

The Charge Presented to the Phase 6 Nutrient Management Expert Panel

General Scope

Define and configure the nutrient management (NM) BMPs in the Phase 6 model.

Specific Charges

1. Review the Phase 5.3.2 definitions and effectiveness estimates and evaluate the “Tier System” for identifying NM BMP implementation.
2. Determine how NM BMPs can be applied to the new Phase 6 land uses with a focus on nutrient mass balance and nutrient spreading routines.
3. Make recommendations to account for soil residual nutrients and how soil residual nutrient concentrations should be credited to annual crop nutrient requirements.
4. Collaborate with the Cropland Irrigation Management Expert Panel on fertigation effectiveness and accounting practices.
5. Address NM reduction efficiencies for nitrogen (N) and phosphorus (P).

Phase 6 Nutrient Management Expert Panel

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Phase 6 Nutrient Management Expert Panel: Summary Conclusions

1. Nitrogen (N) and phosphorus (P) assessments are handled similarly but separately.
2. Historical base-line conditions (i.e.1985) are used as a uniform reference point for pre-BMP, non-nutrient management conditions.
3. Core Nutrient Management BMP efficiency factors for N and P are based on state LGU recommendations, as modified by CBP state partners, and represent land-use and cropping system specific N and P application rates.
4. Core Nutrient Management BMP efficiency factors for N and P modify the nutrient application rate goals.
5. Supplemental Nutrient Management BMP efficiencies for rate, timing and placement of N and P are additive to the Core Nutrient Management BMP efficiencies for N and P, but can not be applied without application of the Core BMPs.
6. Supplemental Nutrient Management BMP efficiency factors modify the edge of field nutrient loss to the receiving stream.
7. All BMP efficiency values (n=130) for N and P are numeric variables that have been defined by the Nutrient Management Expert Panel.
8. County-level redistribution of CBW N fertilizer sales data should be used as an independent cross-reference for and validation of the modified LGU recommendation based N application rate goals.
9. LGU recommendations for P application are based on soil-test P concentration. Soil P concentration data are not available to CBP but should be collected and utilized in the future. In the absence soil-test P based application rate goals, county-level redistribution of CBW P fertilizer sales data may serve as a surrogate.

Phase 6 Nutrient Management BMPs

Core Nutrient Management BMPs

Nitrogen Core Nutrient Management BMP

Phosphorus Core Nutrient Management BMP

Supplemental Nutrient Management BMPs

Nitrogen Rate Supplemental Nutrient Management BMP

Nitrogen Placement Supplemental Nutrient Management BMP

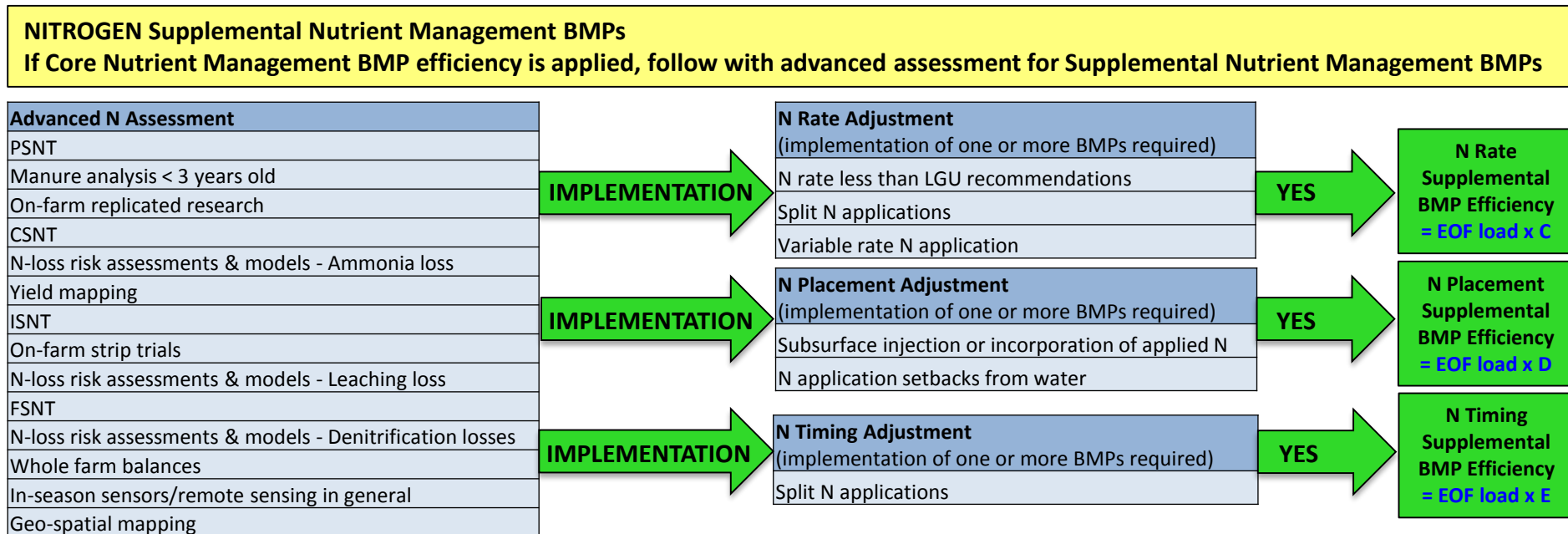
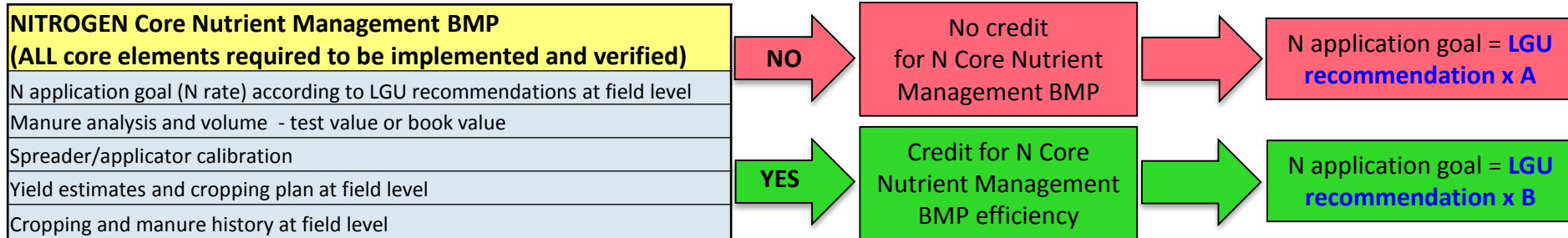
Nitrogen Timing Supplemental Nutrient Management BMP

Phosphorus Rate Supplemental Nutrient Management BMP

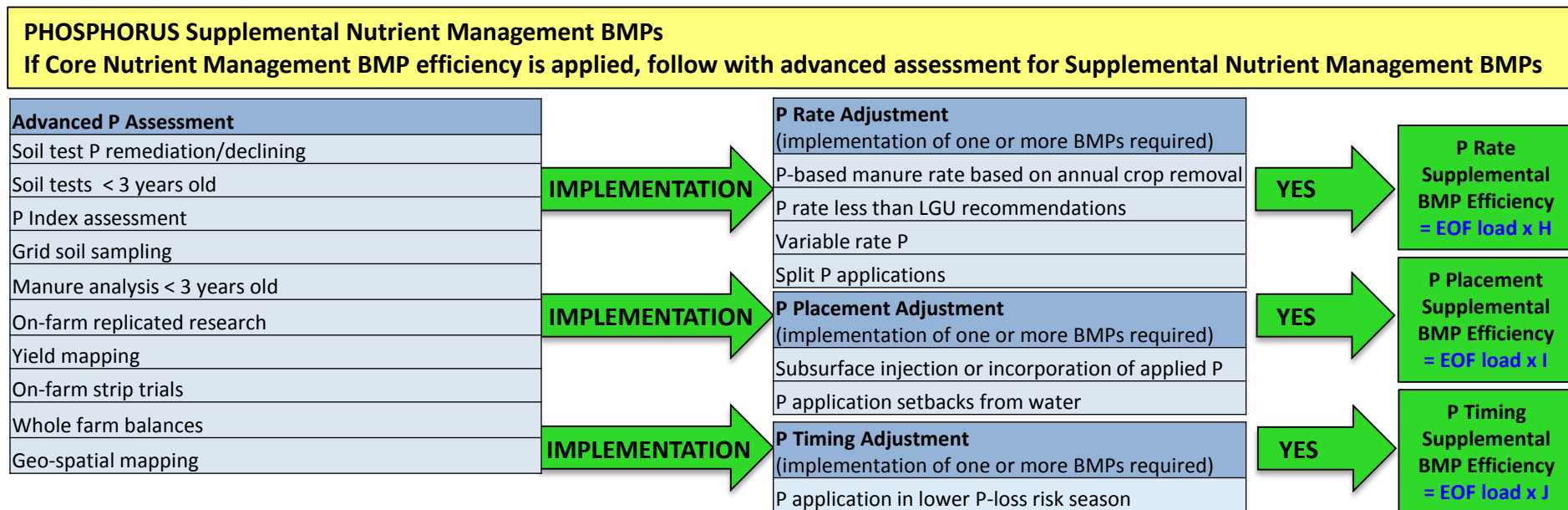
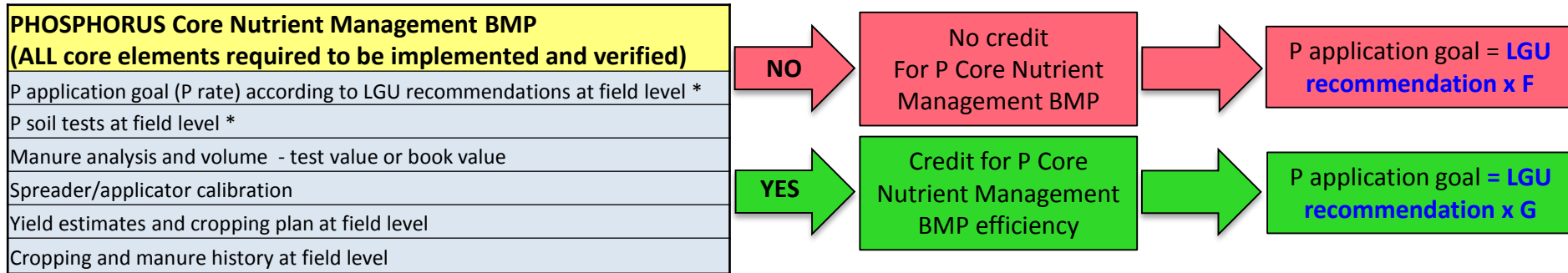
Phosphorus Placement Supplemental Nutrient Management BMP

Phosphorus Timing Supplemental Nutrient Management BMP

Nitrogen Nutrient Management BMP Efficiency Factors



Phosphorus Nutrient Management BMP Efficiency Factors



* Some site-specific exceptions apply, as defined in the NM Panel draft report

Nutrient Management BMP Efficiency Values – draft version #4, 07-19-2016

| Nutrient Management BMP | BMP Efficiency Variable | Action of BMP | How the math works |
|---|-------------------------|---|---|
| Nitrogen Core Non-Nutrient Management BMP efficiency | A | modifies N application rate goal on the nutrient input side | efficiency is multiplied by the LGU N application rate goal |
| Nitrogen Core Nutrient Management BMP efficiency | B | modifies N application rate goal on the nutrient input side | efficiency is multiplied by the LGU N application rate goal |
| Nitrogen Rate Supplemental BMP efficiency | C | modifies edge of field N loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field N load |
| Nitrogen Placement Supplemental BMP efficiency | D | modifies edge of field N loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field N load |
| Nitrogen Timing Supplemental BMP efficiency | E | modifies edge of field N loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field N load |
| | | | |
| Phosphorus Core Non-Nutrient Management BMP efficiency | F | modifies P application rate goal on the nutrient input side | efficiency is multiplied by the LGU P application rate goal |
| Phosphorus Core Nutrient Management BMP efficiency | G | modifies P application rate goal on the nutrient input side | efficiency is multiplied by the LGU P application rate goal |
| Phosphorus Rate Supplemental BMP efficiency | H | modifies edge of field P loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field P load |
| Phosphorus Placement Supplemental BMP efficiency | I | modifies edge of field P loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field P load |
| Phosphorus Timing Supplemental BMP efficiency | J | modifies edge of field P loss to the stream on the outflow side | efficiency is multiplied by the calculated edge of field P load |

Development of Phase 6 Nutrient Management BMP Efficiency Values

- Nutrient management practices are implemented at either the field or sub-field level.
- The diverse landforms, hydrology, climate and cropping systems of the agricultural landscapes in the CBW have a multitude of impacts on biogeochemical transformations of N and P.
- Changes in hydrological pathways alone can have dramatic effects on nutrient loads to streams when viewed from the Atlantic Coastal Plain to the Appalachian Plateau.
- Site-specific physical conditions and management factors have a strong influence on the effectiveness of imposed conservation practices.
- Nutrient management BMP effectiveness must represent the average condition over a wide range of real-world scenarios.
- It was essential to distill numerous lines of evidence to arrive at a single efficiency value for each of the N and P BMPs that could be applied equitably across the CBW.

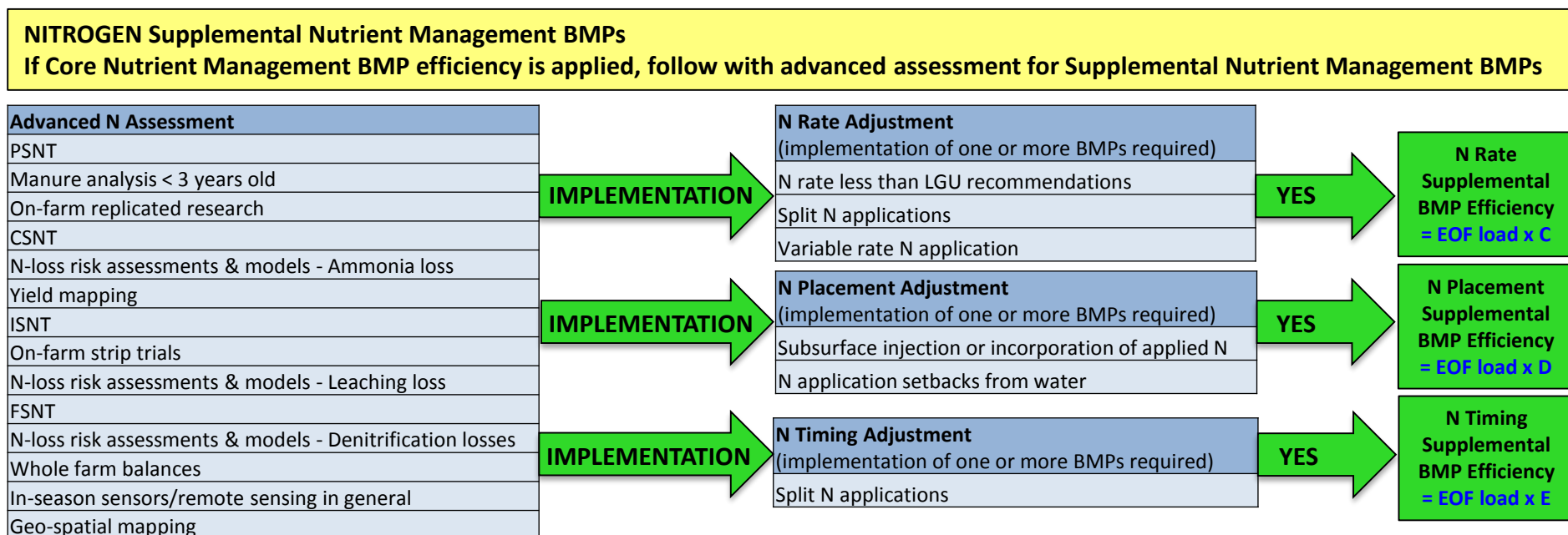
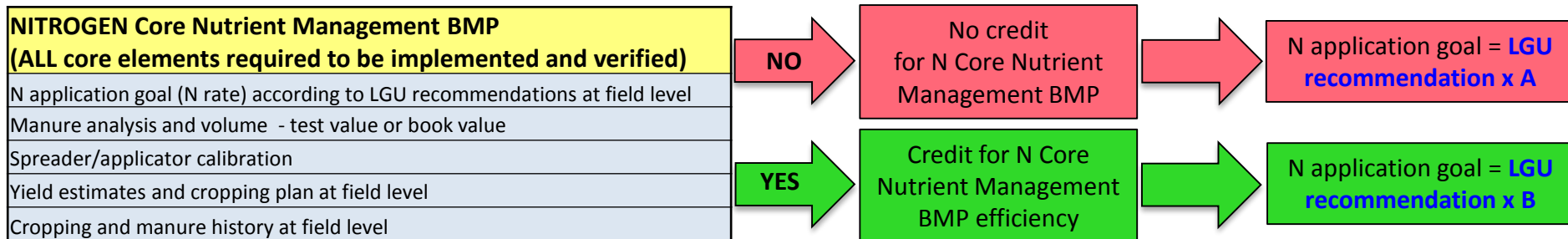
Development of Phase 6 Nutrient Management BMP Efficiency Values

Efficiency factors for the Core NM BMPs and the NM Supplemental BMPs represent:

1. A collection of required elements, or
2. The impact of numerous applicable on-site management practices.

In order to develop broadly pertinent NM BMP efficiency factors, multiple sources of information and data were necessarily synthesized.

Nitrogen Nutrient Management BMP Efficiency Factors



Nutrient Management BMP Efficiency Values

| Nutrient Management BMP | BMP Efficiency Variable | Full Season Soybeans | Grain w/ Manure | Grain w/o Manure | Legume Hay | Silage w/ Manure | Silage w/o Manure | Small Grains and Grains | Small Grains and Soybeans | Specialty Crop High | Specialty Crop Low | Other Agronomic Crops | Other Hay | Pasture |
|---|-------------------------|----------------------|-----------------|------------------|------------|------------------|-------------------|-------------------------|---------------------------|---------------------|--------------------|-----------------------|-----------|---------|
| Nitrogen Core Non-Nutrient Management BMP efficiency | A | 1.20 | 1.30 | 1.20 | 1.20 | 1.40 | 1.20 | 1.20 | 1.20 | 1.30 | 1.20 | 1.10 | 1.00 | 1.00 |
| Nitrogen Core Nutrient Management BMP efficiency | B | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Nitrogen Rate Supplemental BMP efficiency | C | 1.00 | 0.85 | 0.95 | 1.00 | 0.85 | 0.95 | 0.95 | 0.95 | 0.85 | 0.95 | 0.95 | 1.00 | 1.00 |
| Nitrogen Placement Supplemental BMP efficiency | D | 1.00 | 0.95 | 0.97 | 1.00 | 0.95 | 0.97 | 0.97 | 0.97 | 0.95 | 0.97 | 0.97 | 1.00 | 1.00 |
| Nitrogen Timing Supplemental BMP efficiency | E | 1.00 | 0.90 | 0.95 | 1.00 | 0.90 | 0.95 | 0.90 | 0.90 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| | | | | | | | | | | | | | | |
| Phosphorus Core Non-Nutrient Management BMP efficiency | F | 1.50 | 3.00 | 1.50 | 1.00 | 3.00 | 1.50 | 1.50 | 1.50 | 2.00 | 2.00 | 1.50 | 1.00 | 1.00 |
| Phosphorus Core Nutrient Management BMP efficiency | G | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Phosphorus Rate Supplemental BMP efficiency | H | 0.95 | 0.90 | 0.95 | 0.99 | 0.90 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 |
| Phosphorus Placement Supplemental BMP efficiency | I | 0.90 | 0.80 | 0.90 | 0.90 | 0.80 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 1.00 | 1.00 |
| Phosphorus Timing Supplemental BMP efficiency | J | 0.99 | 0.80 | 0.99 | 0.99 | 0.80 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 |

