

# Nutrient Management Panel Phase 5 Report

Advance preview of recommendations

Agriculture Workgroup Meeting

June 17-18, 2015

# Agriculture Workgroup Phase 5 Expert Panel Membership

- Comprised of Research Scientists, Extension Specialists, Nutrient Management Program Specialists, Policy Specialists

- **County Conservation Districts:**

- New York (1)

- **State Agencies:**

- Delaware (1)
  - Maryland (1)
  - New York (1)
  - Pennsylvania (1)
  - Virginia (1)
  - West Virginia (1)

- **Federal Agencies:**

- USDA Agricultural Research Service (3)
  - USDA Natural Resources Conservation Service (1)

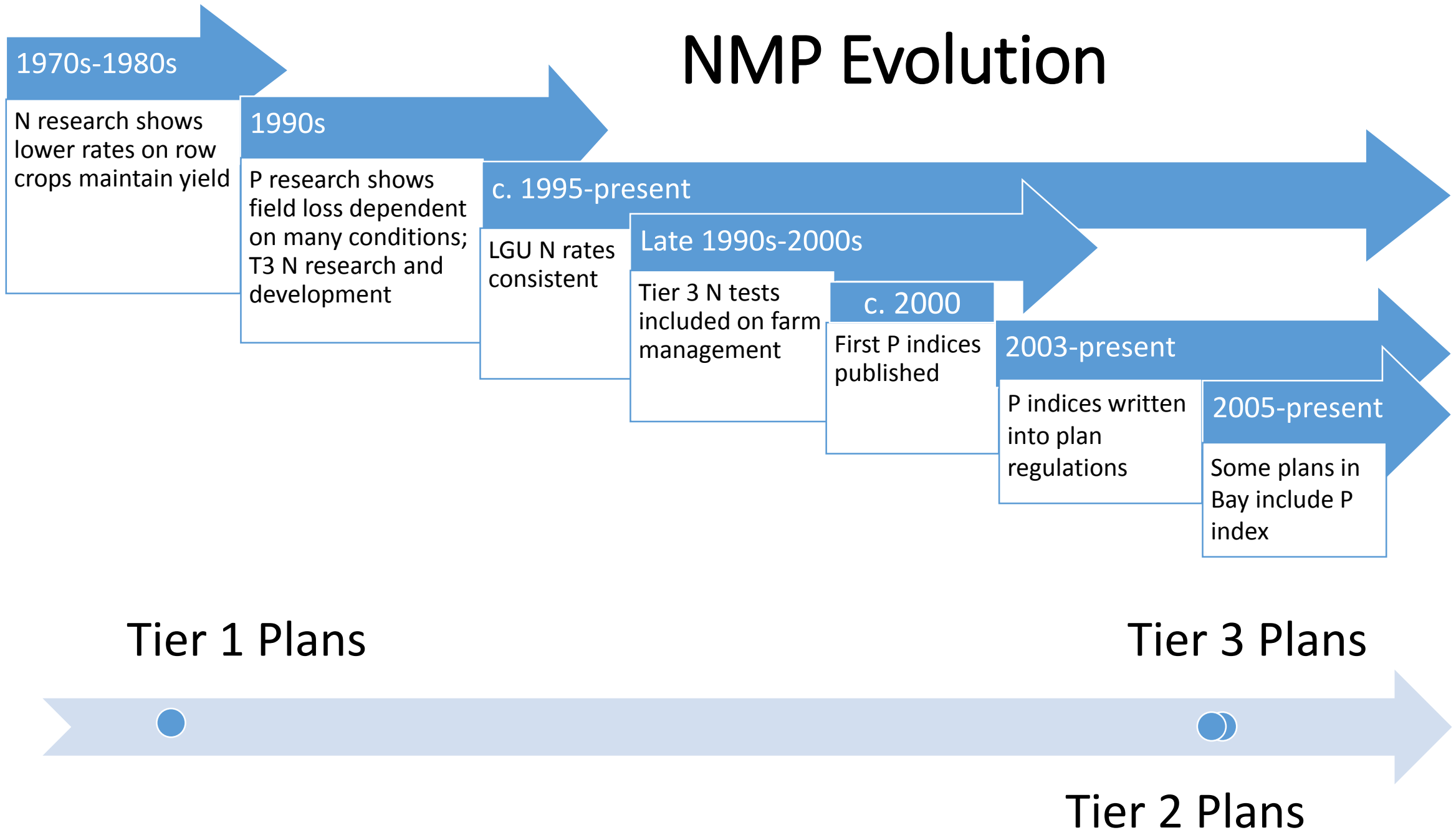
- **Universities:**

- Maryland (6)
  - Pennsylvania (2)
  - Virginia (3)
  - West Virginia (1)
  - Johns Hopkins (1)

- **Non-Governmental Organizations:**

- Conserve Pennsylvania (1)
  - Northeast Pasture Consortium (1)
  - International Plant Nutrition Inst. (1)

# NMP Evolution



Tier definitions

## Phase 5 Expert Panel's revised tiers of Nutrient Application Management

### **Tier 3 Nitrogen Adaptive Nutrient Application Management**

*Ex: PSNT, CSNT, var. rate*

### **Tier 3 Phosphorus Adaptive Nutrient Application Management**

*Ex: variable rate*

### **Tier 2 Nitrogen Field Level Nutrient Application Management**

*Ex: split N applications, setbacks,  
incorporation*

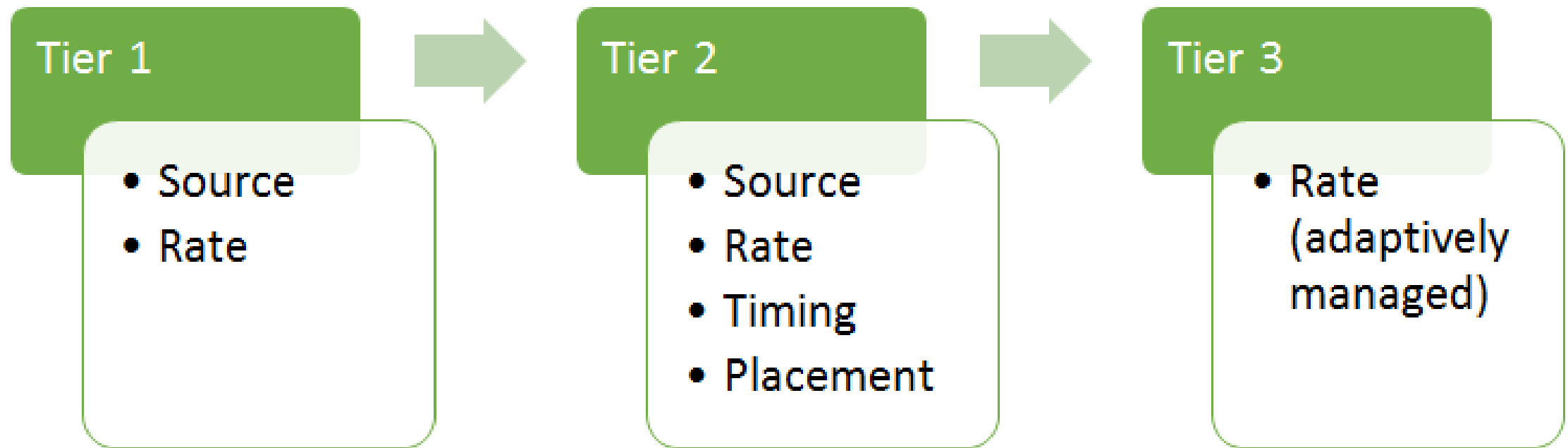
### **Tier 2 Phosphorus Field Level Nutrient Application Management**

*Ex: manure/soil P management; use  
of an assessment*

### **Tier 1 Crop Group Nutrient Application Management**

*Adoption of land grant university recommendations for proper **nutrient source and rate**,  
but including consideration of timing, and placement  
(4Rs)*

## 4Rs Emphasized in Nutrient Management Tiers



**Figure 3. Diagram that shows the most relevant of the 4Rs of nutrient management as considered by the panel to influence the recommended reduction efficiencies.**

Literature support for Tiers

# Tier 2 N – Manure Incorporation

- **Reducing** ammonia volatilization
- N reduction efficiency determined by the ammonia conserved by incorporation within one day after application and using tillage implements that would leave at least 30% residue cover (chisel plow or light tandem-disk)
- Final small-plot estimate = 10% of the applied manure ammonium-N
- Temporary until Phase 6.0 Manure Incorporation panel conducts review for Phase 6.0 Model



# Tier 2 N – Timing of N Applications

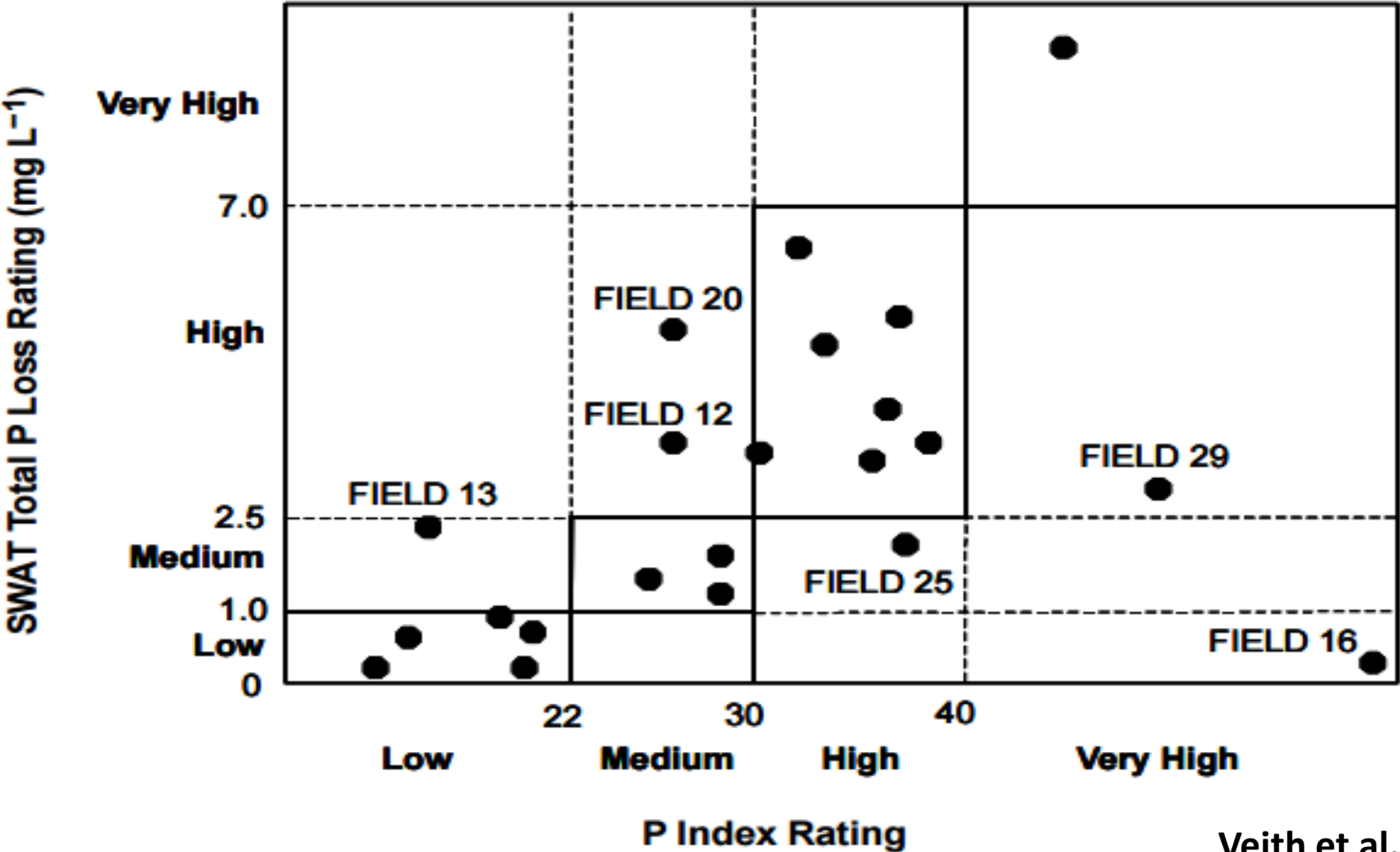
- Timing: one of the 4Rs
- **N use efficiency is increased** by applying N in phase with crop need
- **N loss risk is reduced** by decreasing exposure to loss pathways
- N reduction efficiencies estimated by comparing corn yields from replicated N-response trials over many site-years
- Panel used data from both corn and wheat studies
- Hayland managed similarly

# Tier 2 P – Manure Incorporation

- Reducing risk of early season surface losses from manure spreading
  - Comes at cost of soil erodibility
- Coarser textured, lower sloped fields show benefit from mixing surface applied manure with upper soil. ~40+%
  - Fine textured, steep slopes have too high a risk of soil and nutrient loss to yield a net benefit
- Mixing of surface soil where sediment-bound P can reduce surface loss risk, as well
- One of several elements contributing to P-index
  - Evidence was used in support of P-index recommended credit.

# Tier 2 P – P Site Index

Change in PSI  
rating from High  
to Medium = 35%  
reduction in P loss



# Tier 2 P – Setbacks

- Setback values were not considered in the Tier credit calculation explicitly
- Identified as contributing to conservativeness
  - Practiced after the calibration
  - Results in lower nutrient applications/acre
  - Evidence of water quality protection could be stronger

# Tier 3 N – PSNT, CSNT, ISNT, FSNT

## **Mid/Late season soil or plant tissue tests**

Effective application requires that producers:

- Conduct the tests
- Manage N fertilizer applications based on test results so that excess N is not added where no yield response would be expected

Annual N fertilizer application rates are typically reduced through the recommendations based on test results following the season(s).

# Tier 3 N – Variable rate N applications

- Studies in VA compared N application rates based on Virginia Tech Corn Algorithm to standard N rate
- Average VTCA N rate was 24 kg/ha (~20 percent) less than the standard farmer's rate

Effectiveness Estimates

# Applicable land uses by Tier

## Tier 1

- Row w/ manure
  - HWM
  - LWM
- Specialty row crops (HOM)
- Pasture (PAS)
- Nursery (NUR)
- Hay w/ nutrients (HYW)
- Alfalfa (ALF)
- 92% of ag acres

## Tier 2N

- Row w/ manure
  - HWM
  - LWM
- Hay w/ nutrients (HYW)

## Tier2P

- Row w/ manure
  - HWM
  - LWM
- Hay w/ nutrients (HYW)
- Alfalfa (ALF)

## Tier 3

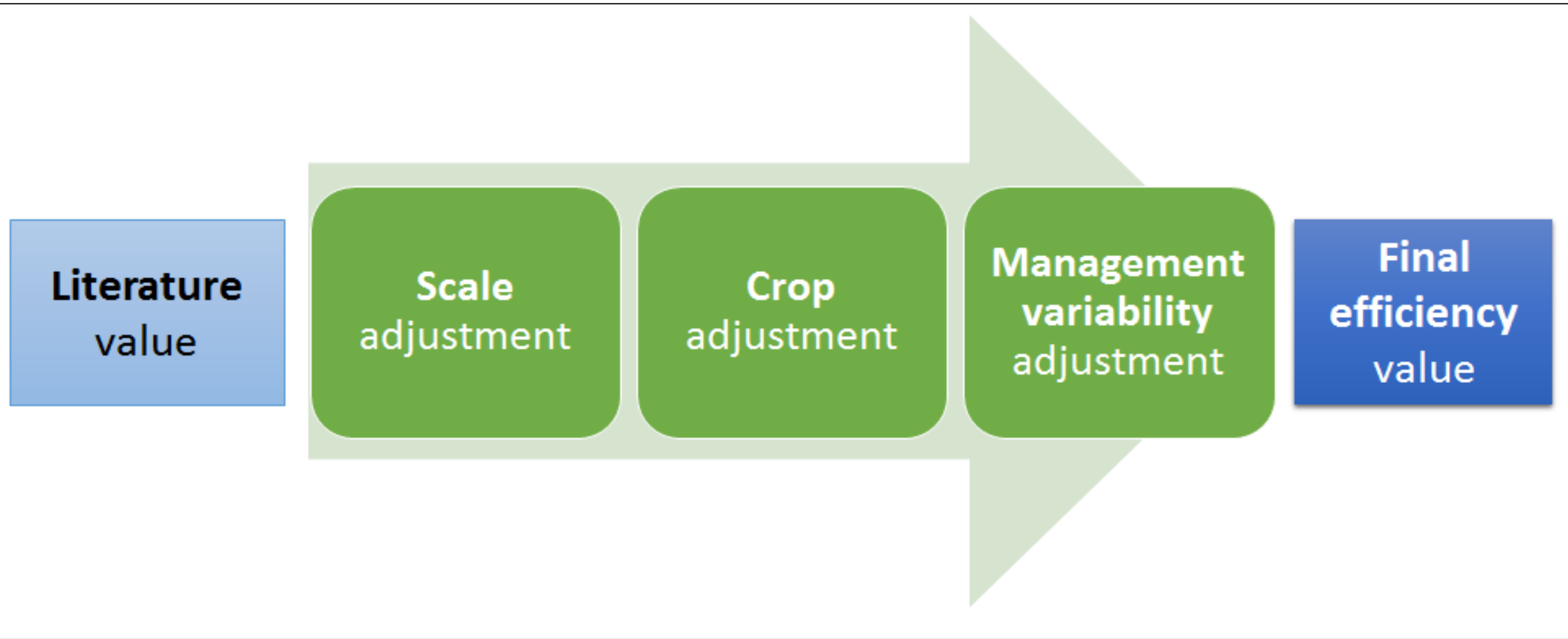
- Row w/ manure
  - HWM
  - LWM



# Ag Acres available for implementation in 2012

Tier	Fall 2014 Report	Current Report	% Change
1	92%	92%	0 - Approved
2N	92%	58%	-37%
2P	92%	66%	-28%
3N	0%	41%	N/A

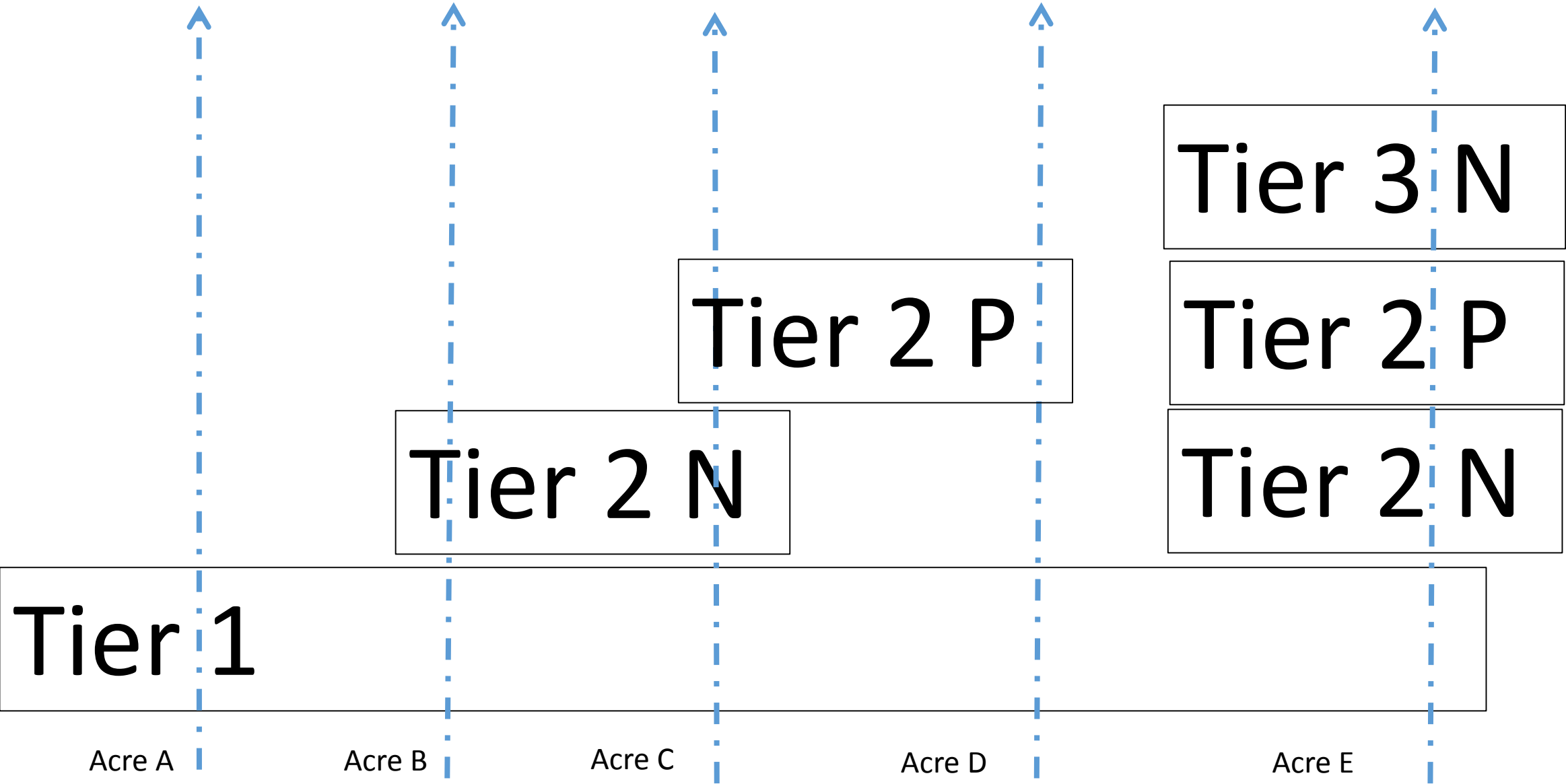
# Adjustments to literature values



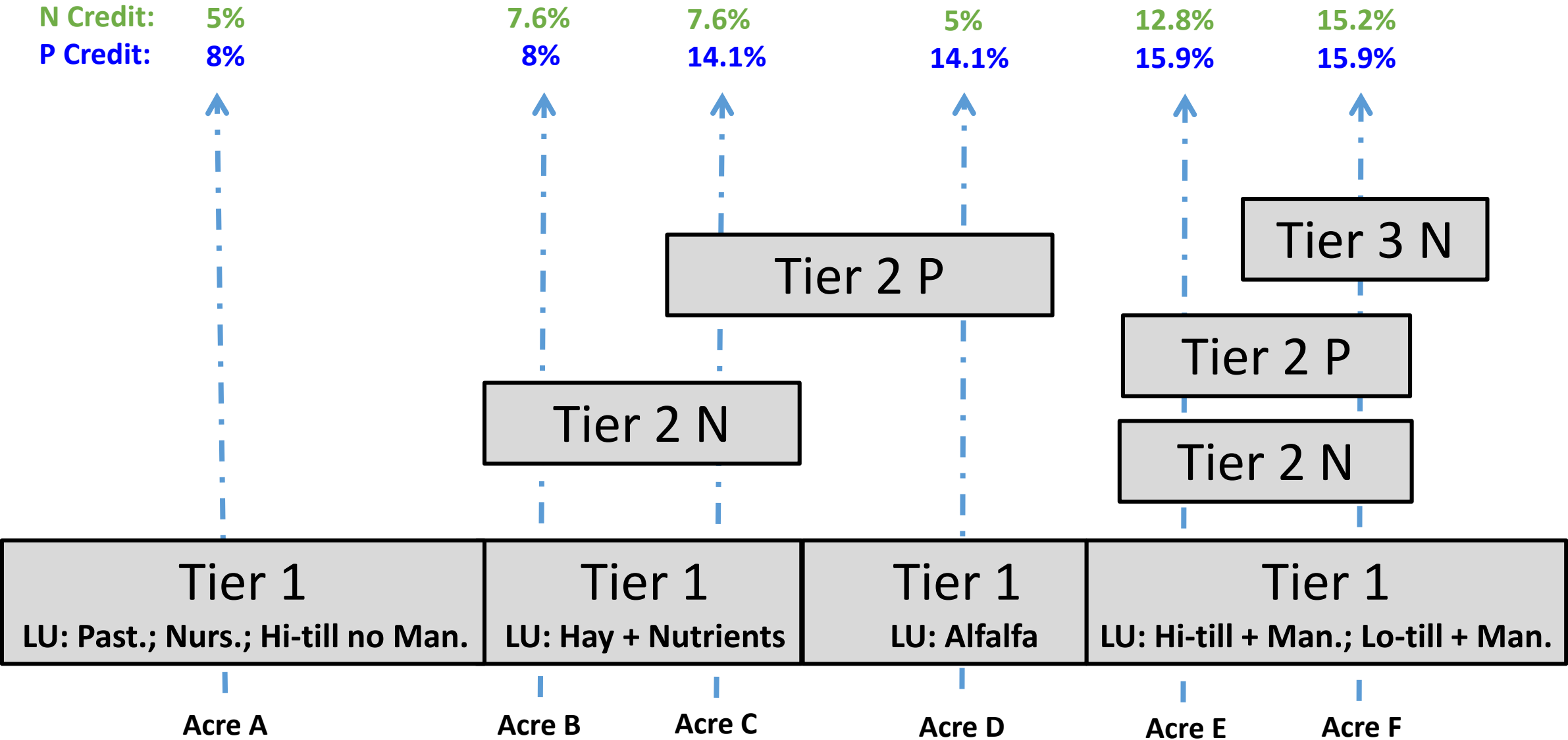
# Recommended efficiencies (max in bold)

		High-Till with Manure	Low-Till with Manure	High-Till without Manure	Pasture	Hay with Nutrients	Alfalfa	Nursery
Tier 1 Reduction from no NMP	TN	9.25	9.25	<b>5</b>	<b>5</b>	5	5	<b>5</b>
	TP	10	10	<b>8</b>	<b>8</b>	8	8	<b>8</b>
Tier 2 Reduction from no BMP	TN	12.79	12.79	N/A	N/A	<b>7.6</b>	N/A	N/A
	TP	<b>15.94</b>	<b>15.94</b>	N/A	N/A	<b>14.07</b>	<b>14.07</b>	N/A
Tier 3 Reduction from no BMP	TN	<b>15.23</b>	<b>15.23</b>	N/A	N/A	N/A	N/A	N/A

# Crediting options



# Some Likely Crediting options



# Review of Fall 2014 comments raised on Nutrient Management Phase 5 Report

# Need for increased scientific support for Tier credit

- Limited data to support manure application timing
- Limited N split application data on leaching and on total nitrogen
- Lack of justification for P site indices benefit
- Lack of data to support setbacks
- Lack of data to support fertilizer banding
- **Need for increased detail on how the literature sources were used by the panel to develop effectiveness estimates**

# Increased scientific support for Tier credit

Revised report section 3.3 explains justification for effectiveness estimates for each component of each Tier

Highlights:

- Effect of timing shifted entirely to split applications (no baseline)
- Leaching identified as sole pathway needed for credit
  - Volatilization and denitrification both only further reduced: adding implicit conservatism.
- P site index research reviewed
  - back up documentation on incorporation of manure
- Banding and Setbacks considered as implicitly contributing to conservative estimate.



# Need for increased transparency with panel process

- Include details of panel discussions and decision making in the report
- Follow BMP protocol:
  - Required elements to be included in report
  - Review and approval process

## Increased transparency with panel process

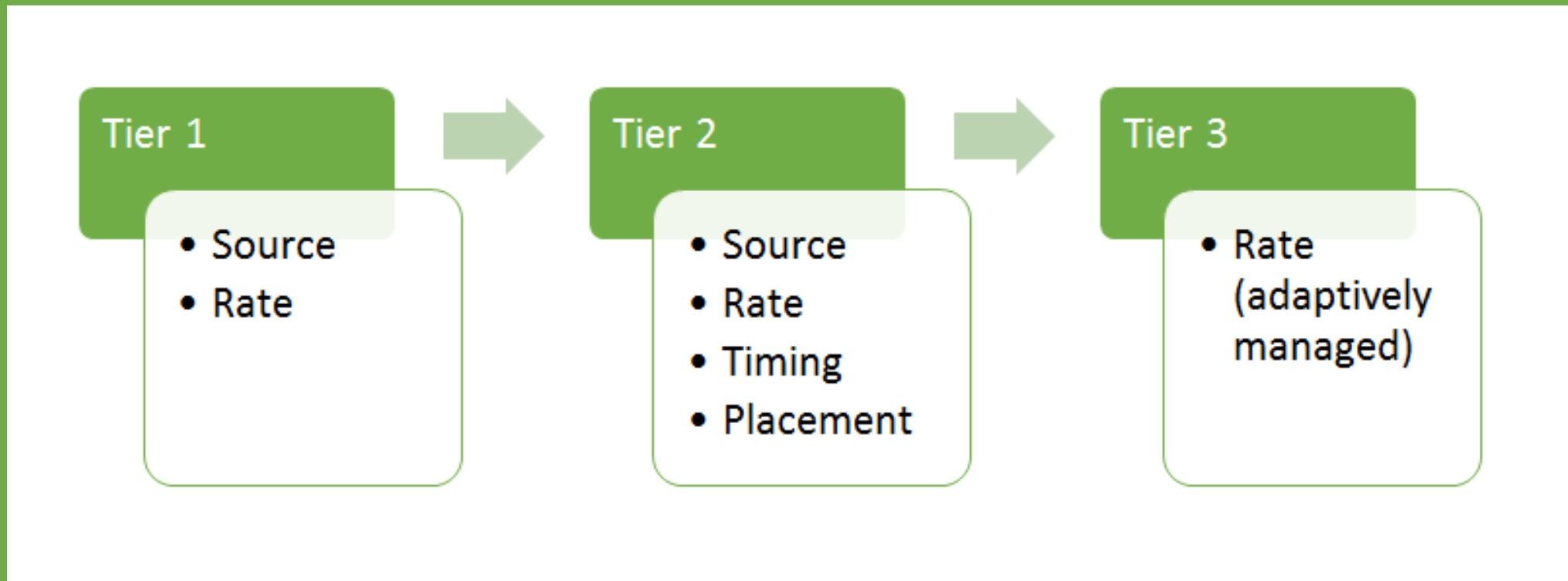
- Revised report section 3.2 explains process for developing effectiveness estimates
- 2-pager summary of panel discussions January – June 2015
- Appendix E(?): crosswalk between required components and BMP protocol
- Webinar to document process and continued concerns was performed April 6.
- Well publicized comment period to begin June 25
- Webinar for recommendation overview scheduled July 1

# Need for improved clarity of Tier definitions

- Definitions should provide clear understanding of whether an acre is under Tier 1 vs. Tier 2 management
- Describe how the 4Rs relate to each Tier

## Improved clarity of Tier definitions

- State Program review of applicability to 590 standard in development for Tier 2 credit, see next slide



**Figure 3. Diagram that shows the most relevant of the 4Rs of nutrient management as considered by the panel to influence the recommended reduction efficiencies.**

		Delaware	Maryland	New York	Pennsylvania	Virginia	West Virginia
Current regulations adopted		2007	2005 Revised 2012 Revised 2015	2004	2006	2006	2011 47CSR10 "CAFO Rule"
Regs apply to:	CAFOs	All CAFOs	All CAFOs	All medium and large CAFOs (per EPA size)	All CAOs > 8 AUs and all CAFOs > 8 AUs	CAFOs/AFOs under DEQ permit ≥300 AU	All Permitted CAFOs and unpermitted
	Other animal operations	Other animal operations ≥8 AU	Other animal operations ≥8 AU	Not a regulation, but required for producers engaged in State or Federal programs for	Tier 2 plans voluntary for non CAOs and non Tier 1 plans required for all operations	Voluntary	Voluntary Note: USDA requires a CNMP based on
	Cropland, pasture, nursery	Cropland, pasture, nursery with applications to ≥10 ac	Cropland, pasture, nursery with applications to ≥10 ac	Not a regulation, but required for producers engaged in State or Federal programs for	Plans are required to include all cropland, hay land, pasture land, and heavy use	Voluntary	Voluntary Note: USDA requires a CNMP based on
Timing (N)		Timing and method of nutrient application	(2005) Sept 1 to Nov 14 apply nutrients @	Nutrient application timings are based on	PA Nutrient Mgmt regulations require		Nutrient application timing is required by
Setbacks (P)		Prohibited from applying manure	(2012) phase in on Jan 2014 35' for all	Manure application setbacks from down-	100 foot manure application setback		Required setbacks for Permitted CAFOs.
Manure incorporation		As soon as possible after application.	(2012) phase in on Jan 2013 all organic	The NY 590 and associated tools (NY P Index, Nitrate	The PA 590 standard states that manure		Manure incorporation is
P risk assessment requirements		Phosphorus applications should be consistent with the rates recommended based on the soil test and/or the P Site Index	(2005) The PSI must be completed on all sites with soil fertility index value above 150.	The NY P Index is run in its entirety on every field.	The PA Phosphorus Index (PI) is broken into two sections, Part A and Part B. Part A is used to identify those	If soil P saturation is >65%, P application is not permitted. Otherwise, soil test P, P-Environmental	Once phosphorus levels exceed 120 lbs per acre, no phosphorus applications will be made unless the
Source of technical standards		<a href="#">DE NRCS 590 standard</a>	<a href="#">Maryland Nutrient Management Manual</a>	<a href="#">NY NRCS 590</a>	<a href="#">Pennsylvania Nutrient Management</a> <a href="#">Pennsylvania's Manure</a>	<a href="#">Virginia Nutrient Management Standards and Criteria</a>	<a href="#">Technical Standards For West Virginia CAFO Nutrient Management</a>

# Need for additional detail on tracking/reporting

- Concern about increasing nutrient reductions due to accounting change rather than change on the ground
  - Document when states adopted Tier 2 plans
- Increased detail about the records/data needed to substantiate the reported implementation for each Tier
- Consideration of CEAP report information about level of nutrient management occurring in CBW

# Tracking issues

- NM has historically been tracked and reported to the CBPO on a farm acreage level (i.e. total acres of NMPs).
- This is the same tracking criteria for tier 2 plans, but the magnitude of recorded data about the 4Rs has become much more rigorous.
  - Manure testing for source information
  - Calibration records for the fertilization equipment, if owned
  - Contracts for nutrient services
  - Field or sub field level records of rates for each season
  - Field or sub field level records of timing for each fertilization
  - Field or sub field level records of method for each fertilization
- CEAP was not considered in more detail than the Fall 2014 report.

# Verification

- Concerns about crediting Tier 2 NM now and then possibly having to remove some or all of the credit in the future when states have adopted verification protocols
- Concerns about increasing credit for NM before verification protocols are adopted
- Recommend that verification be a requirement for states to claim Tier 2 credit



# Verification

- Revised report: section 6
- Non-visual BMPs are difficult to verify and we need to primarily rely on the NMP's and on-farm documentation.
- The jurisdictions are currently developing BMP verification protocols which will identify the methods for verifying NM to implement in Jan 2018.
- Enabling the tracking and reporting of detailed management actions on specific fields or subfields will require retooling of the current partnership framework, as well as inspection and verification procedures.
- The panel recommends criteria for crediting acres to the tier and sub-tier (N vs. P), but adoption and reporting will be a new and unprecedented challenge for the partnership to address.

# Other comments

- Concern about double counting manure incorporation as part of NM and as a separate BMP
- Explain how reduction efficiencies can apply to the row crop land use when not all crops receive manure
- How do the panel recommendations account for evidence of increases in manure and fertilizer applications?

## Phase 5

Nutrient Application  
Management INCLUDES  
manure incorporation

## Phase 6

Nutrient Application  
Management

Manure Injection/  
Incorporation

## Tier 1

- Row w/ manure
  - HWM
  - LWM
- Specialty row crops (HOM)
- Pasture (PAS)
- Nursery (NUR)
- Hay w/ nutrients (HYW)
- Alfalfa (ALF)

## Tier 2N

- Row w/ manure
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- Hay w/ nutrients (HYW)

## Tier2P

- Row w/ manure
  - HWM
  - LWM
- Hay w/ nutrients (HYW)
- Alfalfa (ALF)

## Tier 3

- Row w/ manure
  - HWM
  - LWM

# Nutrient Management Phase 5

## Panel Report Next Steps

# Timeline

- June 25: Report posted – 20 day Partnership review and comment period **begins**
- July 1: Webinar briefing on report content
- July 16 AgWG call: AgWG discusses report – comment period **closes**
- Late July: Panel responds to comments
- Aug 10: Revised report and response to comments posted 10 days in advance of 8/20 AgWG call
- Early August: Tentative 3<sup>rd</sup> webinar to review 1) panel response to comments, and 2) any changes made to the report
- August 20 AgWG call: Tentative date for AgWG approval

# Partnership Review & Comment Period

- **June 25 - July 16, 2015**
- Opportunity for Advisory Committees and other interested groups to comment
- Submit comments to [broshc@vt.edu](mailto:broshc@vt.edu) with CC to [mdubin@chesapeakebay.net](mailto:mdubin@chesapeakebay.net) and [egiese@chesapeakebay.net](mailto:egiese@chesapeakebay.net).
- Comments should be provided in track changes format to the extent possible, other written comments should reference the applicable section(s) of the report

# Response to Comments

- Per WQGIT BMP protocol:
- The Panel will develop a “response to comments”, which will be included as an appendix to the final report.
- Specific response will **not** be provided for:
  - Overlapping comments (one response will be provided)
  - Comments outside the scope of the Panel or demonstrate no relevancy to the report’s findings
  - Editorial changes, such as grammatical edits



# Webinar details

Briefing on Phase 5 Nutrient Management Panel Report

**July 1, 2015**

**10:00AM-12:00PM**

Event website: <http://www.chesapeakebay.net/calendar/event/22716/>

Open invitation to all interested stakeholders – **please share**