AG MODELING SUBCOMMITTEE UPDATE

WTWG

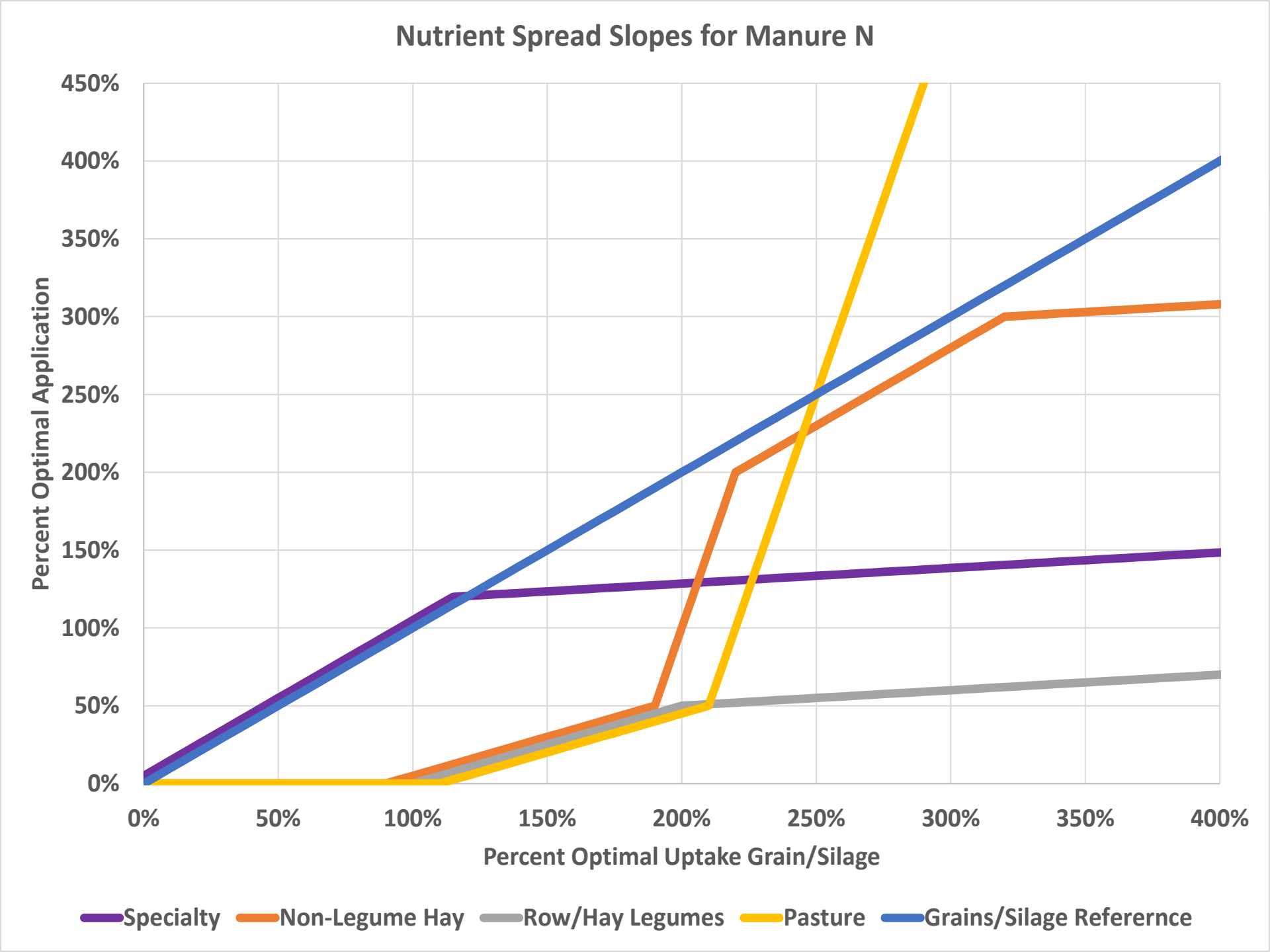
April 2, 2015

Decisions to date

- AAPFCO fertilizer sales will be combined with Ag Census fertilizer expenditures to estimate total fertilizer use by county.
- NASS annual yields and acres for major crops will be incorporated where possible. For non-major crops and where data is not available, Ag Census yields and acres will be used.
- Best 3 out of the last 5 available data points (either NASS yearly data or Ag Census 5-year data) will be used to estimate application yield goal.
- Phase 6 agricultural land uses approved.
- Poultry litter report approved for Phase 6 Model.

Current work

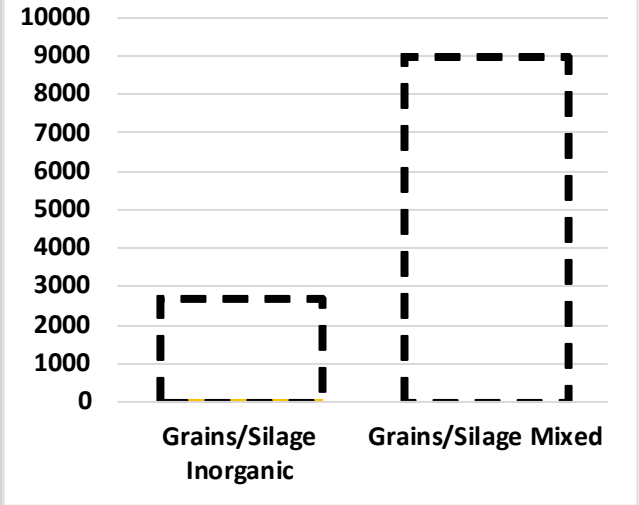
- Develop SB Nutrient Spread procedure
- Evaluate livestock manure nutrient estimates
- Review application timing and rate fractions
- Update mineralization, uptake, and legume fixation numbers
- Review agricultural land use loading rates
- Review crop-to-land use mappings and double-crop procedure

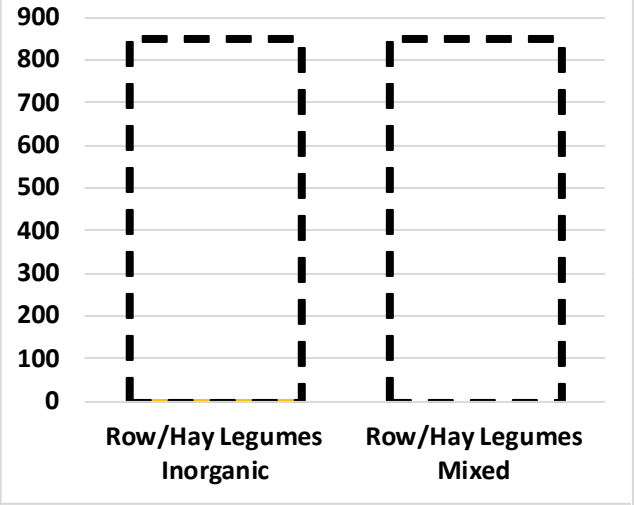

Nutrient Spread Slopes for Manure N
450%
400%
350%
300%
250%
200%
150%
100%
50%
0%
Percent Optimal Application
0%
50%
100%
150%
200%
250%
300%
350%
400%
Percent Optimal Uptake Grain/Silage
Specialty
Non-Legume Hay
Row/Hay Legumes
Pasture
Grains/Silage Referernce

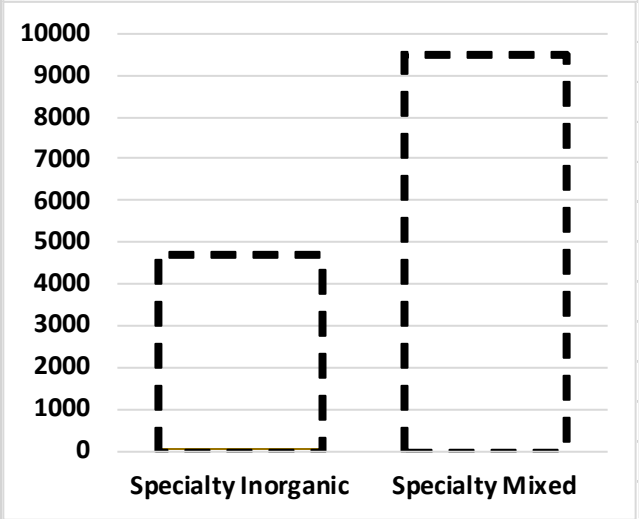
1. Directly deposit manure on Pasture
2. Apply manure consistent with curves
3. Apply inorganic consistent with curves

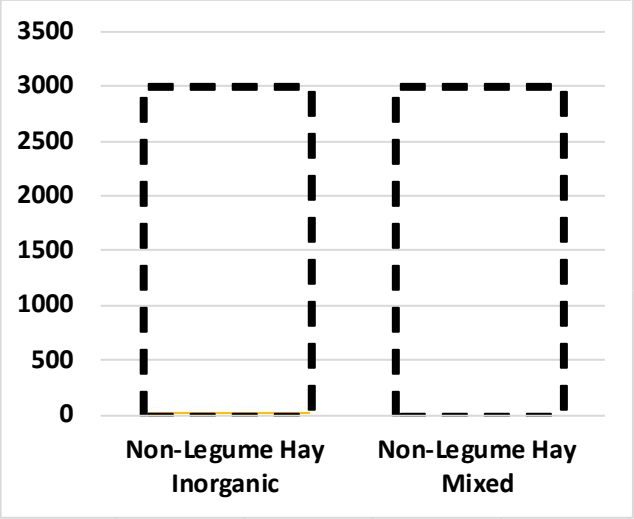
Case 1
Manure ⇩
Inorganic ⇩

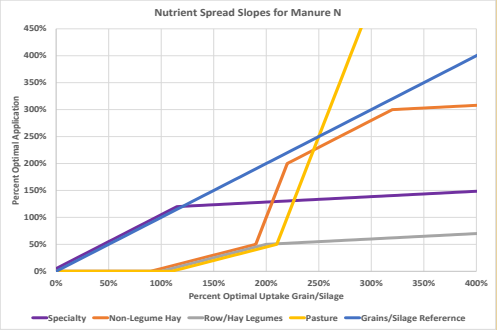
Manure	0	Inorganic	0	Direct Dep	7000











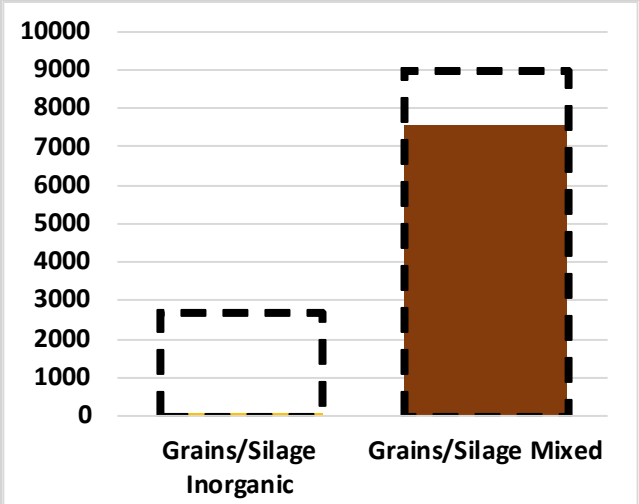
1. Directly deposit manure on Pasture
2. Apply manure consistent with curves
3. Apply inorganic consistent with curves

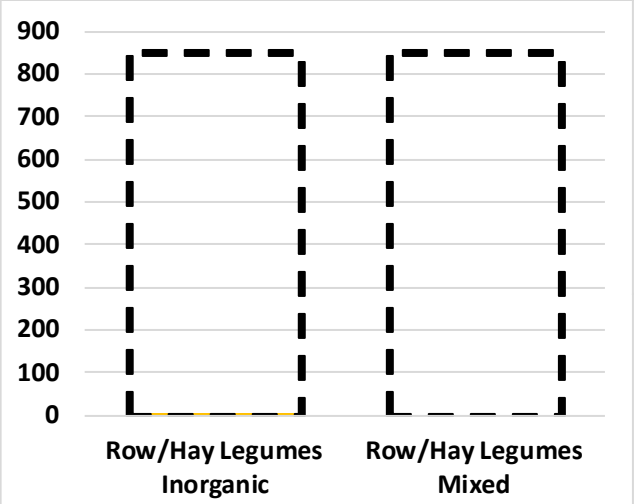
Case 1

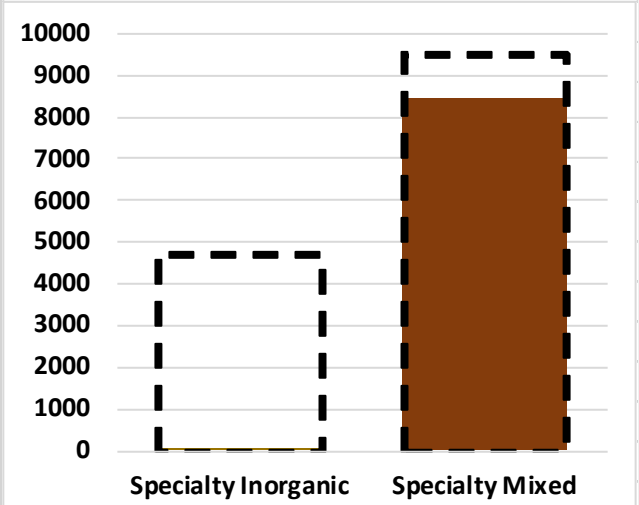
Manure ⇩

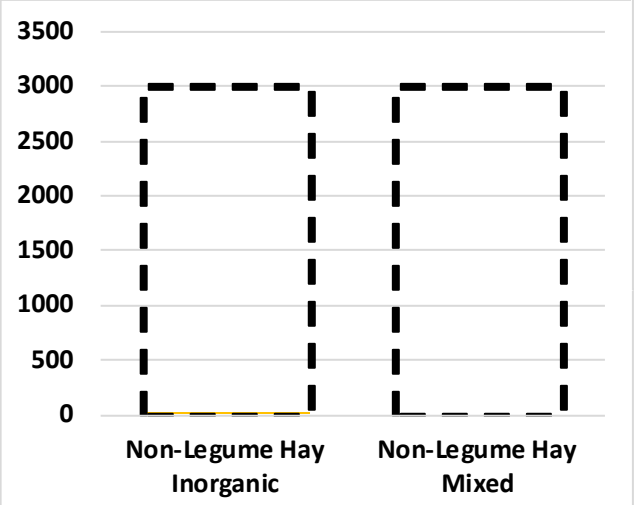
Inorganic ⇩

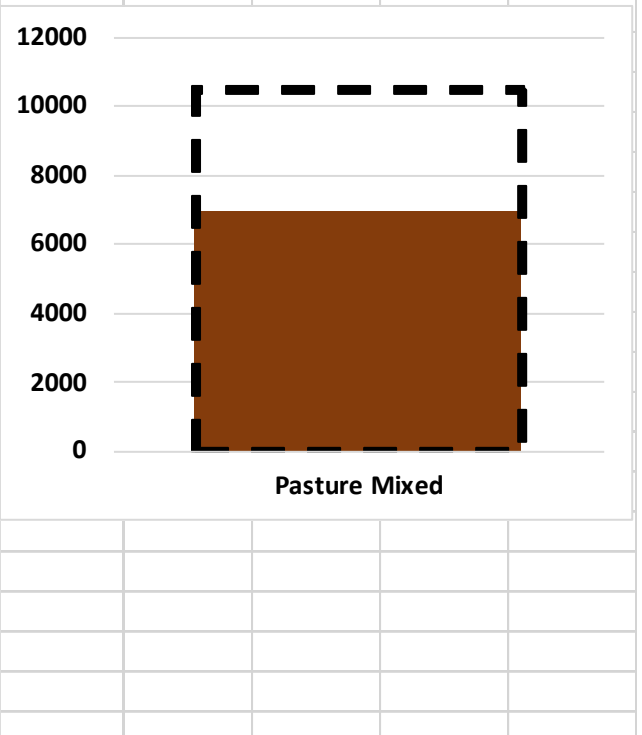
Manure	16000	Inorganic	0	Direct Dep	7000

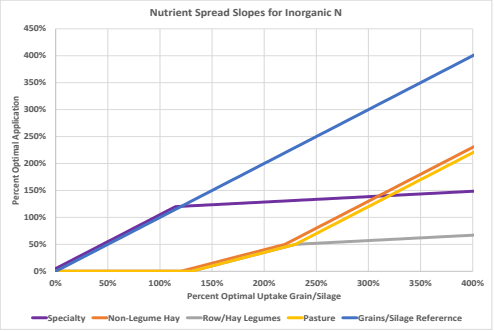








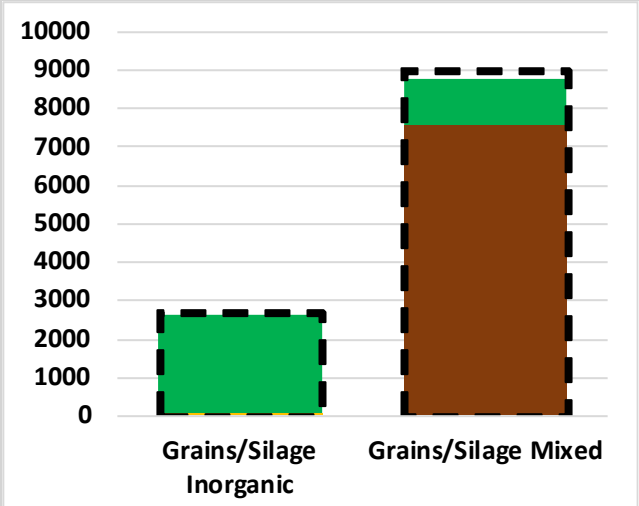


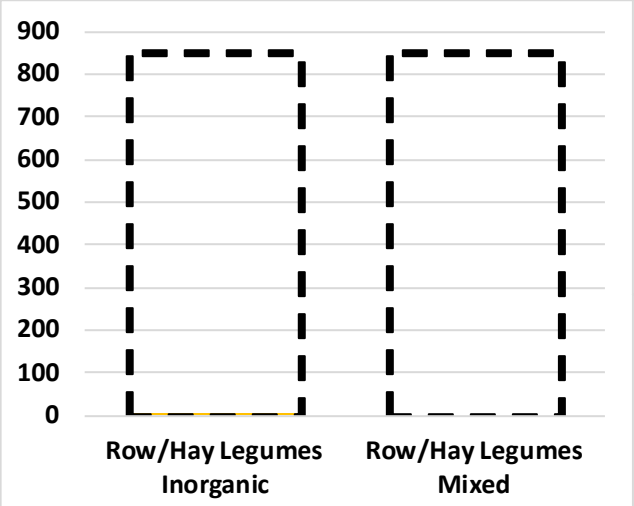


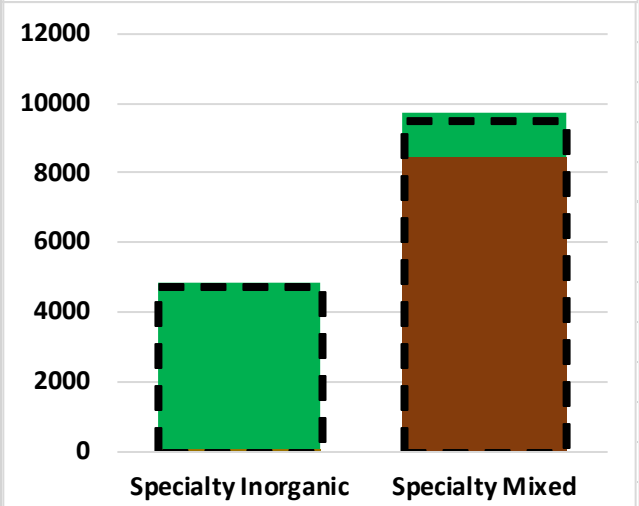
1. Directly deposit manure on Pasture
2. Apply manure consistent with curves
3. Apply inorganic consistent with curves

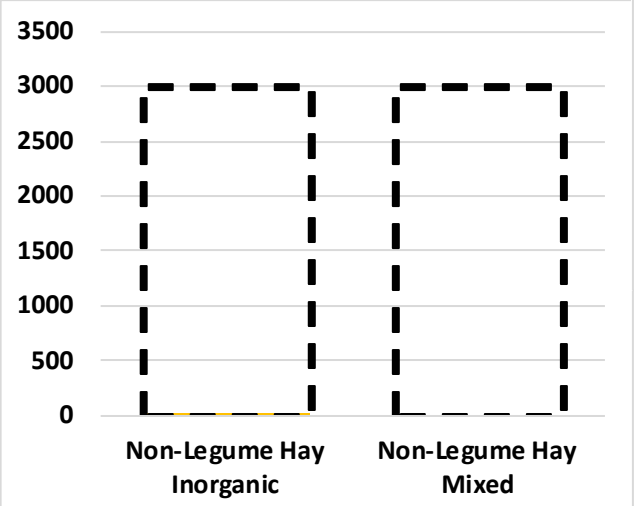
Case 1
Manure ⇩
Inorganic ⇩

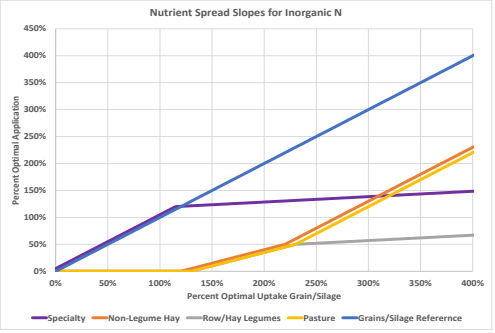
Manure	16000	Inorganic	10000	Direct Dep	7000







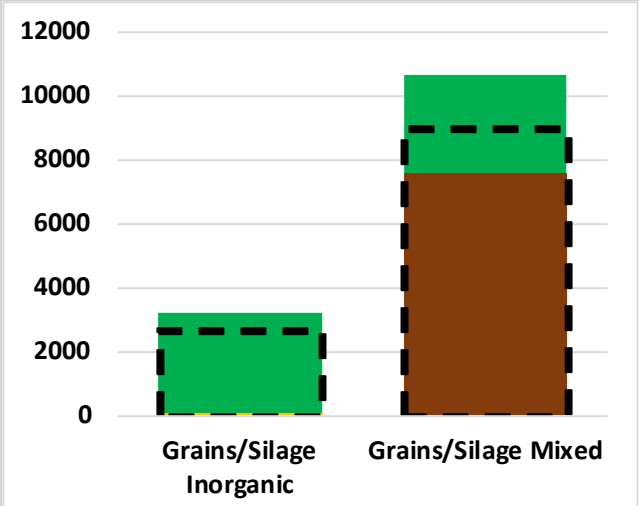


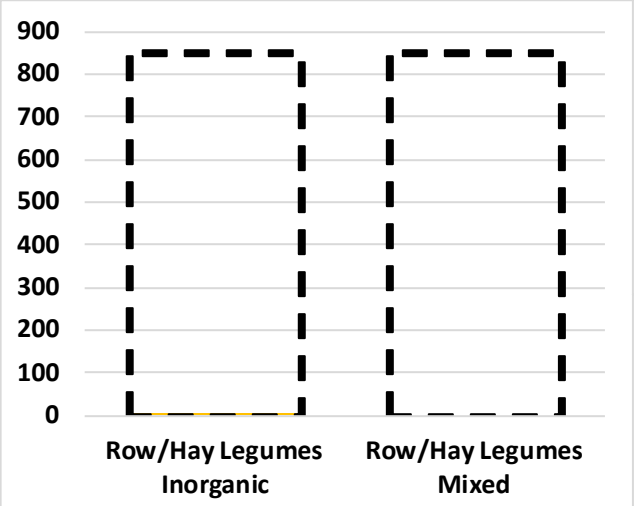


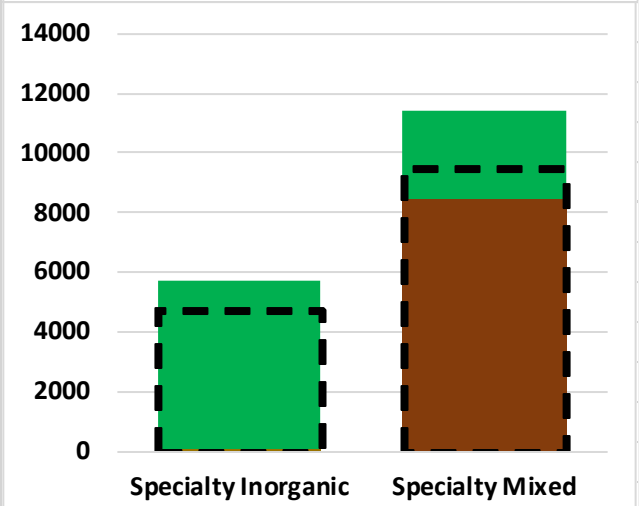
1. Directly deposit manure on Pasture
2. Apply manure consistent with curves
3. Apply inorganic consistent with curves

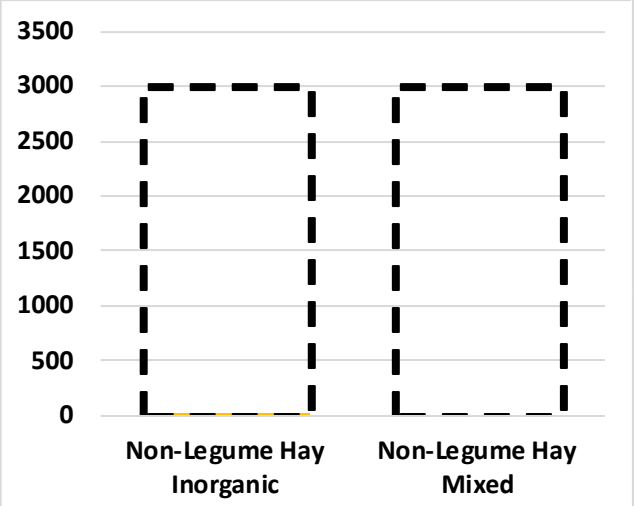
Case 2
Manure
Inorganic

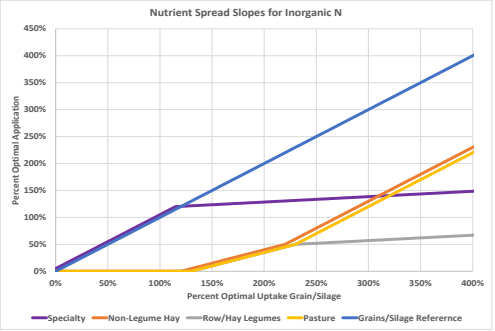
Manure	16000	Inorganic	15000	Direct Dep	7000







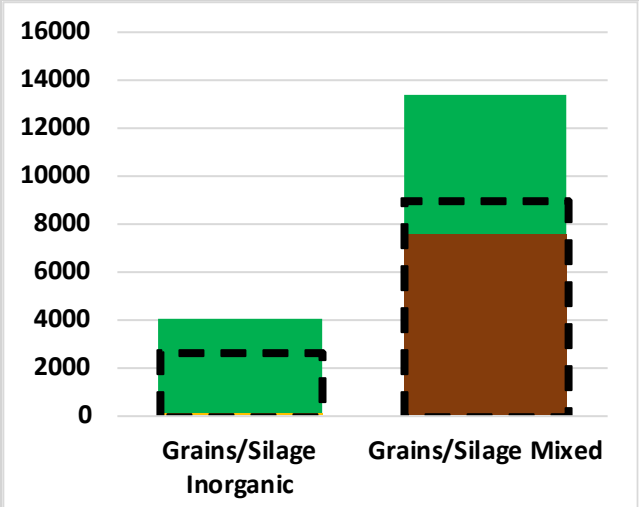


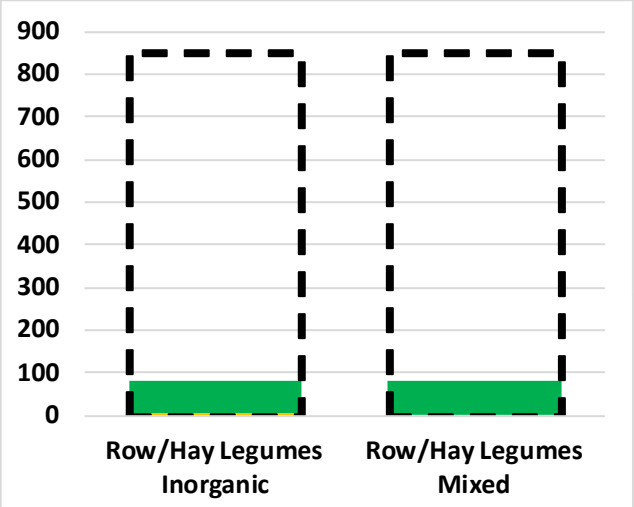


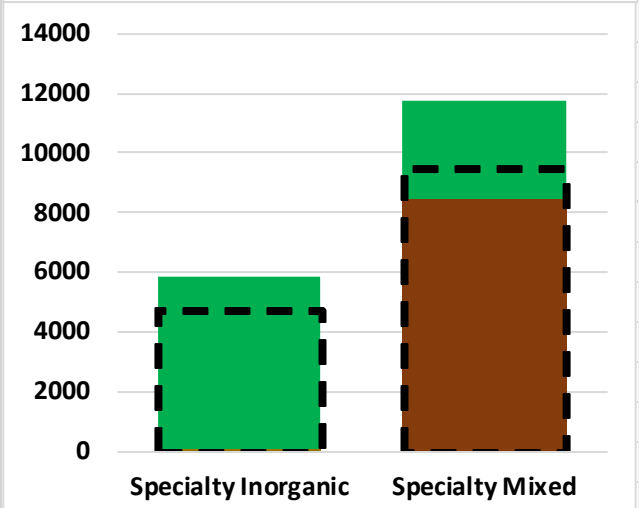
1. Directly deposit manure on Pasture
2. Apply manure consistent with curves
3. Apply inorganic consistent with curves

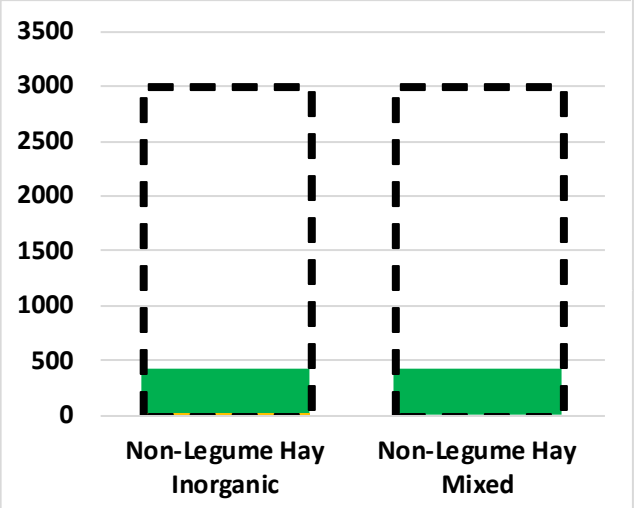
Case 2
Manure ⇩
Inorganic ⇧

Manure	16000	Inorganic	20000	Direct Dep	7000









Next Steps for Nutrient Spread

- AMS evaluating the slopes of curves over the coming weeks and will provide curves to ag economists and nutrient management planners for review.
- Curve approach will be tested following approval, and results will be reviewed for potential problems/improvements.

Land Use Approach

- Divide land uses based upon:
  - Common crop management routines
  - Annual differences in management of the same acre (corn vs. soybeans in a rotation)
  - BMP tracking needs (e.g., provide herbaceous land use to accommodate creation of grass buffers)
  - CBP modeling needs (e.g., differentiate non-permitted feeding operations from permitted)

Crops vs. Land Uses

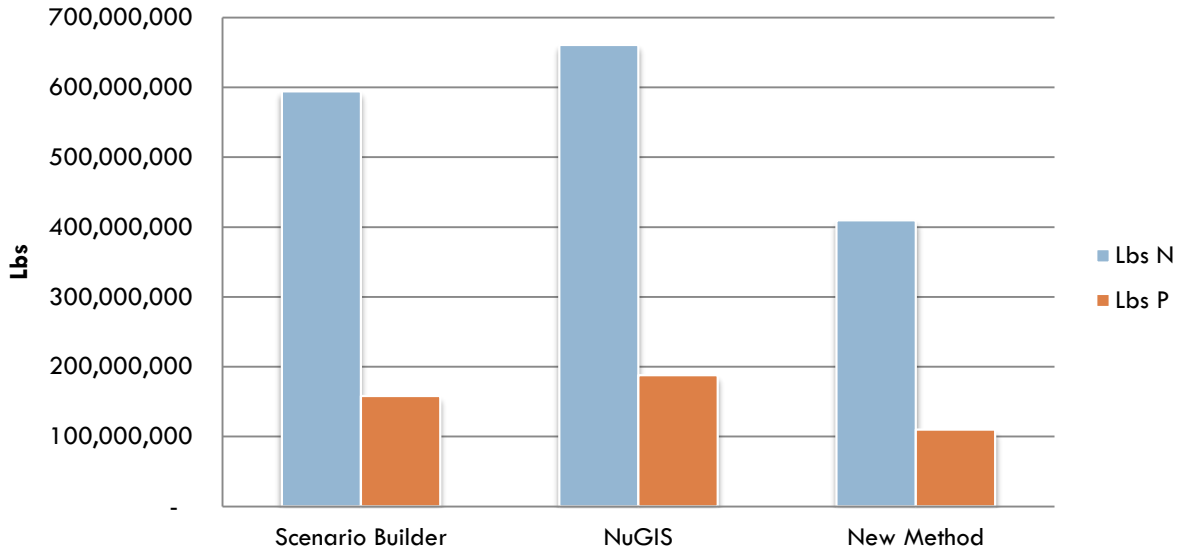
- Individual crops are simulated in SB
  - Unique soil cover, nutrient applications and need
  - Unique characteristics are aggregated into a single land use based on the relative number of acres for each crop (e.g., If 90% of acres are corn and 10% are small grains, the aggregated land use will have average applications much closer to that of corn than small grains.)
- Land uses should have unique BMPs or loading rates (average nutrient runoff through groundwater and surface water).
  - Loading rates can differ if manure is applied or not applied.
  - Multiple land uses may have the same loading rate
- All nutrient loads reported from model on land uses, not individual crops.

Land Use	Eligible for Manure	Eligible for Two Crops on One Acre	Notes
Corn or Sorghum for Grain W/Manure	Y	N	Grains typically using poultry litter
Corn or Sorghum for Grain W/O Manure	N	N	Grains not using manure
Corn or Sorghum for Silage W/Manure	Y	N	Silage typically using ruminant manure
Corn or Sorghum for Silage W/O Manure	N	N	Silage not using manure
Small Grain and Soybeans	N	Y	Beans double cropped with grains in a short season
Full Season Soybeans	N	N	Beans grown without double cropping
Small Grains and Grains for Silage	Y	N	Silage double cropped system without legumes
Other Agronomic Crops	Y (few crops)	N	Tobacco, cotton, etc.
Pasture	Y	N	Grazed land that is managed if possible
Legume Hay	Y	N	Legume forages with cutting and grazing
Other Hay	Y	N	Non-legume forages with cutting and grazing
Ag Open Space	N	N	Grassy or herbaceous area created by BMPs or uncultivated land
Specialty Crops High Input	Y (few crops)	N	Potato, sweet corn, and other crops with high nutrient inputs
Specialty Crops Low Input	Y (few crops)	N	Grapes, some nursery crops with low nutrient inputs
Impervious Farmstead?	N	N	Area not used for production around barnyard and headquarters
Pervious Farmstead?	N	N	Area not used for production around barnyard and headquarters
Non-Permitted Feeding Operation Area	N	N	Barnyard production areas with high nutrient loads
Permitted (or NOI) Feeding Operation Area	N	N	Barnyard production areas with high nutrient loads

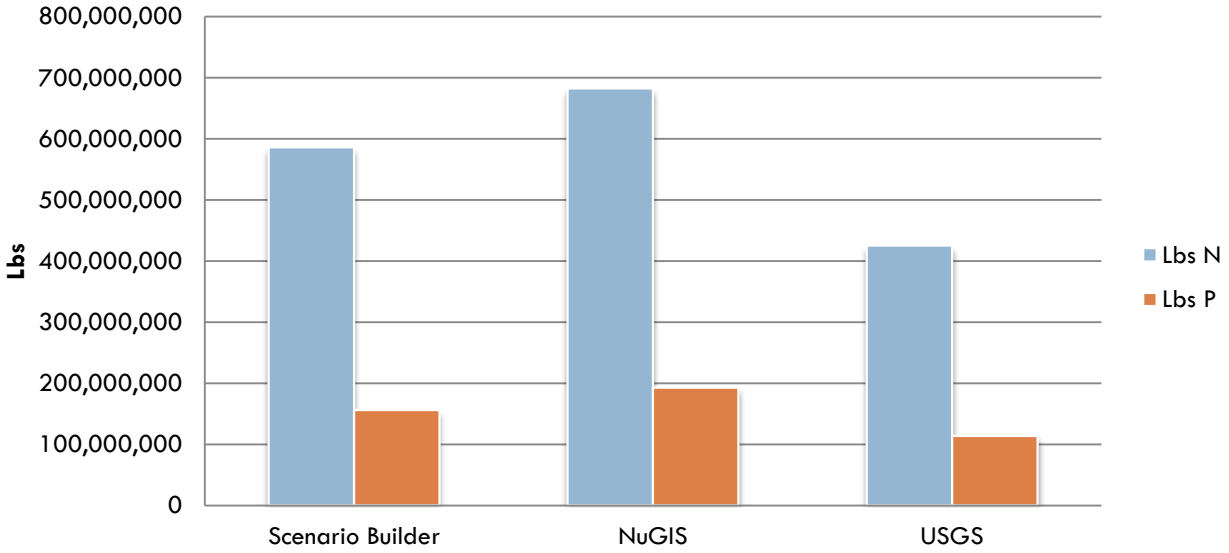
Manure Nutrient Estimates

- Procedures used for poultry litter being evaluated for other livestock
- Biggest remaining issue: recoverability factors used by USDA which represent nutrient losses within the production area.
  - E.g. USDA estimates approximately 45% of manure is lost on dairy operations prior to implementation of AWMS and CNMPs. SB currently estimates a 20% loss prior to BMPs.
- Detailed manure data collected only for broilers and somewhat for turkeys. More data needed for turkeys and layers. No data collection effort yet underway for swine, beef or dairy industries.

2007 Recoverable Nutrient Comparison



2002 Recoverable Nutrient Comparison



- New method estimates 31% fewer nutrients than Scenario Builder for 2007.
- USGS method estimated 27% fewer nutrients than Scenario Builder for 2002. No data available for 2007.
- Direct deposit and recoverability still need to be fully considered.