AMT Office Hours Land Uses, Loading Rates, and Manure

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This Month we are dealing with: Land Uses

- Loading rates and ratios
  - What is the impact of changing rates?
  - Making a decision
- Manure
  - What does manure generation in CAST look like?

Loading rates and ratios [Section 2.2](#)

- ## What is it?
  - Spatially-averaged and temporally averaged nutrient loading export rate to a stream or other waterbody for a given land use.

- ## What impact does it have?
  - We are going to find out!

Today we will be looking at a scenario test

- This is when we run CAST twice to conduct an experiment:
  - Progress run
    - "Normal" CAST run with submitted BMPS in place
  - Experimental run
    - Modified CAST to run with two Loading Rate
      - One for all crops
      - One for all pasture/hay

Test

Ran CAST 17

Current Land Uses

#### Two scenarios:

Current Test
- Existing Loading Ratios (14 total)
- Average inputs are averaged across Land Uses

Ratio Test
- One Loading Ratio for Crops and one for Pasture (2 total)
- Average inputs are averaged across Cropland and Pasture CLASSES

EFFECT: Allows CAST to differentiate between land uses based on differences in application rather than pre-specified ratios

Current Test compared to No Ratio Test 1995

6
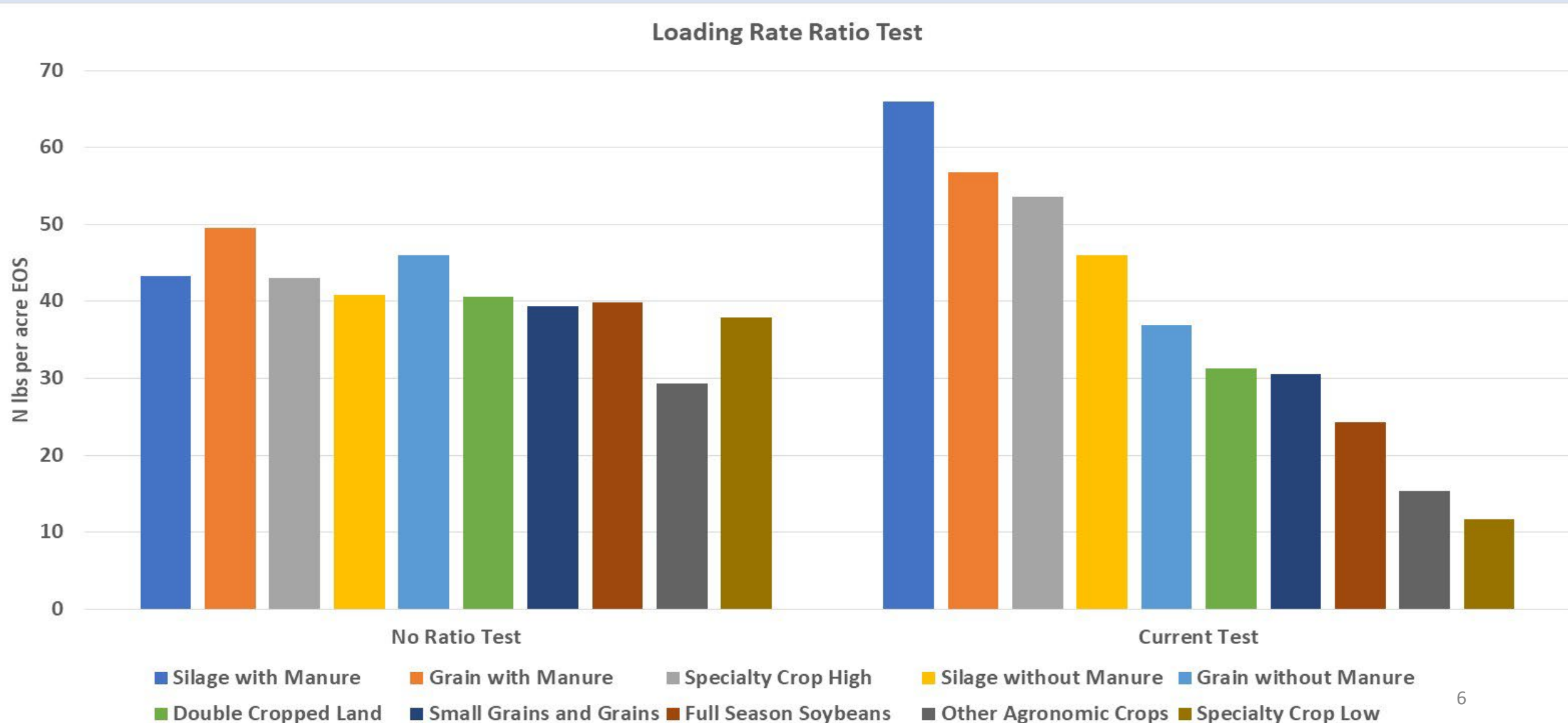
High-level takeaways:

- The total crop load will not change

- Changes can take place geographically or through scenarios

- Scenarios run without ratios will be less prone to variability

- Do we have confidence that those ratios are real?

Questions?

Intentionally Blank

Manure: Section 3.2

- Improve group understanding of how manure in CAST has changed over time.

- Demonstrate the current manure data used in CAST:
  - Generation per animal unit
  - Nutrient concentrations
  - Plant available pool

- Improve connections between data inputs and CAST processes

What we need to keep in mind:

This is a part of the discussions relevant to the current Land Uses in CAST.

Current CAST Ag Land Uses

- 14 total Land Uses
- Each has a Loading Rate
- Relative Ag Land Use Loading Ratios Report:
  - Cropland
    - Corn for grain without manure has the most area
    - Control in each study examined
  - Pasture
    - Pasture covers the most area

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

Current CAST Ag Land Uses

- **IF** we **change any Land Use**, we need to **change their** associated **Loading Rate**

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Nutrient applications on the current CAST Ag Land Uses

Eligible to receive Manure AND Fertilizer
Eligible to receive ONLY fertilizer
Eligible to receive NO nutrients

- 14 Total
- 13 eligible to receive nutrients
  - 11 eligible to receive nutrients from manure
  - 2 eligible to receive nutrients from ONLY fertilizer

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Current CAST Ag Land Uses: Application NOTES

- **ANY** of the Land Uses that are **manure eligible** **CAN** get manure.
  - Application is based on:
    - Amount of manure in each county
    - Specific application rules
- The current split of **WITH and WITHOUT** manure is being **questioned**.

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Current CAST Ag Land Uses

- The question that started this:
  - Can we improve on the simulation of inorganic vs organic Nitrogen?

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Land Uses: What is our focus?

- We need to decide this

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

Stay the same

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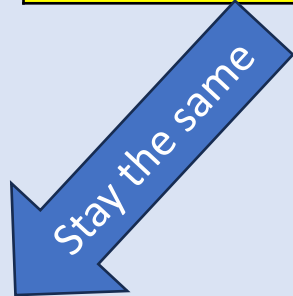
Grain with Manure
Grain without Manure: **Reference land use**
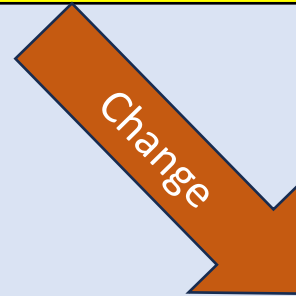
Grains

- Before we discuss this

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

Plotting min, max and quartile midpoints for relationship between AU/Acre and Fraction Manured Acres (MD AIR)

$y = 0.1311\ln(x) + 0.5196$

Fraction Corn Acres Receiving Manure (MD AIR)

AU/Acre Harvested Cropland
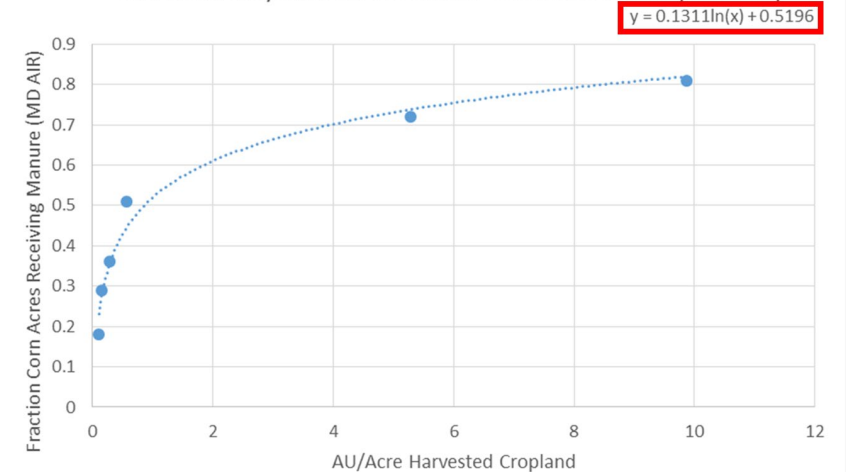
There is another side to this:

11 EXISTING Land Uses are still **ELIGIBLE** to receive **manure nutrients**.

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

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

Questions?