Phase 6 Nutrient Management Expert Panel

CBP Agriculture Workgroup

February 18th, 2016

Chair: Frank Coale

Core Nutrient Management Practices
Assumes implementation and verified

- Method of determining **nutrient application rates** based on contemporary LGU guidelines for **rate and timing** at the **field level**
  - Soil tests for P – field level
  - Manure analysis and volume – test or book value
  - Spreader/applicator calibration
  - Yield estimates and cropping plan – field level
  - Cropping and manure history – field level
- Consequence of implementation of these practices: **Neutral**
- No positive efficiency credits and no negative efficiency in the Chesapeake Bay models. This assumes that credit for core nutrient management is built into the Phase 6 model baseline, adjusted by year.
- Reported as a percent of acres per county.

Core Nutrient Management Practices
Not implemented or reported

- Consequence: **Negative** performance efficiency in the Chesapeake Bay models.
- Non-nutrient management acres will be down-graded from the assumed baseline neutral condition.
- BMP efficiency credits for supplemental nutrient management practices may not be applied to non-nutrient management acres.
- Reported as a percent of acres per county.

Supplemental Nutrient Management BMP Menu (n=42)

- <u>BMPs evaluated for Phase 5.3.2</u>
  - PSNT
  - CSNT
  - FSNT
  - ISNT
  - Variable rate N
  - Soil tests and manure analysis no more than 3 years old
  - Split applications
    - Timing
    - Side dressing
  - Placement options for fertilizers and manures
  - Manure export
  - Cover crop – link back to Cover Crops panel
  - Conservation tillage – link back to Conservation Tillage Panel
    - Residual Biomass management – link to CTP and MIIP
  - Field buffers – link back to Forest Buffer Panel

Supplemental Nutrient Management BMP Menu (n=42)

- <u>Practices to be evaluated for Phase 6</u>
  - Variable rate P
  - P-based manure rate based on crop removal
  - Split applications – Fertigation – link back to Cropland Irrigation panel
  - Source material options – alternative fertilizers and additives
    - Manure- Link to Manure Technology Panel
    - Fertilizer
  - Soil test P remediation/declining
  - Zero P application
  - Irrigation management – link to Cropland Irrigation panel
  - Controlled drainage – linked to Tier 3 Priority Panel
    - Drainage ditch filters
  - Grid soil sampling
  - In-season sensors/remote sensing in general
  - Yield mapping
  - On-farm replicable trials/data
    - Strip-trials
  - Geo-spatial mapping
  - Whole farm balances
  - P-loss risk assessments
    - Particulate P loss pathways
    - Dissolved P loss pathways
    - Source P losses
    - Soil P saturation
  - N-loss risk assessments, including Nitrogen rate models
    - Ammonia loss
    - Denitrification
    - Leaching
  - Nutrient application setbacks

Deferred BMPs (n=8)

Cover crops	Cover Crop Expert Panel
Conservation tillage	Conservation Tillage Expert Panel
Field buffers	Forest Buffer Expert Panel
Split applications – Fertigation	Cropland irrigation Expert Panel
Source material options – manures	Manure Treatment Technoloties Expert Panel
Source material options – fertilizers	Fertilizer Treatment & Addiitve Expert Panel
Irrigation management	Cropland Irrigatioin Expert Panel
Controlled drainage	Controlled Drainage Expert Panel

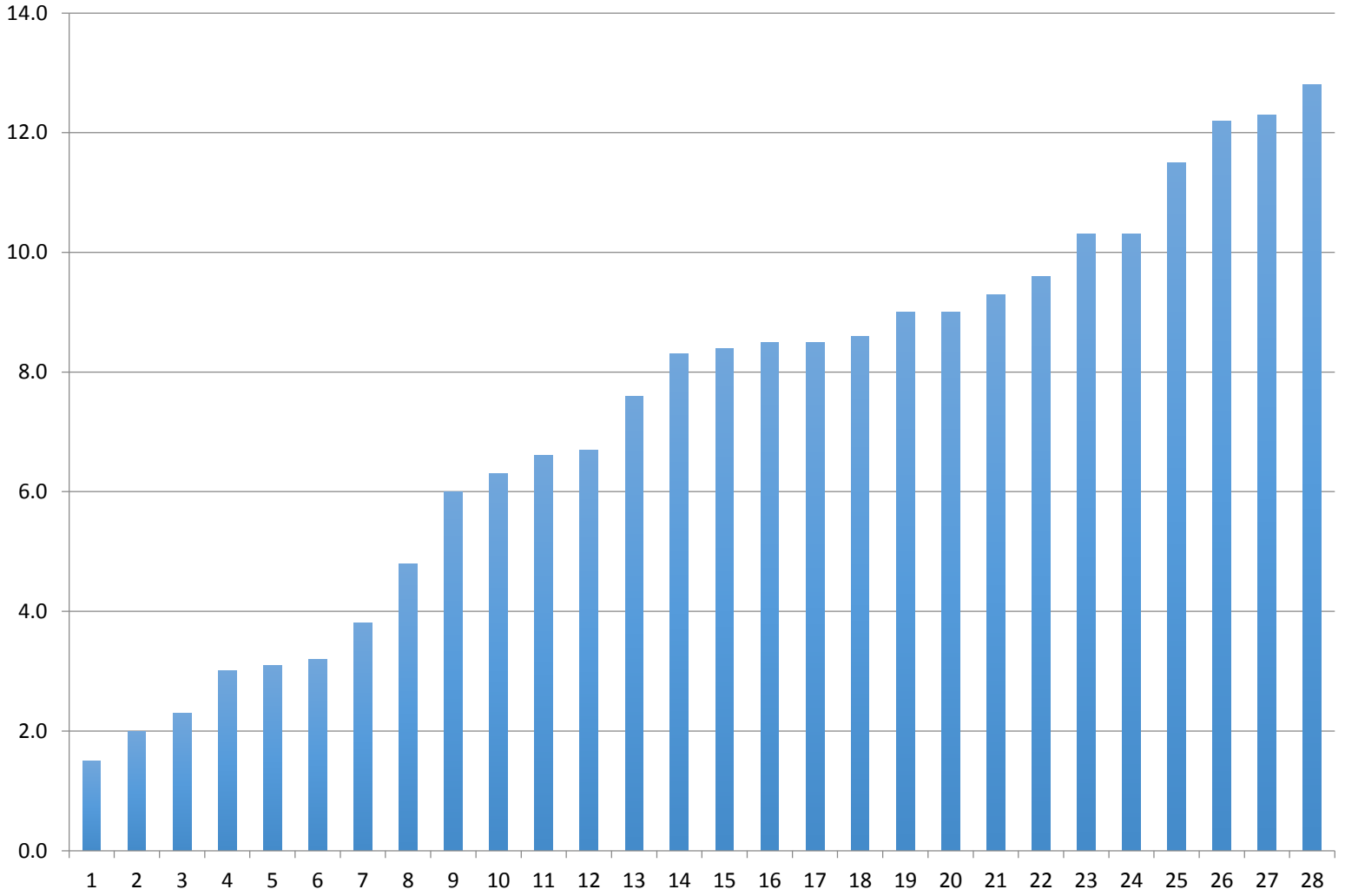
Classification of 28 Supplemental BMPs across 13 P6 land use categories
BMP efficiency applies to N or P

P6 Land Use Category (n=13) ==>	Full Season Soybeans	Full Season Soybeans	Grain w/ Manure	Grain w/ Manure	Grain w/o Manure	Grain w/o Manure	Legume Hay	Legume Hay
N BMP or P BMP ==>	**N**	**P**	**N**	**P**	**N**	**P**	**N**	**P**
PSNT			N		N			
CSNT			N		N			
FSNT								
ISNT			N		N			
Variable rate N			N		N			
Manure analysis < 3 years old		P	N	P			N	P
Soil tests < 3 years old		P		P		P		P
Split applications			N		N			
Placement options for fertilizers and manures	N	P	N	P	N	P	N	P
Variable rate P		P		P		P		P
P-based manure rate based on crop removal		P		P				P
Soil test P remediation/declining		P		P		P		P
Zero P application		P		P		P		P
Grid soil sampling		P		P		P		P
In-season sensors/remote sensing in general			N		N			
Yield mapping		P	N	P	N	P		P
On-farm replicated research		P	N	P	N	P		P
On-farm strip trials		P	N	P	N	P		P
Geo-spatial mapping		P	N	P	N	P		P
Whole farm balances	N	P	N	P	N	P	N	P
P-loss risk assessments - Particulate P loss		P		P		P		P
P-loss risk assessments - Dissolved P loss		P		P		P		P
P-loss risk assessments - Source P losses		P		P		P		P
P-loss risk assessments - Soil P saturation		P		P		P		P
N-loss risk assessments & models - Ammonia loss	N		N		N		N	
N-loss risk assessments & models - Denitrification losses	N		N		N		N	
N-loss risk assessments & models - Leaching losses	N		N		N		N	
Nutrient application setbacks	N	P	N	P	N	P	N	P

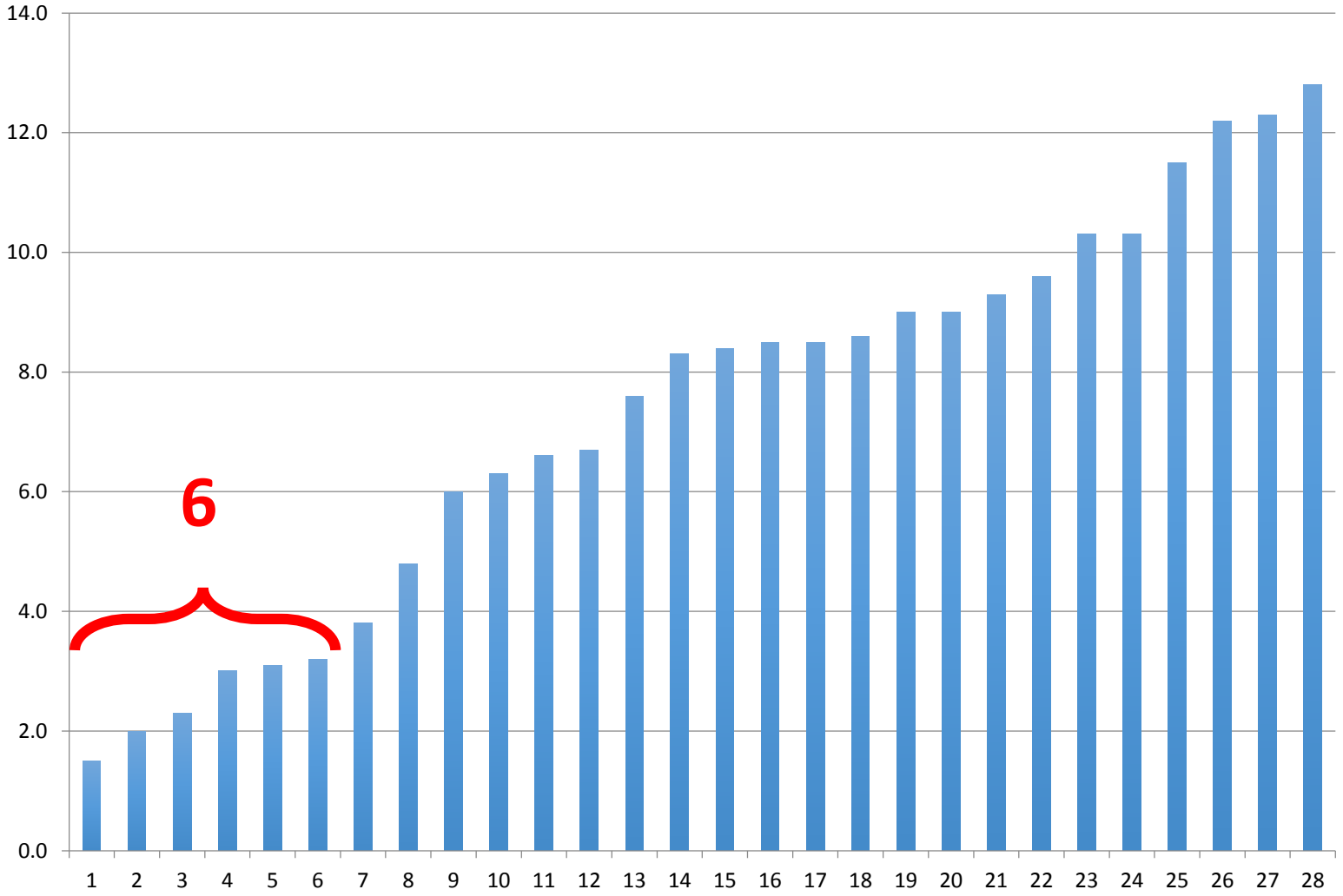
Prioritization and ranking of 28 BMPs

	Average Priority	Ranking
Soil test P remediation/declining	1.5	1
Split applications	2.0	2
Soil tests < 3 years old	2.3	3
Zero P application	3.0	4
P-based manure rate based on crop removal	3.1	5
PSNT	3.2	6
Placement options for fertilizers and manures	3.8	7
Nutrient application setbacks	4.8	8
Variable rate N	6.0	9
Manure analysis < 3 years old	6.3	10
On-farm replicated research	6.6	11
CSNT	6.7	12
P-loss risk assessments - Particulate P loss	7.6	13
N-loss risk assessments & models - Ammonia loss	8.3	14
Yield mapping	8.4	15
ISNT	8.5	16
Variable rate P	8.5	17
On-farm strip trials	8.6	18
P-loss risk assessments - Soil P saturation	9.0	19
N-loss risk assessments & models - Leaching loss	9.0	20
FSNT	9.3	21
P-loss risk assessments - Dissolved P loss	9.6	22
P-loss risk assessments - Source P losses	10.3	23
N-loss risk assessments & models - Denitrification losses	10.3	24
Whole farm balances	11.5	25
In-season sensors/remote sensing in general	12.2	26
Geo-spatial mapping	12.3	27
Grid soil sampling	12.8	28

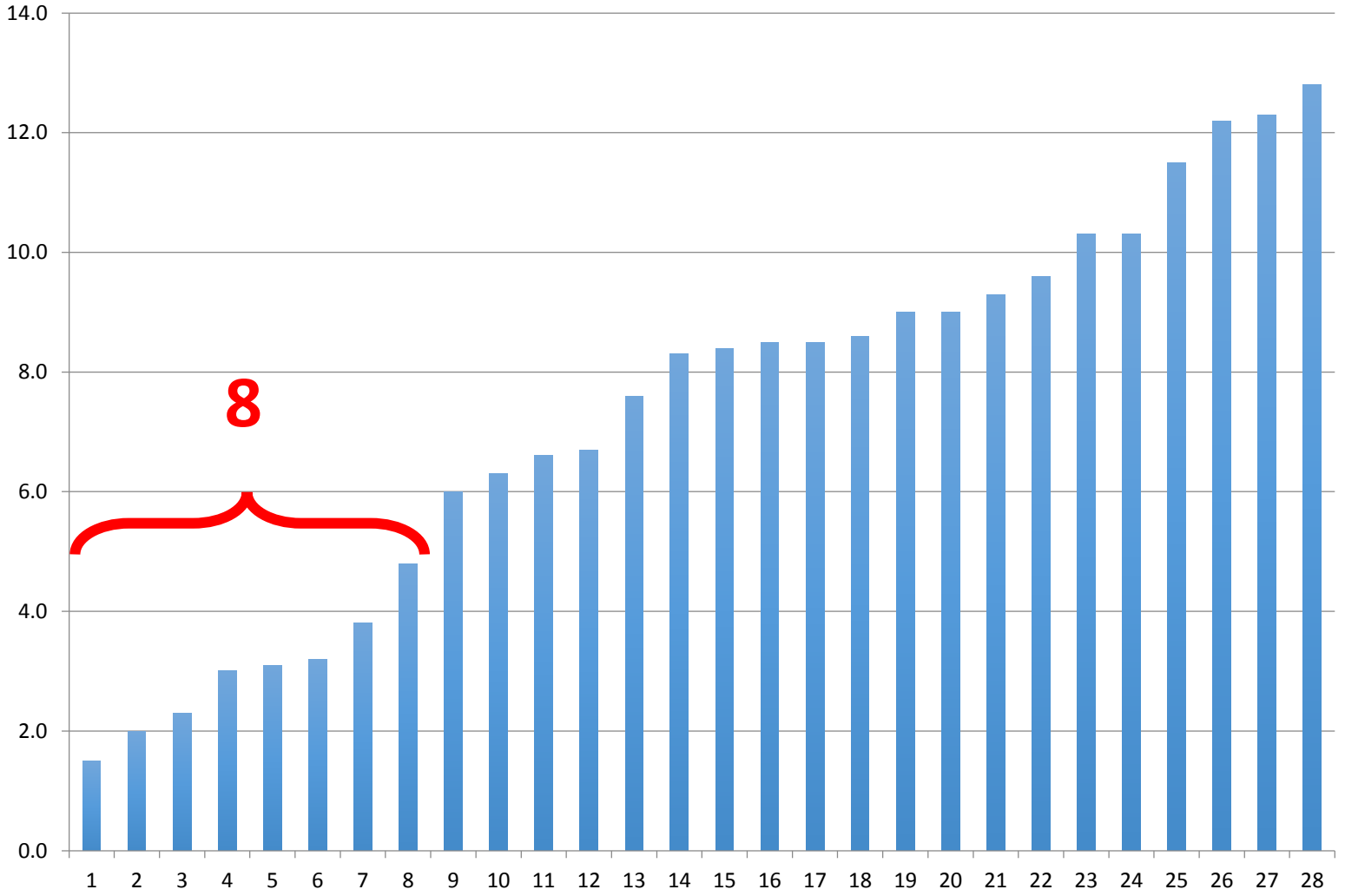
Prioritization/ranking of 28 BMPs



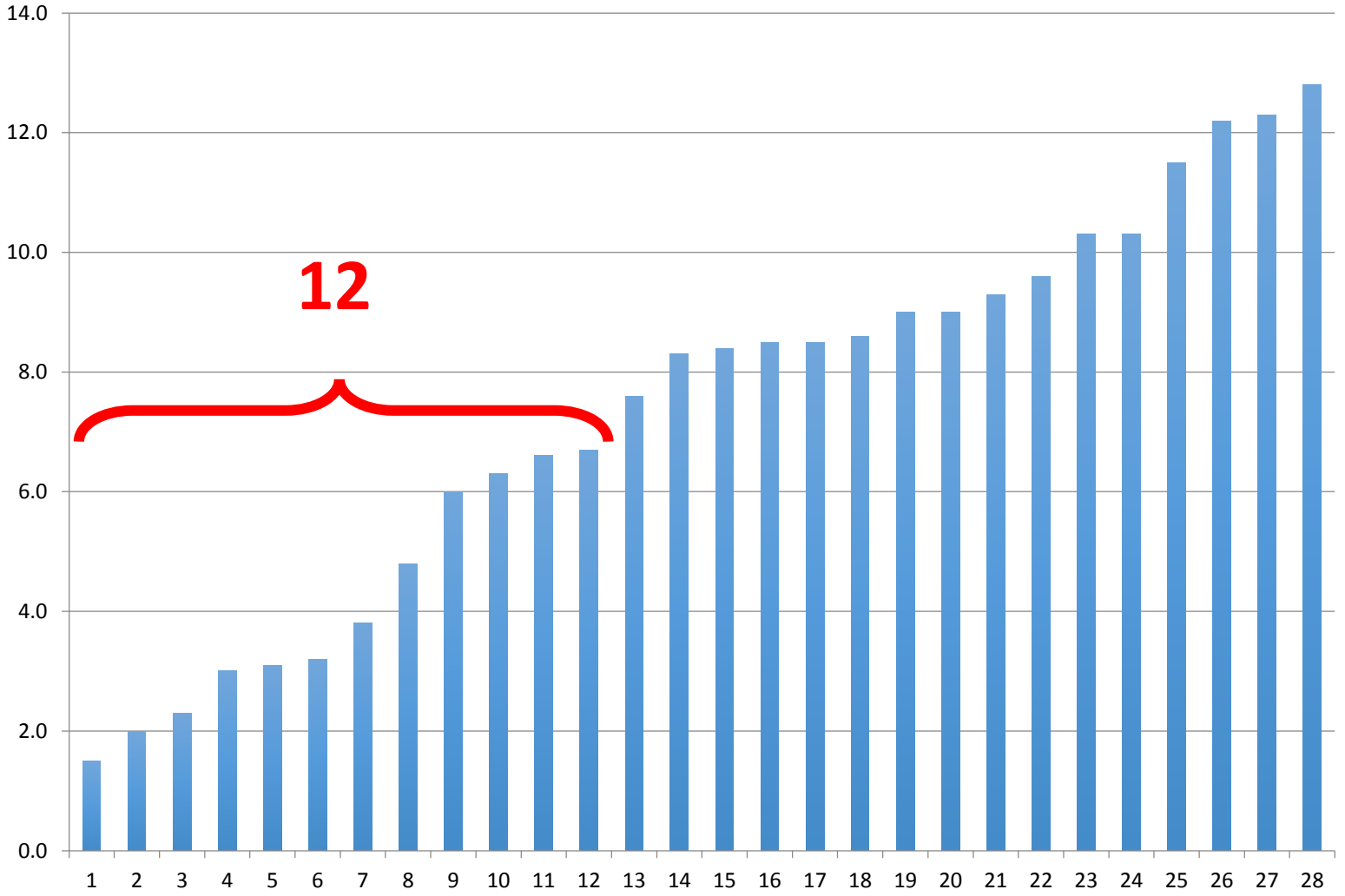
Prioritization/ranking of 28 BMPs



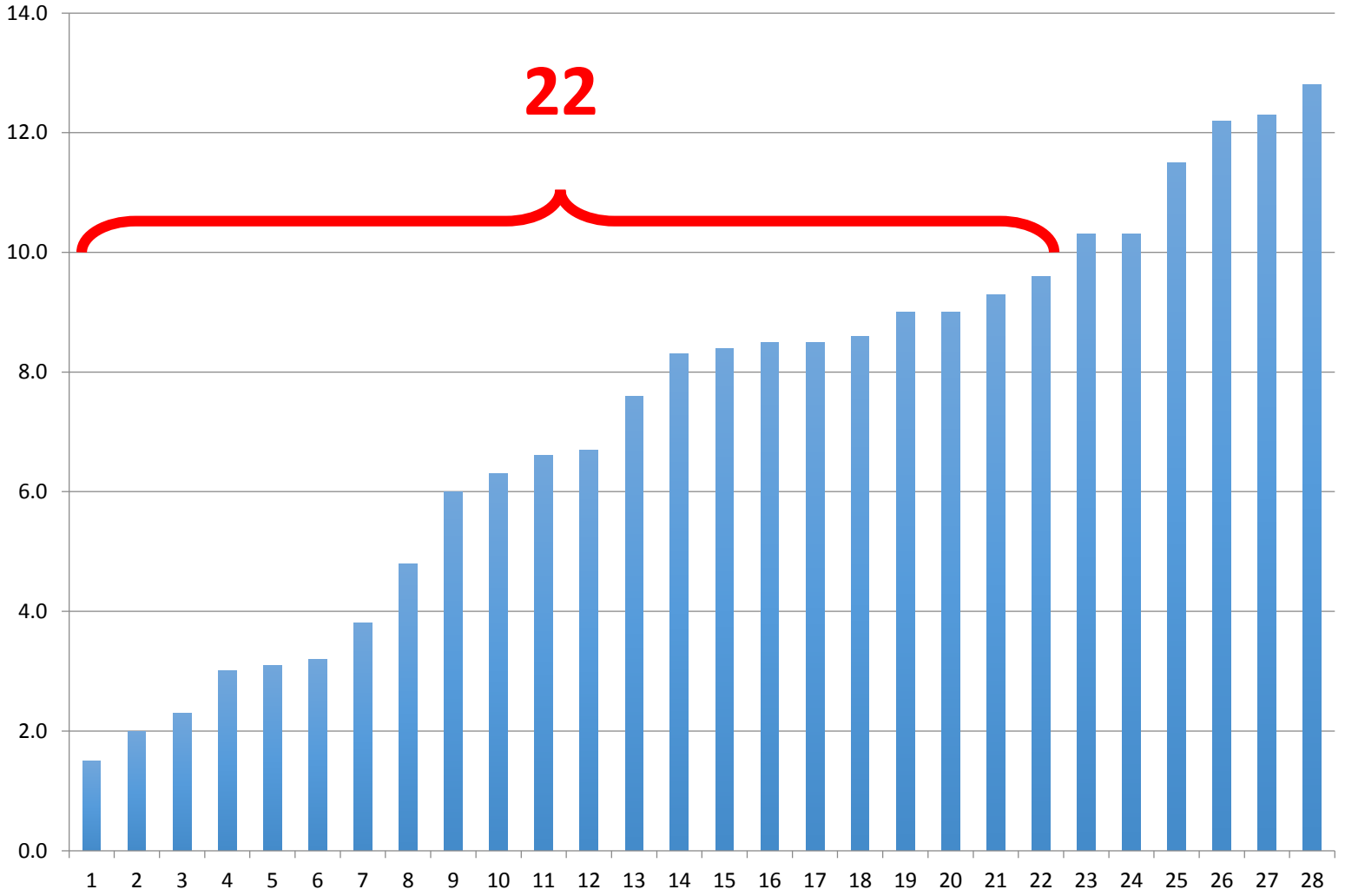
Prioritization/ranking of 28 BMPs



Prioritization/ranking of 28 BMPs



Prioritization/ranking of 28 BMPs



Next Steps

- Grouping prioritized specific BMPs into implementation categories
- Developing efficiency values
- Next conference call: February 24th