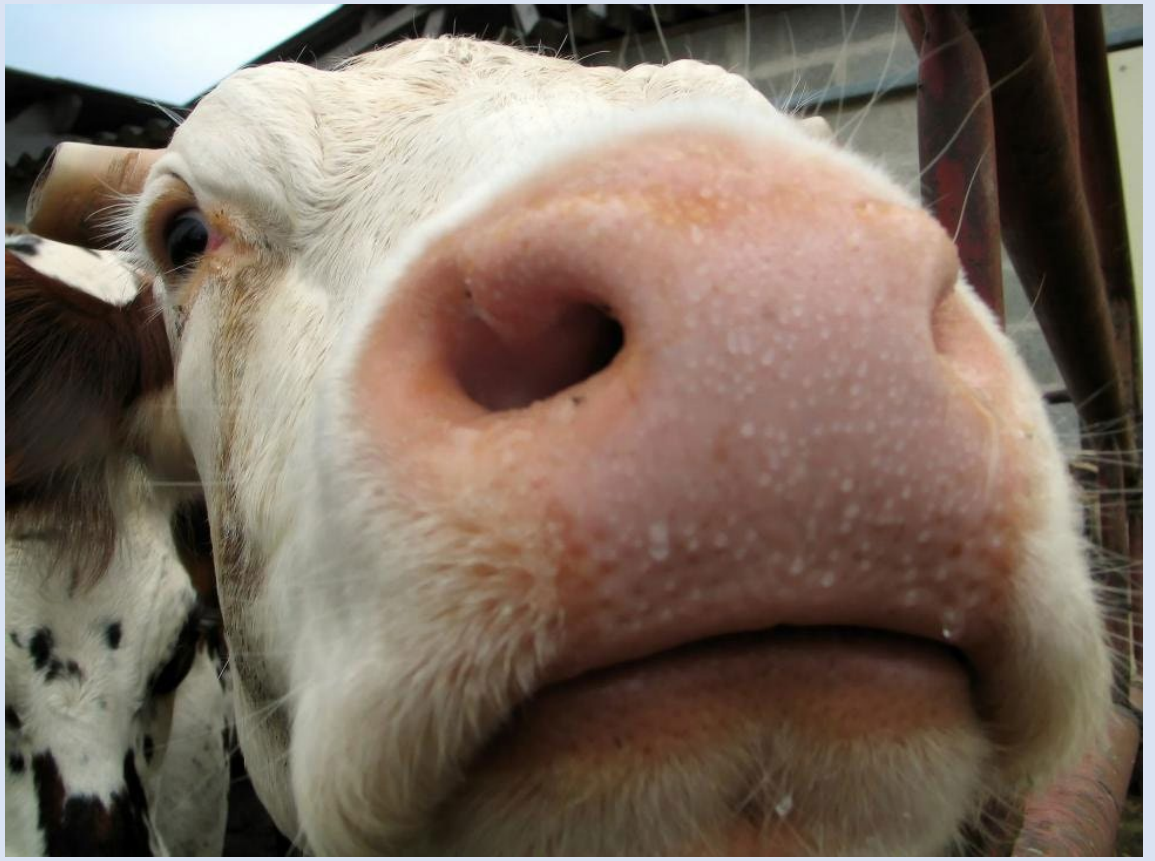
Recap Manure generation diagram:



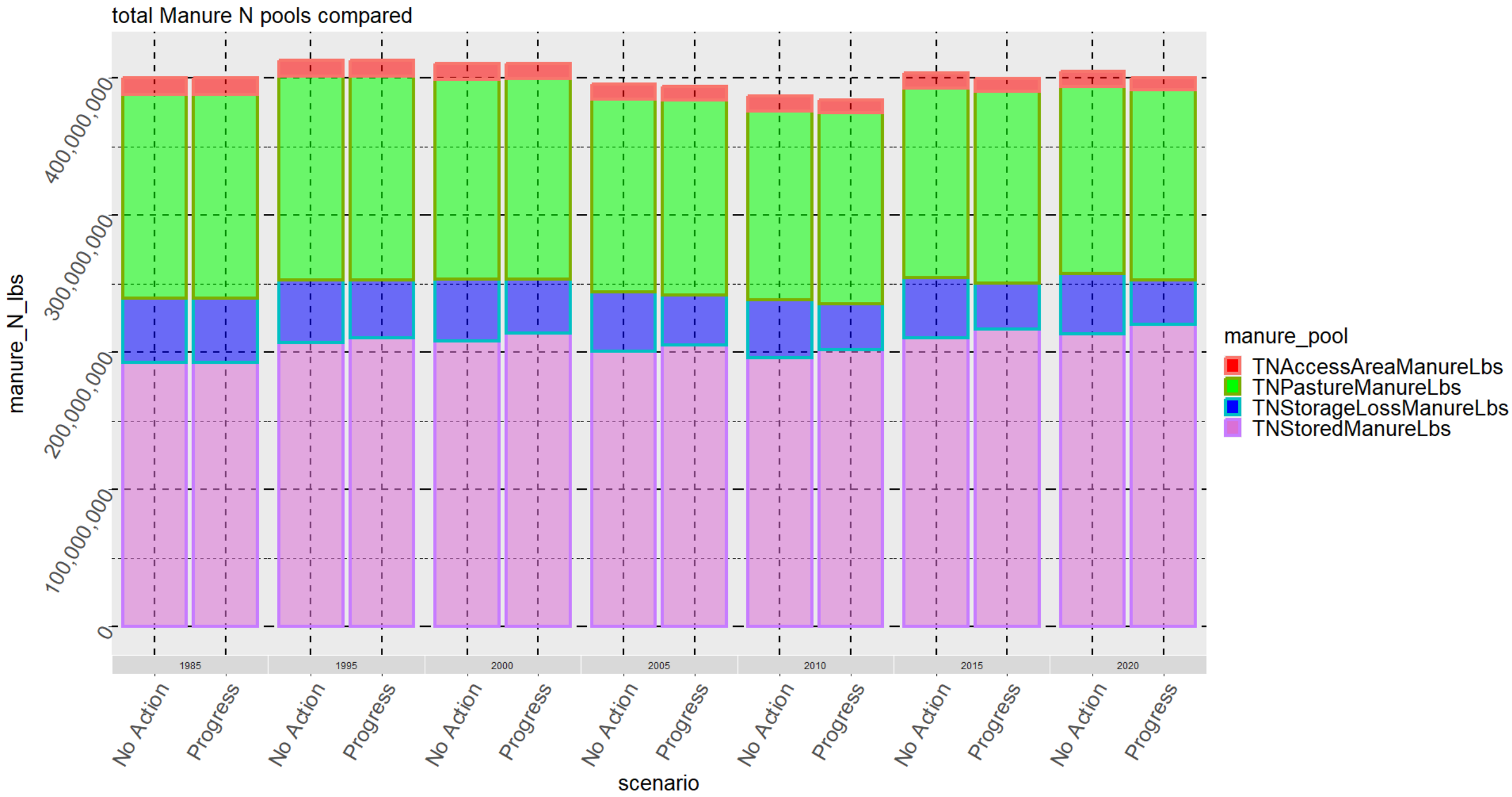
- Manure nutrients stay in their county of origin UNLESS they are transported

A quick manure sniff test:

- Ran CAST 23 scenarios:
  - Zero BMPs (no action)
  - BMPs implemented to date (2022 progress)
- Compared results for Total Manure Nitrogen:
  1. Direct deposition in riparian zones
  2. Direct deposition in pasture
  3. Losses from stored manure
  4. Remaining portion of stored manure
- NOTE* ALL results must still apply further losses to determine the Plan Available Nitrogen.



https://freerangestock.com/photos/87679/photo-details.html


total Manure N pools compared
manure_N_lbs
400,000,000
300,000,000
200,000,000
100,000,000
0
1985
1995
2000
2005
2010
2015
2020
No Action
Progress
scenario
manure_pool
TNAccessAreaManureLbs
TNPastureManureLbs
TNStorageLossManureLbs
TNStoredManureLbs

Where nutrient losses occur in each pool?

Riparian

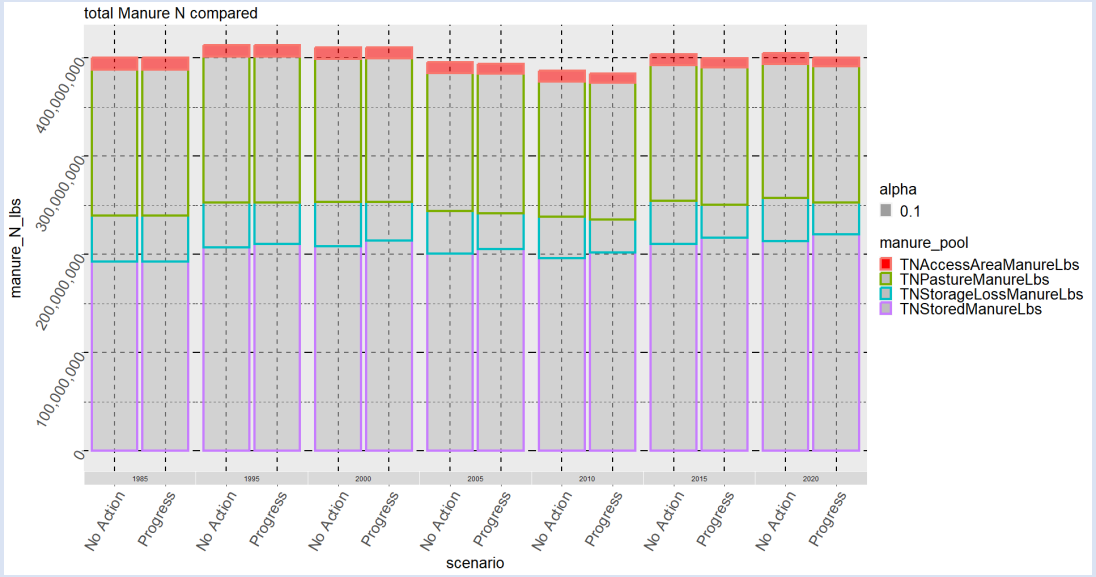
- Volatilization

Pasture

- Volatilization

Confined

- Volatilization
- Storage and handling
- Transported across county lines



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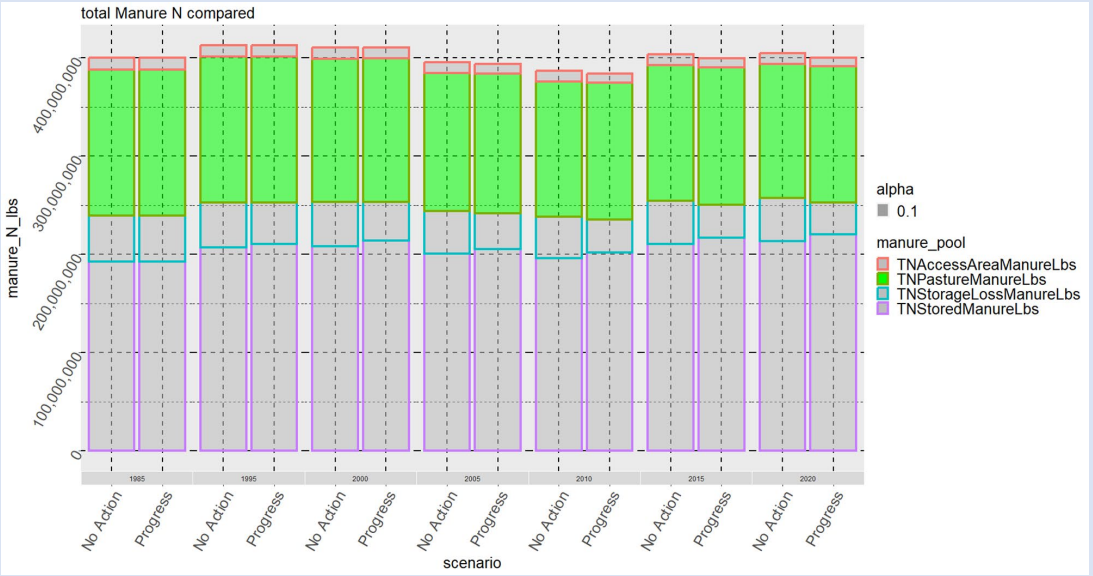

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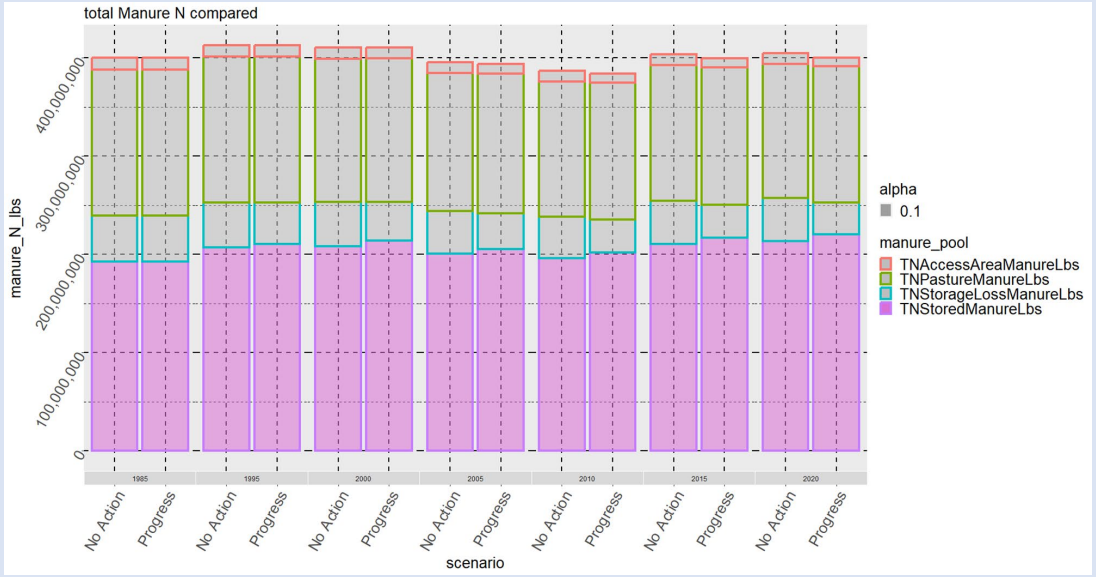
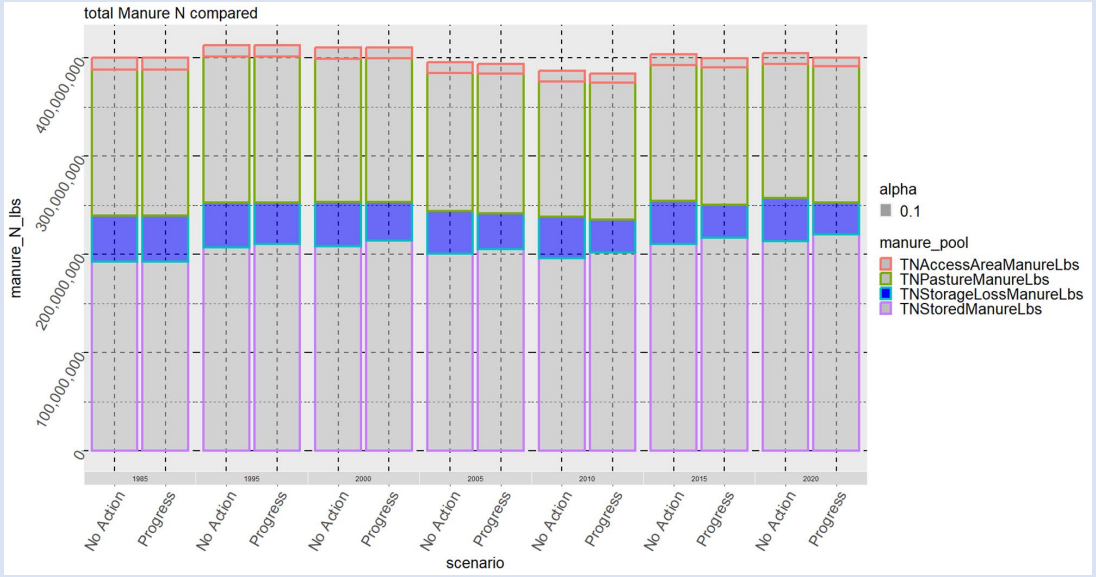


Manure Storage Losses

- Animal Waste Management System expert panel report provided values

Table 3-7: Recoverability of Manure with and Without AWMS (Hawkins, et al. 2016)

Animals	% Recoverable without AWMS	% Recoverable with AWMS
Beef	60	99
Dairy	75	95
Other Cattle	60	99
Hogs for Slaughter	90	99
Hogs for Breeding	90	99
Broilers	90	99
Layers	90	99
Turkeys	90	99
Pullets	90	99
Sheep	95	98
Horses	95	98
Goats	95	98



How does it smell?

- Do these numbers look reasonable?
- Where can we improve?
  - Change pools based on animal composition?
  - Update time animals spend in different environments?

Summary

- **Manure acres** are necessary if we decide to retain a split in manure vs non manure acres.
- **Manure nutrient generation** is still necessary for all Land Uses which can receive manure.
- We will still need to tie decisions to the overall Land Uses.

Questions?