Biosolids and Phase 6 Model

03312016

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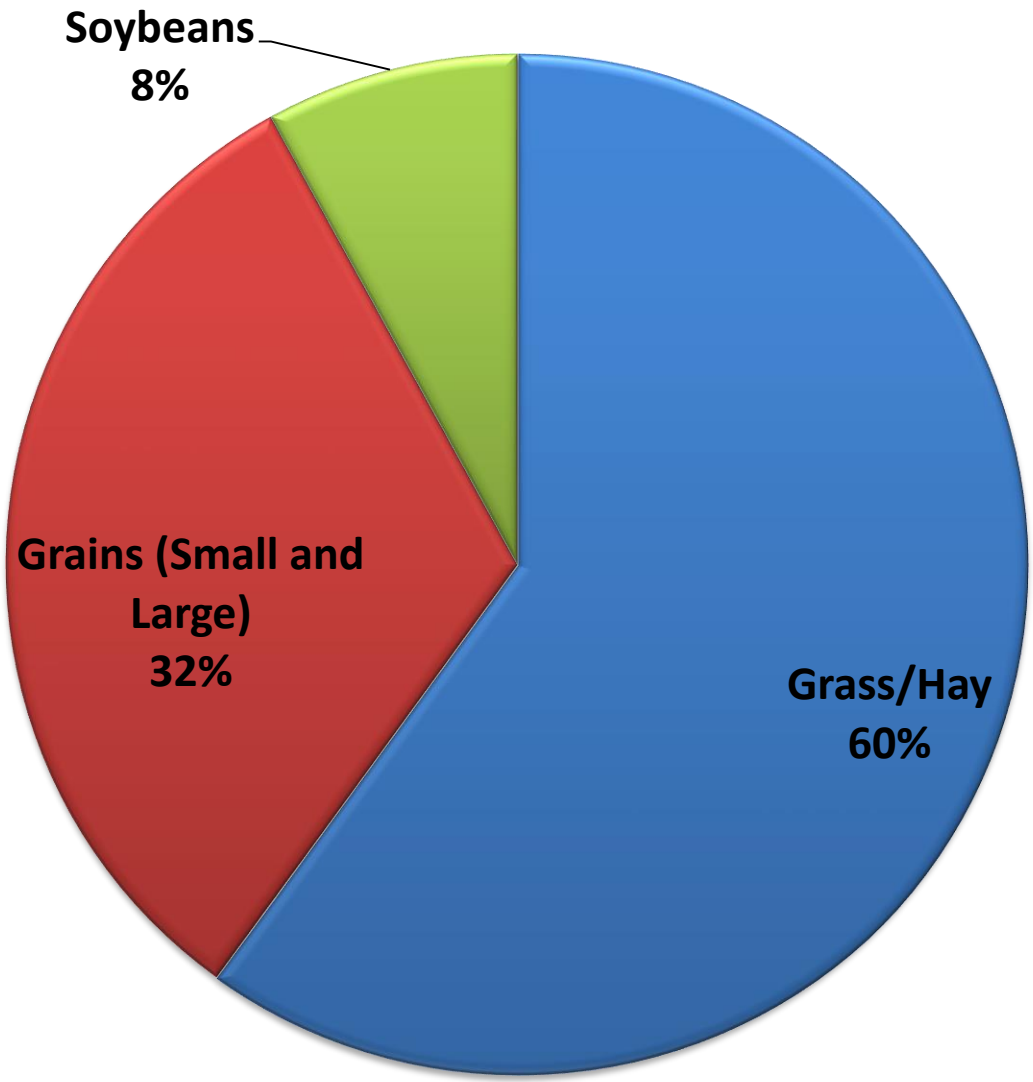
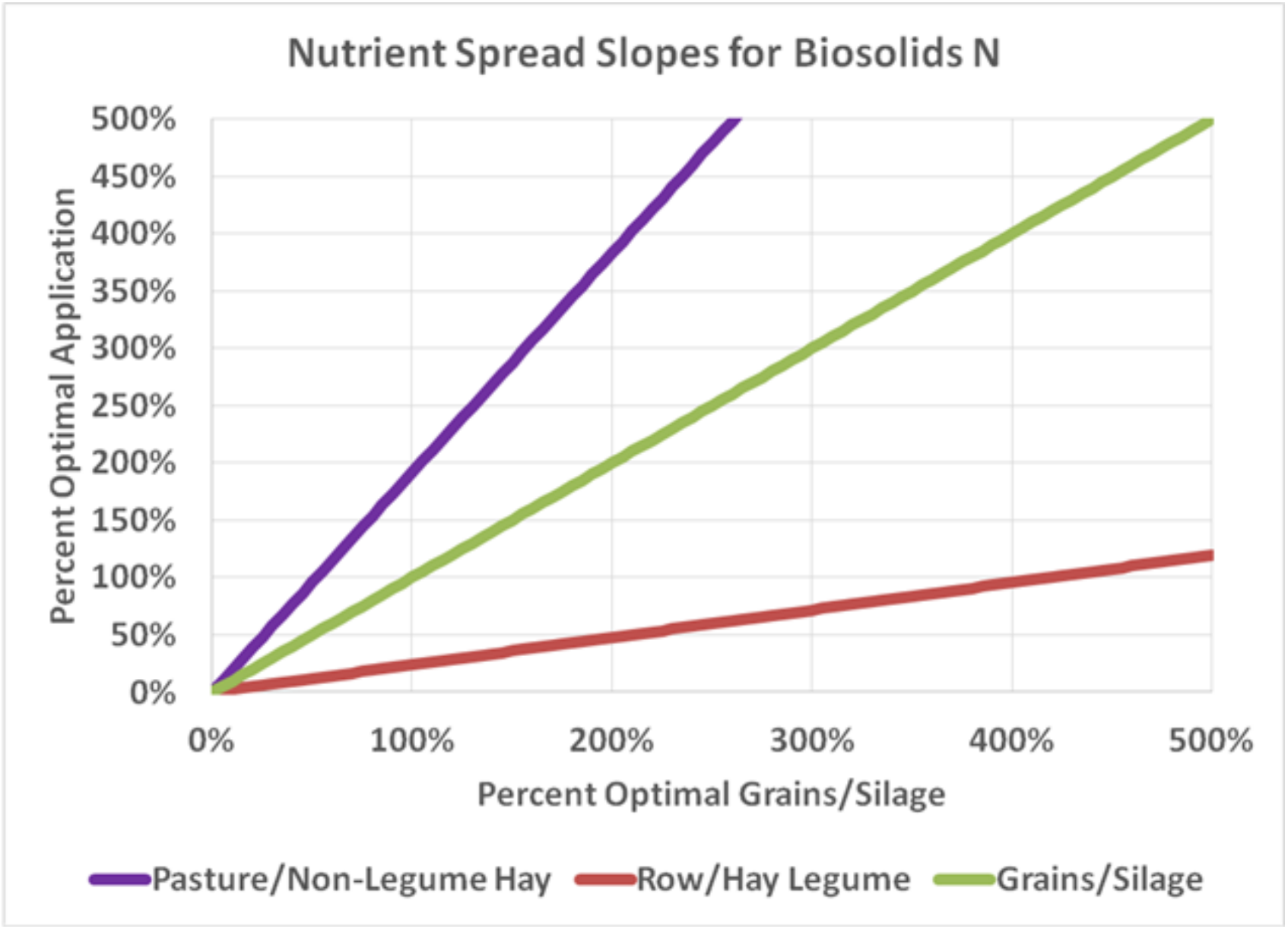
Blue Plains Biosolids Applications to Crop Groups (MD and VA)




Nutrient Spread Slopes for Biosolids N
Percent Optimal Application
500%
450%
400%
350%
300%
250%
200%
150%
100%
50%
0%
0%
100%
200%
300%
400%
500%
Percent Optimal Grains/Silage
Pasture/Non-Legume Hay
Row/Hay Legume
Grains/Silage

Still to be resolved:

(1) Can we use just one application scheme meant to represent watershed-wide average conditions, or do we have separate application schemes for each state?

- Note that the Ag Workgroup is not currently considering manure curves that vary by state. However, crop need varies by county, so one county could be majority pasture and receive most applications on pasture, while another county could be dominated by corn and receive higher applications to corn based on the application slopes.

(2) Can we use just one application scheme over the full extent of the model simulation period (1985 – 2014) or do we have different application schemes for different periods of time?

– Again note that the Ag Workgroup is not currently considering different manure curves by time period. However, crop need varies across time as yields and nutrient management recommendations have changed.

Gap Filling Rules

1) INTERPOLATION: If a state provides data for certain years with missing data for years in between, interpolate data to fill in unknown years.

Year	Known	Interpolated
2000	10,000	10,000
2001		10,417
2002		10,833
2003		11,250
2004		11,667
2005		12,083
2006		12,500
2007		12,917
2008		13,333
2009		13,750
2010		14,167
2011		14,583
2012	15,000	15,000

Gap Filling Rules

2) BACK-CAST: For every year back to 1985 for which data is not provided, use the most recent year provided.

Year	Known	Interpolated	Back-Cast
1985-1999			10,000
2000	10,000	10,000	10,000
2001		10,417	10,417
2002		10,833	10,833
2003		11,250	11,250
2004		11,667	11,667
2005		12,083	12,083
2006		12,500	12,500
2007		12,917	12,917
2008		13,333	13,333
2009		13,750	13,750
2010		14,167	14,167
2011		14,583	14,583
2012	15,000	15,000	15,000

Gap Filling Rules

3) FUTURE: For every future year unreported or unknown, use the most recent past year provided.

Year	Known	Interpolated	Back-Cast	Future
1985-1999			10,000	10,000
2000	10,000	10,000	10,000	10,000
2001		10,417	10,417	10,417
2002		10,833	10,833	10,833
2003		11,250	11,250	11,250
2004		11,667	11,667	11,667
2005		12,083	12,083	12,083
2006		12,500	12,500	12,500
2007		12,917	12,917	12,917
2008		13,333	13,333	13,333
2009		13,750	13,750	13,750
2010		14,167	14,167	14,167
2011		14,583	14,583	14,583
2012	15,000	15,000	15,000	15,000
2013				15,000
2014				15,000
2015				15,000

Gap Filling Rules

4) NUTRIENT SPECIES STATE-WIDE: If only pounds are provided, then the statewide, average species concentrations from the most recent year will be used.

5) NUTRIENT SPECIES WATERSHED-WIDE: If a state NEVER reports concentrations, then the watershed-wide species concentrations from the most recent year will be used.

Year	Known	Interpolated	Back-Cast	Future
1985-1999			10,000	10,000
2000	10,000	10,000	10,000	10,000
2001		10,417	10,417	10,417
2002		10,833	10,833	10,833
2003		11,250	11,250	11,250
2004		11,667	11,667	11,667
2005		12,083	12,083	12,083
2006		12,500	12,500	12,500
2007		12,917	12,917	12,917
2008		13,333	13,333	13,333
2009		13,750	13,750	13,750
2010		14,167	14,167	14,167
2011		14,583	14,583	14,583
2012	15,000	15,000	15,000	15,000
2013				15,000
2014				15,000
2015				15,000

Year	Dry Lbs	Known Lbs NH3/Dry Lb	Final Lbs NH3/Dry Lb
1985-1999	10,000		0.1
2000	10,000	0.1	0.1
2001	10,417		0.1
2002	10,833		0.1
2003	11,250		0.1
2004	11,667		0.1
2005	12,083		0.1
2006	12,500		0.1
2007	12,917		0.1
2008	13,333		0.1
2009	13,750		0.1
2010	14,167		0.1
2011	14,583		0.1
2012	15,000		0.1
2013	15,000		0.1
2014	15,000		0.1
2015	15,000		0.1

Gap Filling Rules

6) If county applied is not provided, then biosolids will be proportioned to counties based upon the most recent county distribution supplied.

Year	Known	Interpolated	Back-Cast	Future
1985-1999			10,000	10,000
2000	10,000	10,000	10,000	10,000
2001		10,417	10,417	10,417
2002		10,833	10,833	10,833
2003		11,250	11,250	11,250
2004		11,667	11,667	11,667
2005		12,083	12,083	12,083
2006		12,500	12,500	12,500
2007		12,917	12,917	12,917
2008		13,333	13,333	13,333
2009		13,750	13,750	13,750
2010		14,167	14,167	14,167
2011		14,583	14,583	14,583
2012	15,000	15,000	15,000	15,000
2013				15,000
2014				15,000
2015				15,000

Year	Dry Lbs	Known County 1 Frac	Final County 1 Frac
1985-1999	10,000		0.25
2000	10,000	0.25	0.25
2001	10,417		0.25
2002	10,833		0.25
2003	11,250		0.25
2004	11,667		0.25
2005	12,083		0.25
2006	12,500		0.25
2007	12,917		0.25
2008	13,333		0.25
2009	13,750		0.25
2010	14,167		0.25
2011	14,583		0.25
2012	15,000		0.25
2013	15,000		0.25
2014	15,000		0.25
2015	15,000		0.25

Gap Filling Rules

7) If county applied is NEVER provided by state, then biosolids will be proportioned to counties based upon manure-eligible crop application goal for that year.

- Manure-eligible crop application is defined as:
  State-supplied application rate/yield unit X yield/year X acres

Monthly or Yearly?

- Do we need a rule to disaggregate annual data by month?
  - No. Annual data is sufficient as the Phase 6 Model is not very sensitive to timing of application, and application curves will be based upon crop need in each month.

Where do we stand now?

- DE cleaned up biosolids data for April calibration. Data from all other states remains the same from the January calibration.
- Plan is for states to undergo an effort to cleanup data when Biosolids Workgroup provides a clear definition of eligible biosolids AND potential data cleanup rules.
- States should attempt to revise data using approved cleanup rules. If they do not, CBP will use the same rules.
- States can submit data by June 1 for July calibration and by September 1 for October calibration (final opportunity).