Testing Core Nutrient Management in the Phase 6 Model

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Matt Johnston
University of Maryland - CBPO

Request and Methods

- Request: DE asked CBPO to test the impact to loads of placing core NM N and P across 70%, 80% and 90% of acres.

- Method:
  - Input 2013 Progress (2014 through 2016 still being edited by states)
  - Remove all Core NM N and P
  - Apply at 70% of Crop and Hay acres
  - Apply at 80% of Crop and Hay acres
  - Apply at 90% of Crop and Hay acres
  - Compare all scenarios to 2013 Progress

What Core Nutrient Management Does

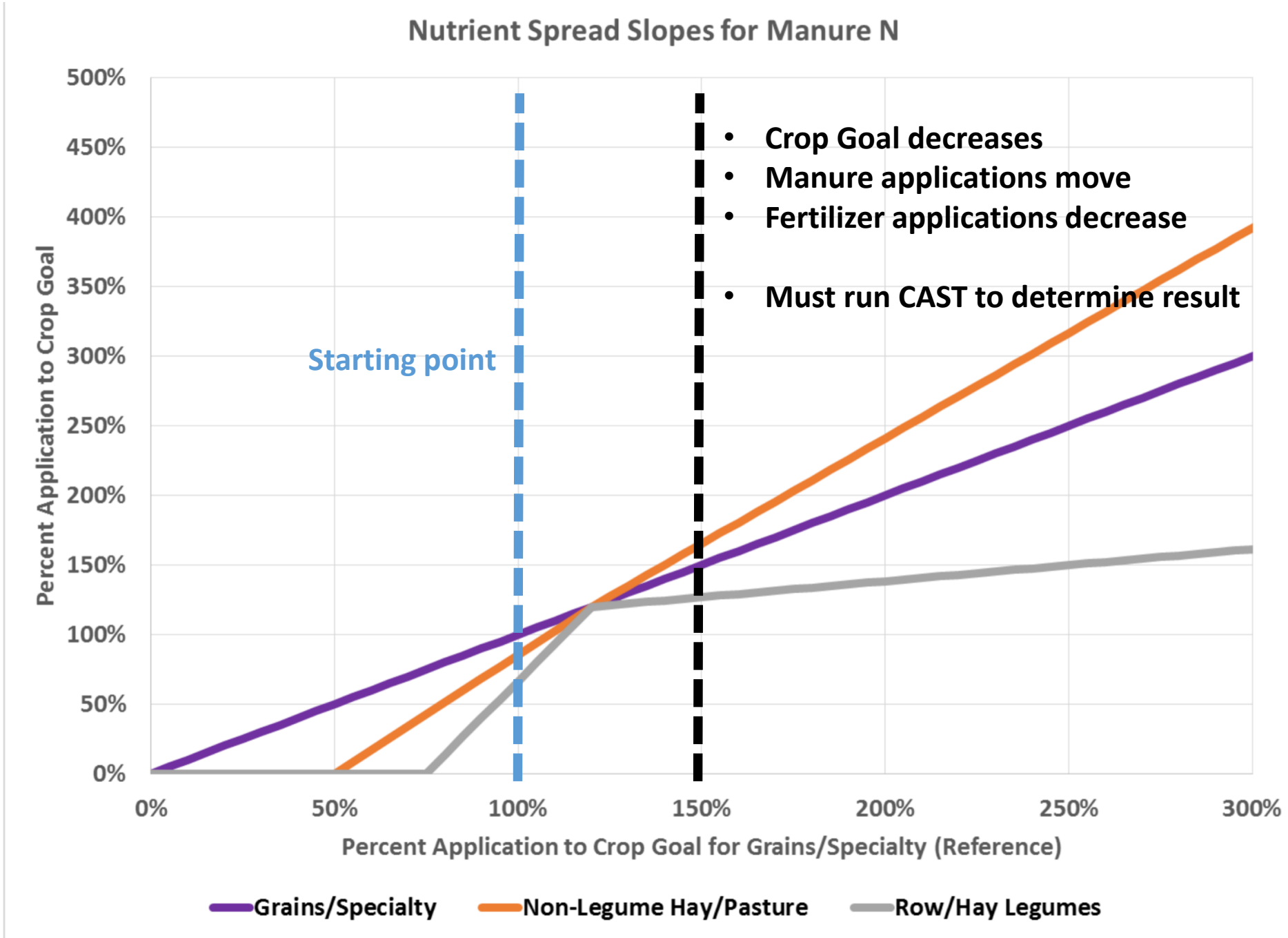
Land Use	Nutrient Management BMP N	
	Nitrogen Core Non-Nutrient Management	Nitrogen Core Nutrient Management
Full Season Soybeans	1.20	1.00
Grain w/ Manure	1.30	1.00
Grain w/o Manure	1.20	1.00
Legume Hay	1.20	1.00
Silage w/ Manure	1.40	1.00
Silage w/o Manure	1.20	1.00
Small Grains and Grains	1.20	1.00
Small Grains and Soybeans	1.20	1.00
Specialty Crop High	1.30	1.00
Specialty Crop Low	1.20	1.00
Other Agronomic Crops	1.10	1.00
Other Hay	**1.00**	1.00
Pasture	**1.00**	1.00

Land Use	Nutrient Management BMP P	
	Phosphorus Core Non-Nutrient Management	Phosphorus Core Nutrient Management
Full Season Soybeans	1.50	1.00
Grain w/ Manure	3.00	1.00
Grain w/o Manure	1.50	1.00
Legume Hay	**1.00**	1.00
Silage w/ Manure	3.00	1.00
Silage w/o Manure	1.50	1.00
Small Grains and Grains	1.50	1.00
Small Grains and Soybeans	1.50	1.00
Specialty Crop High	2.00	1.00
Specialty Crop Low	2.00	1.00
Other Agronomic Crops	1.50	1.00
Other Hay	**1.00**	1.00
Pasture	**1.00**	1.00

What Nutrient Management Does Cont'd

- Decreases application goal for crops.
- Moves manure to hay and pasture from crops.
- Lowers fertilizer application rates.

- The final impact of nutrient management is dependent upon:
  - Mixture of crops/hay/pasture
  - Amount of manure and fertilizer available before NM is applied
  - Amount of NM applied


Nutrient Spread Slopes for Manure N
Percent Application to Crop Goal
500%
450%
400%
350%
300%
250%
200%
150%
100%
50%
0%
Starting point
• Crop Goal decreases
• Manure applications move
• Fertilizer applications decrease
• Must run CAST to determine result
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

Impact on Edge of Stream Nitrogen

		Per Acre Percent Reduction from 2013 Progress		
State	**2013Progress Lbs N/Acre of Ag Land**	**70 Percent NM**	**80 Percent NM**	**90 Percent NM**
DE	35.9	-8.2%	-8.5%	-8.6%
MD	21.4	-12.4%	-11.4%	-11.1%
NY	22.9	-18.1%	-18.1%	-18.1%
PA	24.8	-13.9%	-14.3%	-14.6%
VA	14.9	-11.6%	-12.1%	-12.4%
WV	12.4	-17.7%	-18.1%	-18.3%

- States with lower average per acre load have more hay and pasture land.
- All states but MD see increasing per acre impact of NM at higher percent applications.
- MD – As applications goals are decreasing on crop, manure is being pushed to small acres of pasture and hay.
- If combined with manure transport or application rate reduction, MD's would also decrease.

Impact on Edge of Stream Phosphorus

		Per Acre Percent Reduction from 2013 Progress		
State	**2013Progress Lbs P/Acre of Ag Land**	**70 Percent NM**	**80 Percent NM**	**90 Percent NM**
DE	0.4	21.4%	8.5%	1.8%
MD	0.7	-22.1%	-18.2%	-16.3%
NY	1.2	-13.9%	-13.9%	-13.8%
PA	1.2	-11.3%	-11.3%	-11.0%
VA	1.4	-28.3%	-23.4%	-20.6%
WV	1.0	-25.2%	-22.4%	-20.4%

- All states but DE see a small decrease in benefit per acre as percent application increases.
- DE – Excess P is getting moved to very limited hay and pasture, but eventually the reductions in applications on cropland appear to overcome this. If combined with manure transport or application rate reduction, DE's would also decrease.

CAST http://cast.chesapeakebay.net

- CAST = Phase 6 Watershed Model
- CAST = Phase III WIP Planning Tool
- CAST = Milestone Input Deck Generator
- CAST = Gateway to Model Documentation
- CAST = Gateway to Data Visualization
- CAST = Etc…

- Run it!
- Use the online tutorials
- Ask for a training if needed
- Download documentation
- Don’t hesitate to ask questions, but please try to run it.