

Membership-Phase 6 Cover Crop Panel

Name	Affiliation	Role
Ken Staver	University of Maryland	Panel Chair
Charlie White	Penn State University	Panel Member
Jack Meisinger	USDA – Agriculture Research Service	Panel Member
Paul Salon	USDA-Natural Resources Conservation Service	Panel Member
Wade Thomason	Virginia Tech	Panel Member
<i>Jason Keppler</i>	<i>Maryland Department of Agriculture</i>	<i>Watershed Technical Workgroup representative</i>
<i>David Wood</i>	<i>Chesapeake Bay Program Office</i>	<i>Modeling Team representative</i>
<i>Mark Dubin</i>	<i>University of Maryland</i>	<i>AgWG Coordinator</i>
<i>Lindsey Gordon</i>	<i>Chesapeake Research Consortium</i>	<i>Staff</i>

Winter cereals – review effects on nutrient losses

- Erosion – planting can increase erosion potential but once established can reduce erosion potential depending on baseline residue cover. Total effect depends on site erosion potential.
- N leaching – Potential to reduce root zone nitrate pool but N applications to production fields temporarily increase root zone pool and risk of loss. Timing relative to leaching critical.
- Surface runoff dissolved N – Effects on very shallow soil dissolved N pools can reduce runoff dissolved losses. N applications increase losses.
- P – Particulate losses tied to erosion impacts and soil P, dissolved P lots of questions, NT applications???

MD Eastern Shore winter cereal recollections

- 1985 – Almost all wheat/barley following corn using conventional tillage. Now 30-40% following single crop sb. Now, much less tillage, more NT and VT.
- 1985 Fall fertilizer – 30-40lb N & 50 lb P_2O_5 + K spread between plowing and disking.
- Remainder of N spread as soon as field conditions allowed after January 1. Freeze up not green up!
- Now, no fall N after sb but no difference in spring.
- Splitting spring N started around 1990.
- Fall N 70-80% of growers before commodity cc program, now about 10%.

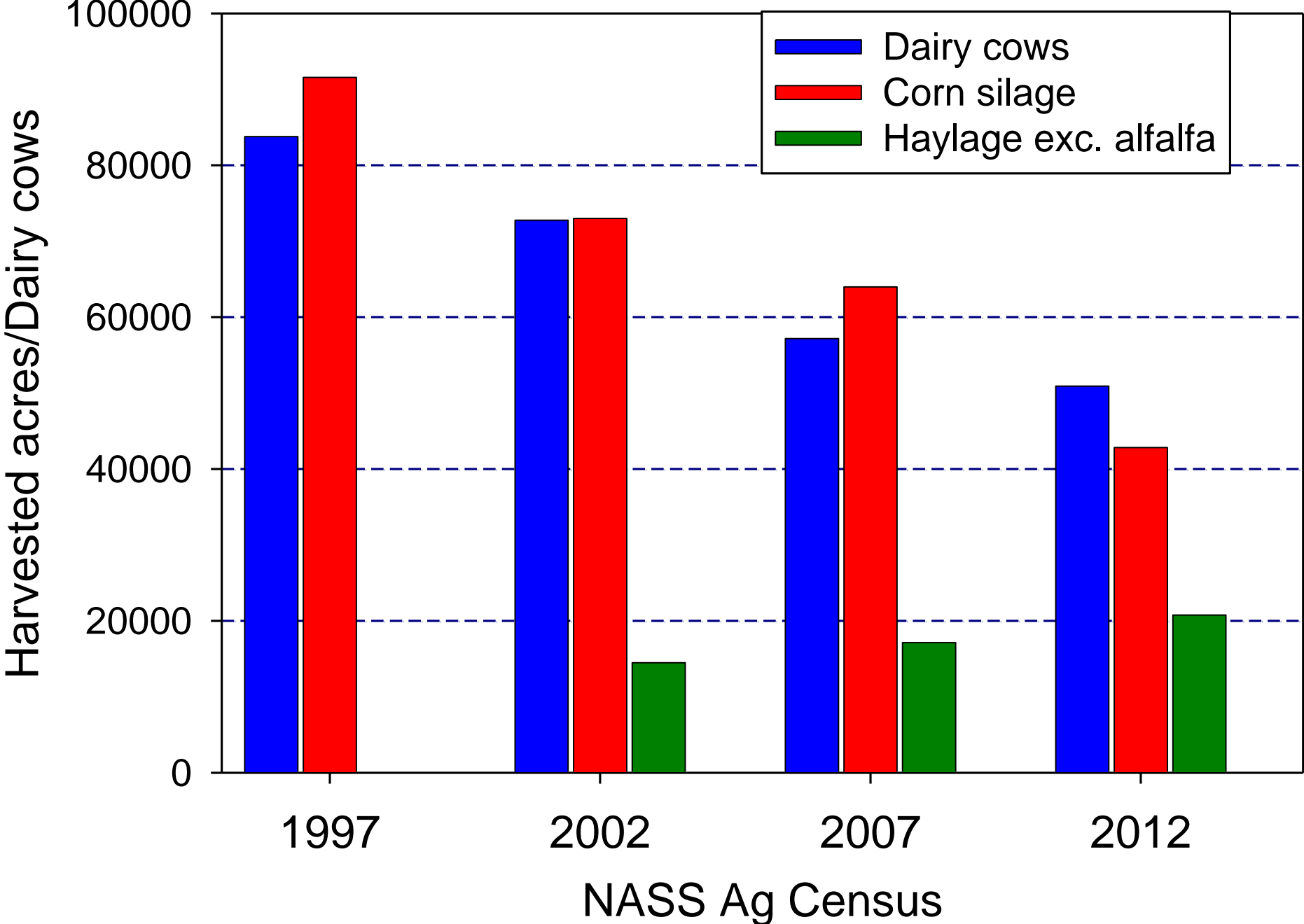
P6 CC panel three main tasks (May 19-2016)

- Use 5.3.2 panel table efficiencies for traditional cover crops as base and ...
 1. Modify efficiencies for mixtures based on new data from PSU and VT, probably a little higher.
 2. Modify table to apply to cropland where manure is applied in fall, mostly corn silage.
 3. Modify table to apply to winter cereal production fields (commodity) with no fall nutrients applied.

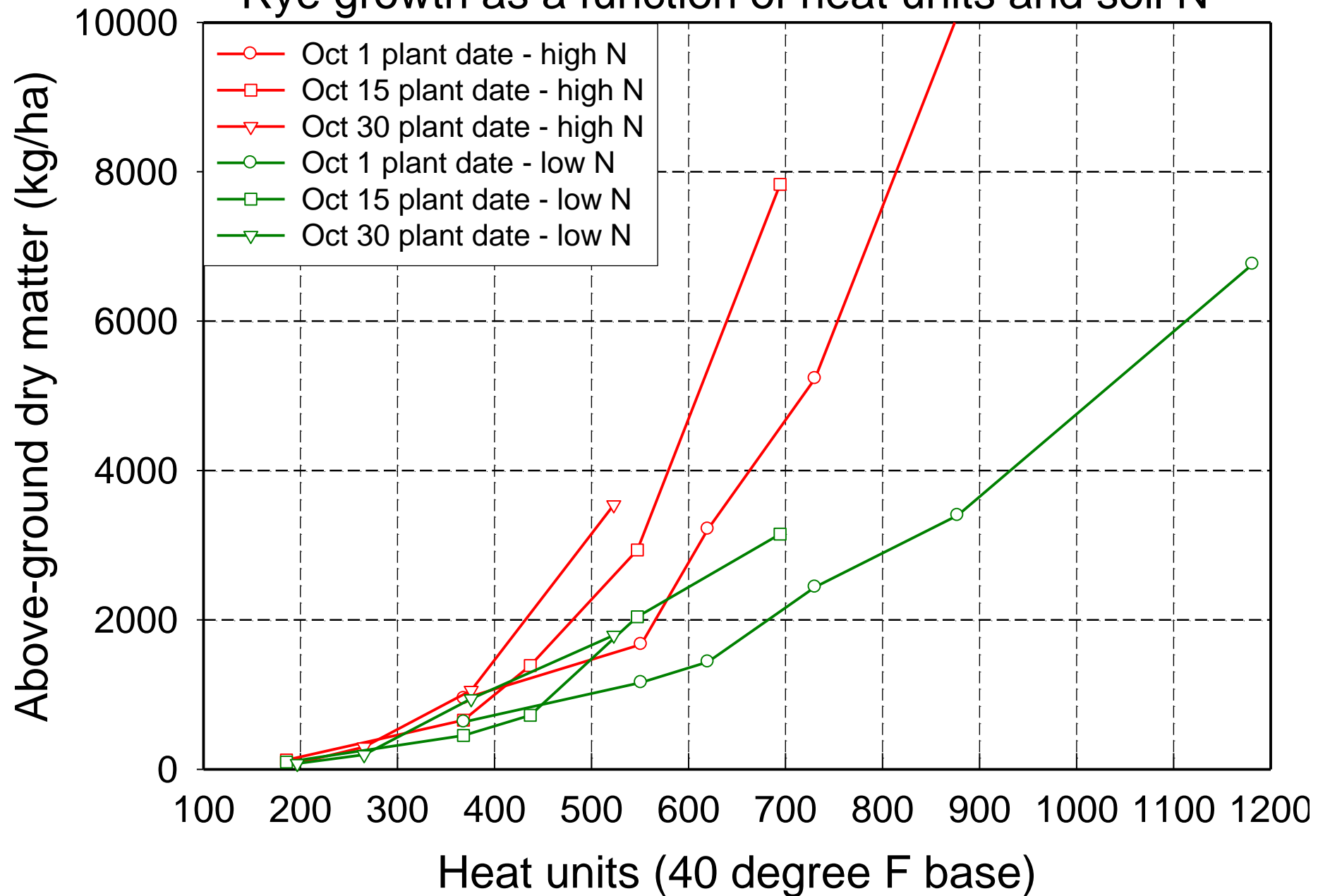
A couple of key changes from 5.3.2

- Traditional and commodity cover crops can be applied to all row crop land uses except for some minor specialty crops (e.g., spinach)
- Cover crop efficiencies will be applied to specific land uses, rather than the average crop acre
- Commodity cover crop effect will only consider impact of no fall nutrient applications. After Jan. 1 dealt with in the winter cereals land use with NM

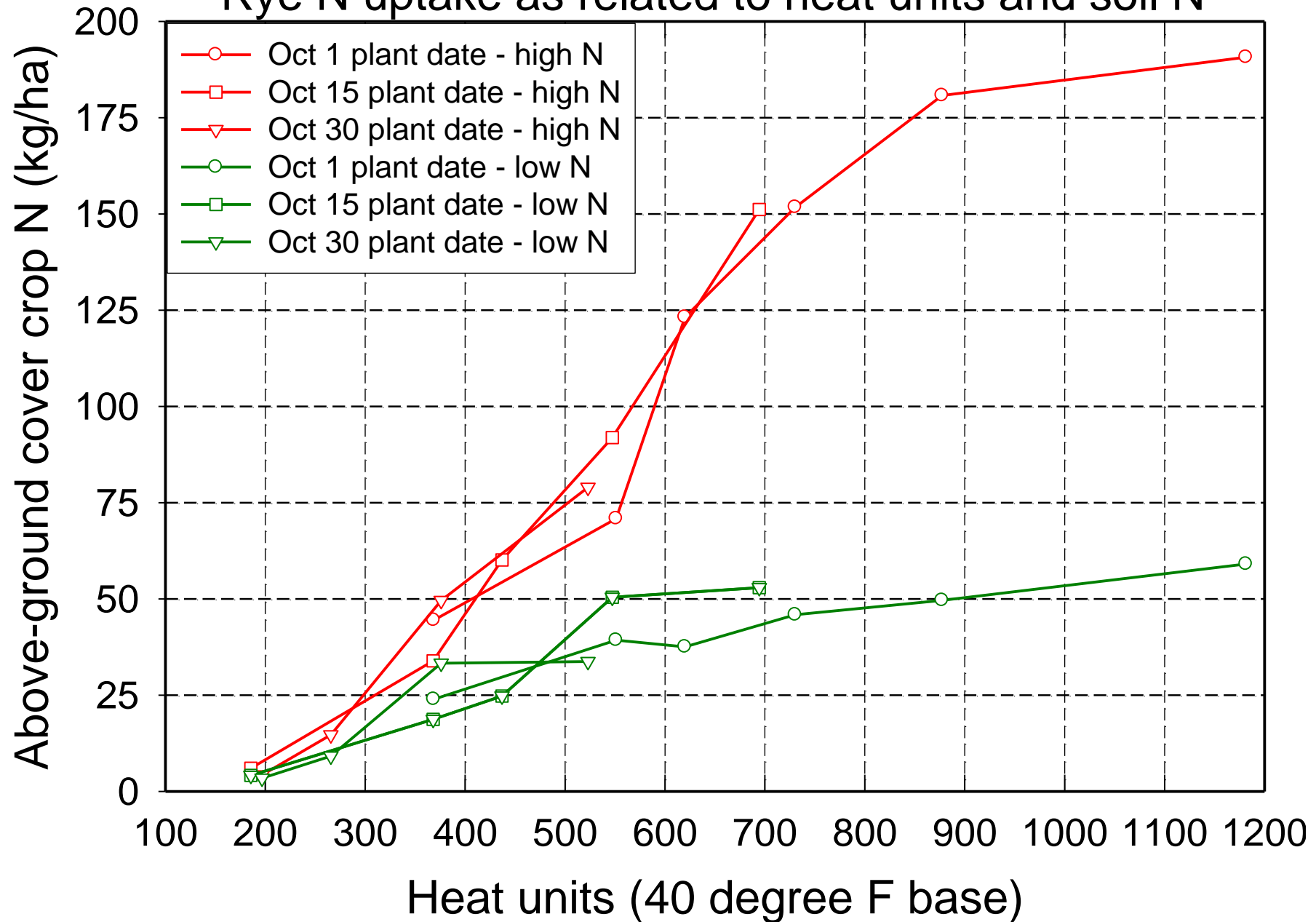
MD State totals



Rye growth as a function of heat units and soil N



Rye N uptake as related to heat units and soil N



Overall effects (adjustments likely)

- Pure stand traditional cover crop reductions from 5.3.2 panel not changed but will be applied to specific land uses.
- Mixture values likely increased from ~ 0.5 of pure stand values to $\sim 0.7-0.8$ of pure stand values.
- Commodity cover crop efficiencies ~ 0.5 of 5.3.2 traditional cover crop values and applied to land use where planted.
- New cc practice for crop land with unavoidable fall manure applications, ~ 0.8 of 5.3.2 traditional values.
- Defining baselines critical although not clearly part of panels task (e.g., historical patterns of fall nutrient applications).

1. Modify efficiencies for mixtures based on new data from PSU and VT, probably a little higher.
 - 5.3.2 approach average grass and legume values.
 - At lower grass planting rates evidence of compensatory nitrate uptake, i.e., more uptake per plant, so reduction of nitrate uptake is not as great as cut in planting rate (to a point).
 - Grass/legume mixtures tend not to be killed as early in the spring as pure grass cover crops to allow more N fixation by legume component suppressing soil nitrate concentrations later into the spring.

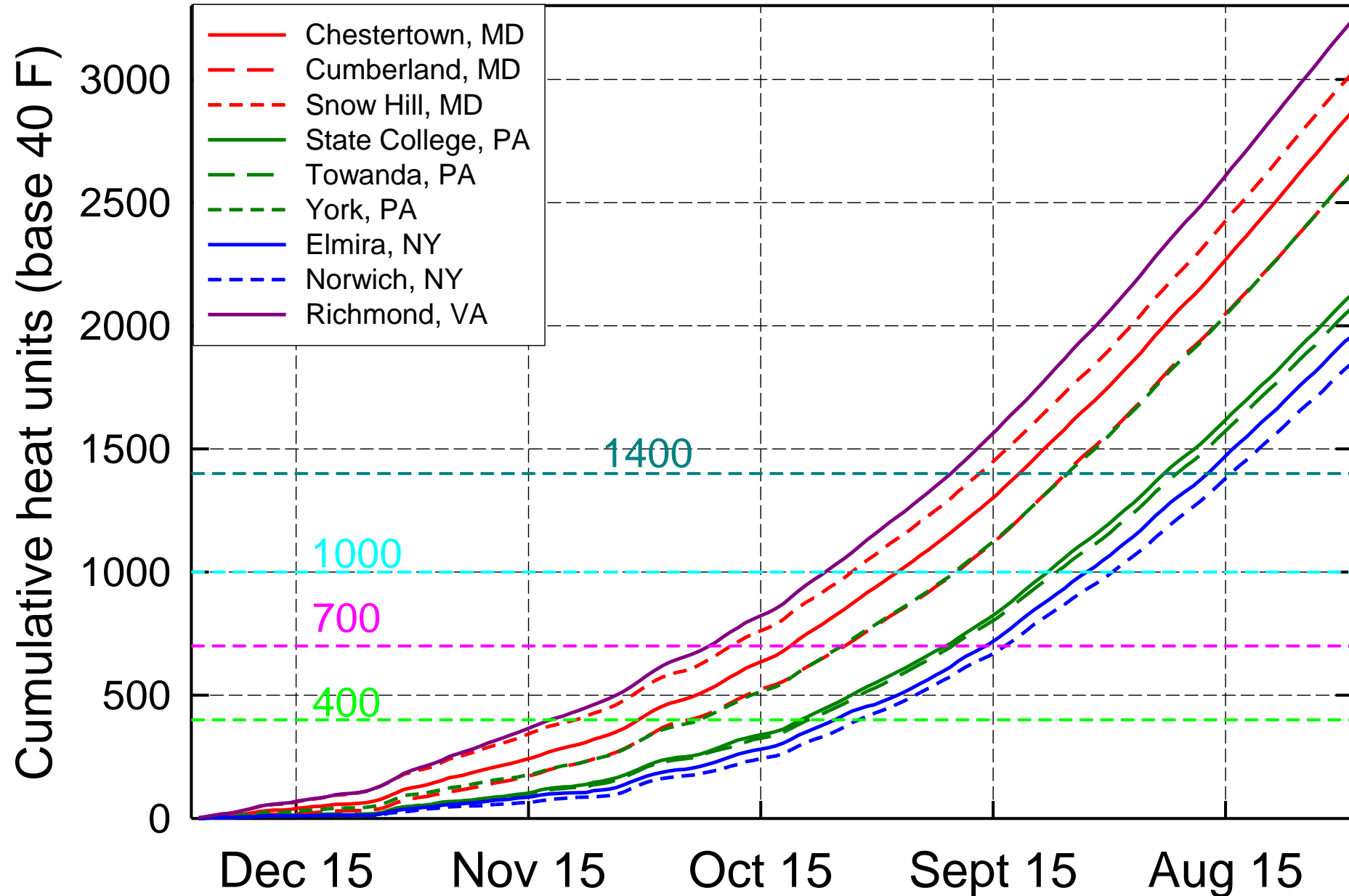
2. Modify table to apply to cropland where manure is fall applied, mostly corn silage.

- 5.3.2 definition of traditional cover crop does not allow fall manure application.
- Many operations do not have 365 day manure storage capacity; fall manure applications unavoidable and can sharply increase soil nitrate.
- Cover crops can result in large load reductions because of high potential for losses.
- But because of increased soil nitrate pool, cover crop efficiencies will be less than 5.3.2 values.

3. Modify table to apply to winter cereal fields (commodity) with no fall nutrients applied.

- Only considering fall management, spring management too complicated. Baseline info critical but not panels change.
- Eliminating fall N application means all nitrate uptake is scavenging soil N following previous crop; functions like a traditional cover crop for autumn/early winter.
- Effect applied the same as traditional cover crop to land use where planted, mostly corn and soybean.
- Efficiencies will be less than for traditional cover crop because only applied to part of fall-winter period.
- Other effects addressed in winter cereal land use (Jan-Dec).

5-year average heat unit accumulation Aug 1 - Dec 31



Some Issues (panel will not deal with all)

- Fall establishment of winter cereals currently not represented in P6 land uses; tillage and nutrients?
- Erosion and P benefits will need to be done with modeling or very thin literature/bpj combo. Erosion potential and soil P concentration highly site specific and critical to estimating cc effects.
- Identifying baselines essential for estimating change in behavior and nutrient losses. Simple for traditional cc, much more complicated for others.