United States Department of Agriculture
Natural Resources Conservation Service

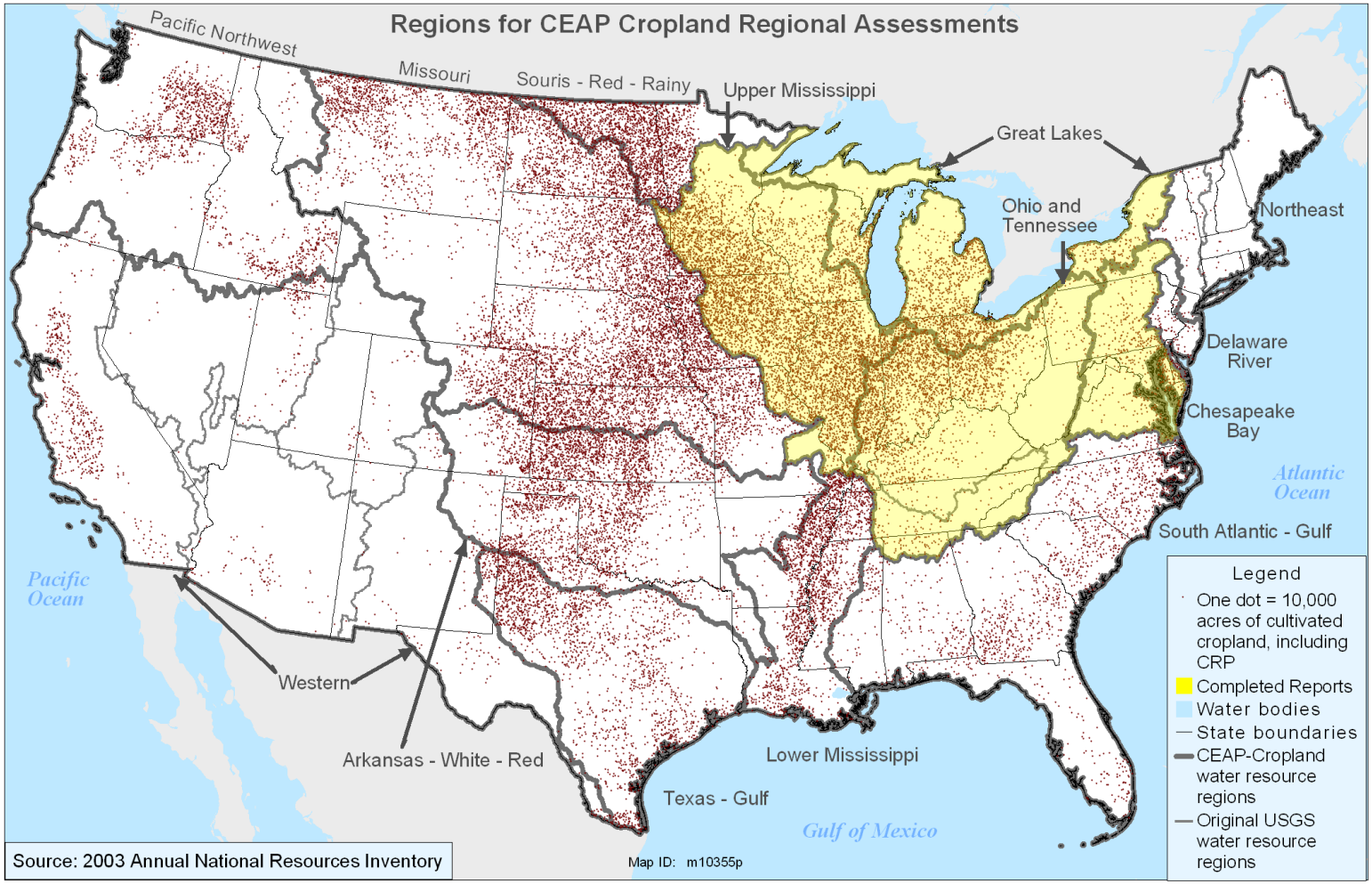
USDA NRCS

CEAP—Conservation Effects Assessment Project

The effects of conservation practices on sediment and nutrient losses from farm fields

Robert Kellogg, USDA/NRCS

Cropland Regional Assessments



What the CEAP reports address

1. Evaluation of practices in use in 2003-2006
2. Effects of conservation practices in use in 2003-2006
3. Estimates of conservation treatment needs
4. Potential gains with additional conservation treatment
   - Soil erosion control
   - Nutrient management

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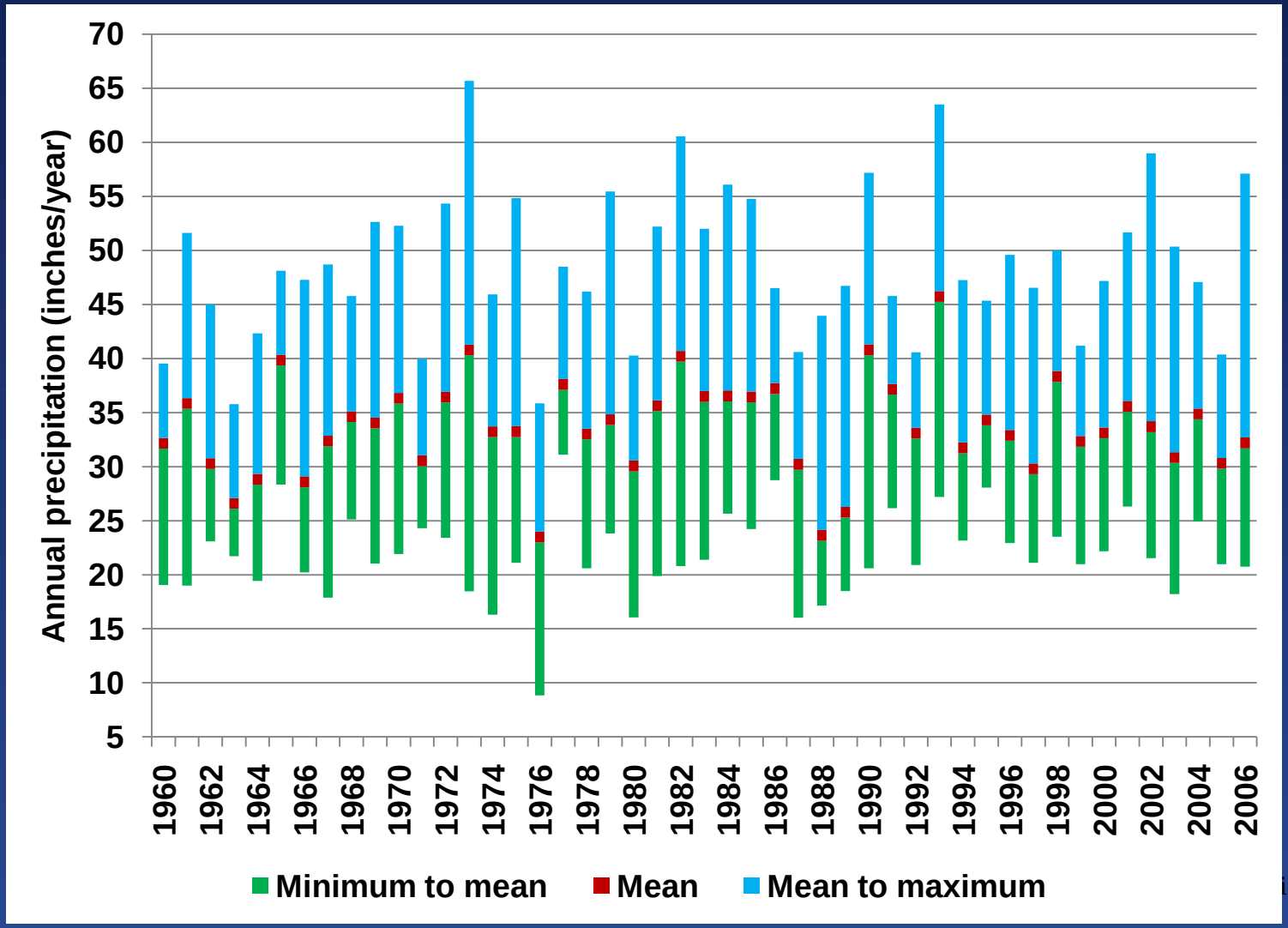
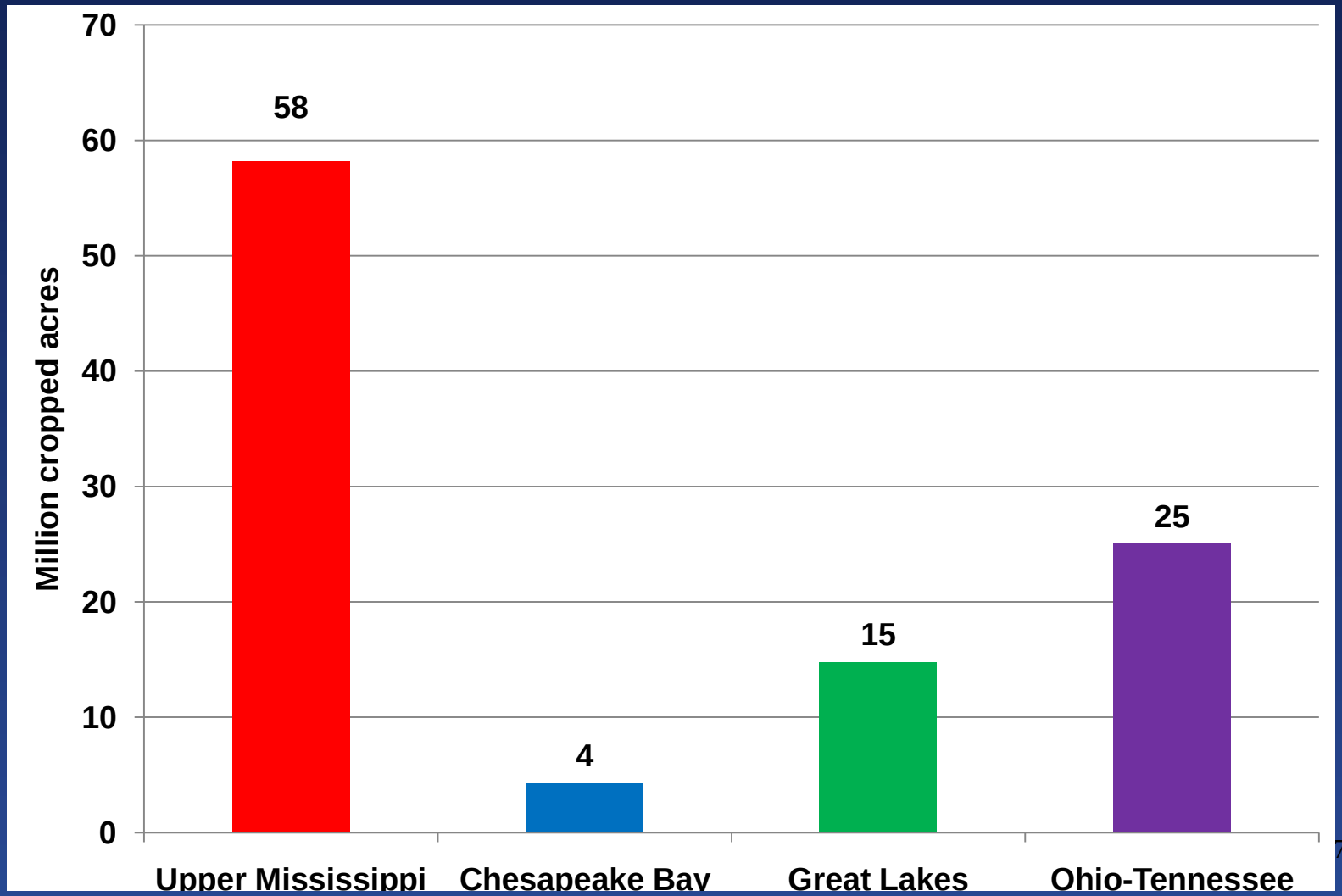
How Are We Doing This?

- Statistical sampling and modeling approach, extension of the NRI
- CEAP Cropland Survey—2003 to 2006
- Field-level model for onsite effects (APEX)
- National water quality model for offsite water quality effects (HUMUS/SWAT)

47-year mean-minimum-maximum precipitation



Million Cropped Acres



Evaluation of Conservation Practices

The Baseline Conservation Condition

Soil erosion control	Upper Miss.	Ches. Bay	Great Lakes	Ohio-Tenn
Structural practices for water erosion control				
-- All acres	**45%**	46%	26%	40%
-- HEL acres	**72%**	63%	37%	59%
Tillage				
-- No till acres	**28%**	48%	32%	52%
-- Mulch till acres	**63%**	40%	50%	41%

The Baseline Conservation Condition

Nitrogen application for all crops in rotation	Upper Miss. % acres	Ches. Bay % acres	Great Lakes % acres	Ohio-Tenn % acres
Appropriate rate	**39%**	32%	40%	39%
Appropriate timing	**45%**	54%	69%	64%
Appropriate method	**56%**	35%	50%	46%
Appropriate rate and timing and method	**16%**	12%	18%	17%
No nitrogen applied	**2%**	3%	4.5%	3%

The Baseline Conservation Condition

Phosphorus application for all crops in rotation	**Upper Miss. % acres**	**Ches. Bay % acres**	**Great Lakes % acres**	**Ohio-Tenn % acres**
Appropriate rate	**53%**	39%	46%	43%
Appropriate timing	**50%**	57%	69%	61%
Appropriate method	**57%**	49%	61%	47%
Appropriate rate and timing and method	**28%**	19%	29%	21%
No phosphorus applied	**<1%**	1%	1.5%	<1%

The Baseline Conservation Condition

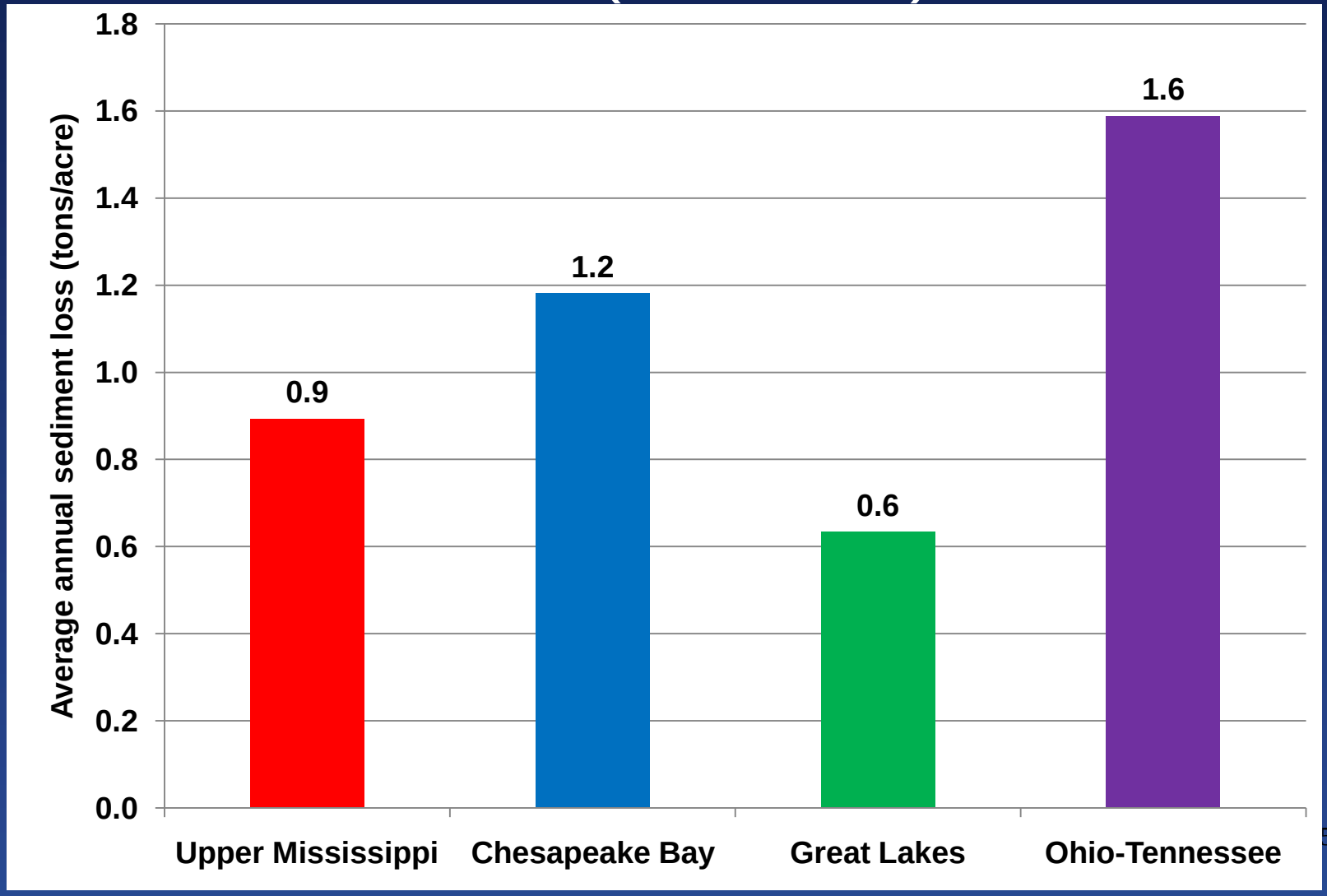
Nutrient application for all crops in rotation	**Upper Miss. % acres**	**Ches. Bay % acres**	**Great Lakes % acres**	**Ohio-Tenn % acres**
Appropriate rate and timing and method for both nitrogen and phosphorus, including acres with no applications	**13%**	9%	12%	10%
Cover crops	**<1%**	4%	1%	2%

Inherent Vulnerability

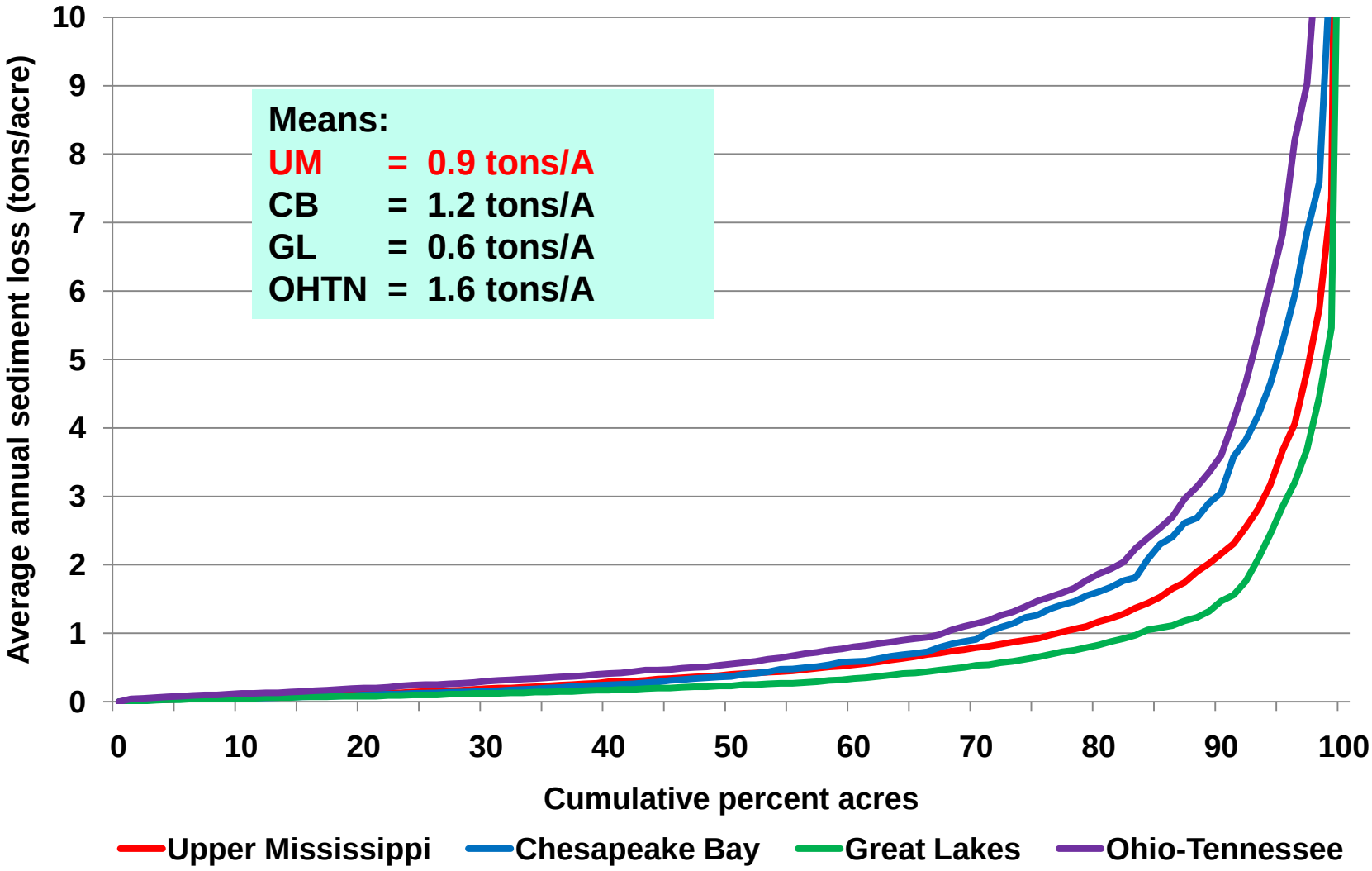
	Upper Miss.	Ches Bay	Great Lakes	Ohio-Tenn
Avg. annual precipitation	**34** inches	42 inches	34 inches	42 inches
% cropped acres with slopes>2%	**42%**	60%	34%	33%
% cropped acres that are HEL	**18%**	44%	17%	27%
% cropped acres highly prone to surface water runoff	**13%**	23%	6%	9%
% cropped acres prone to leaching	**9%**	46%	30%	8%

Losses of Sediment and Nutrients from Fields

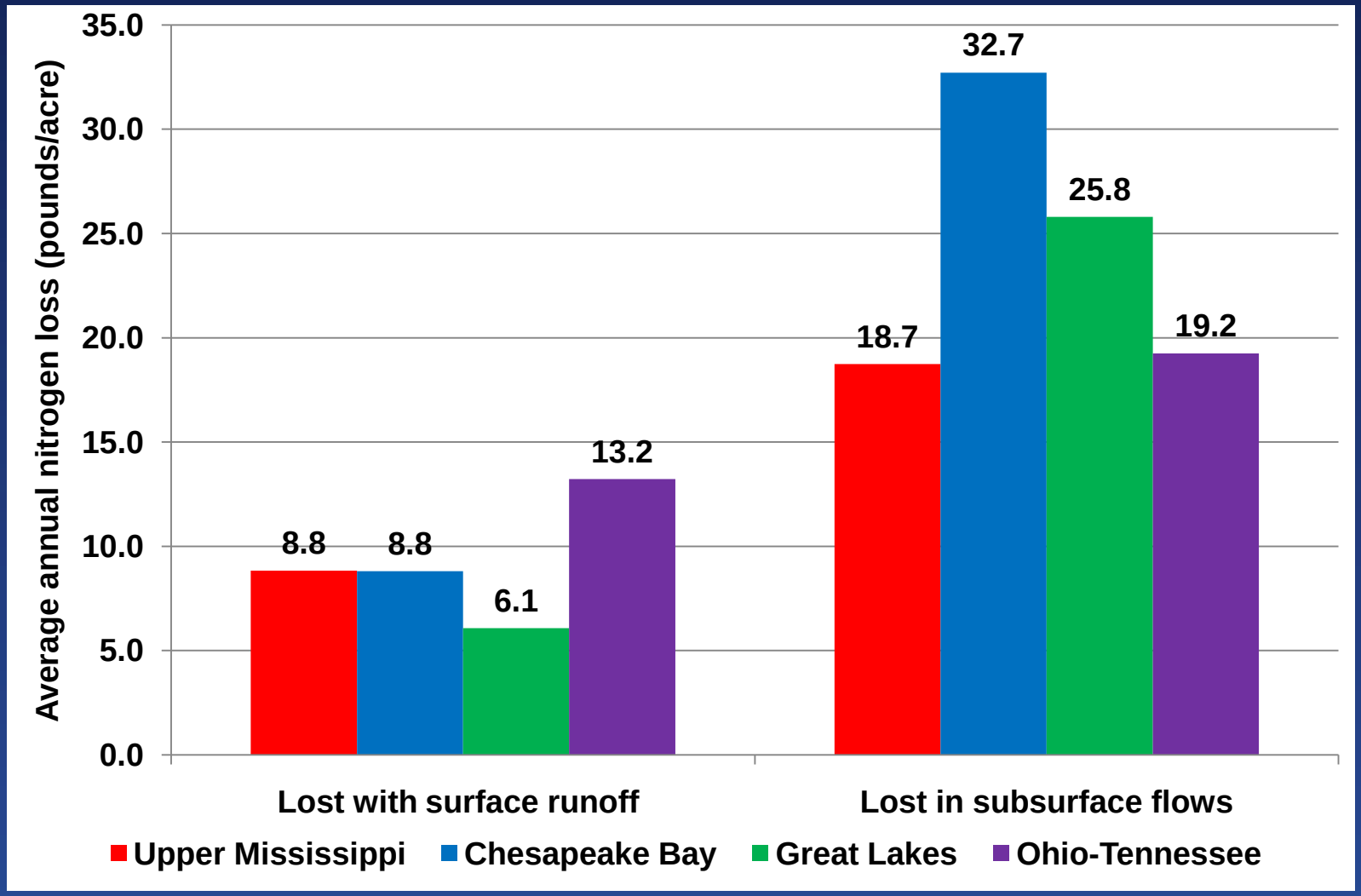
Sediment Loss (tons/acre), Baseline



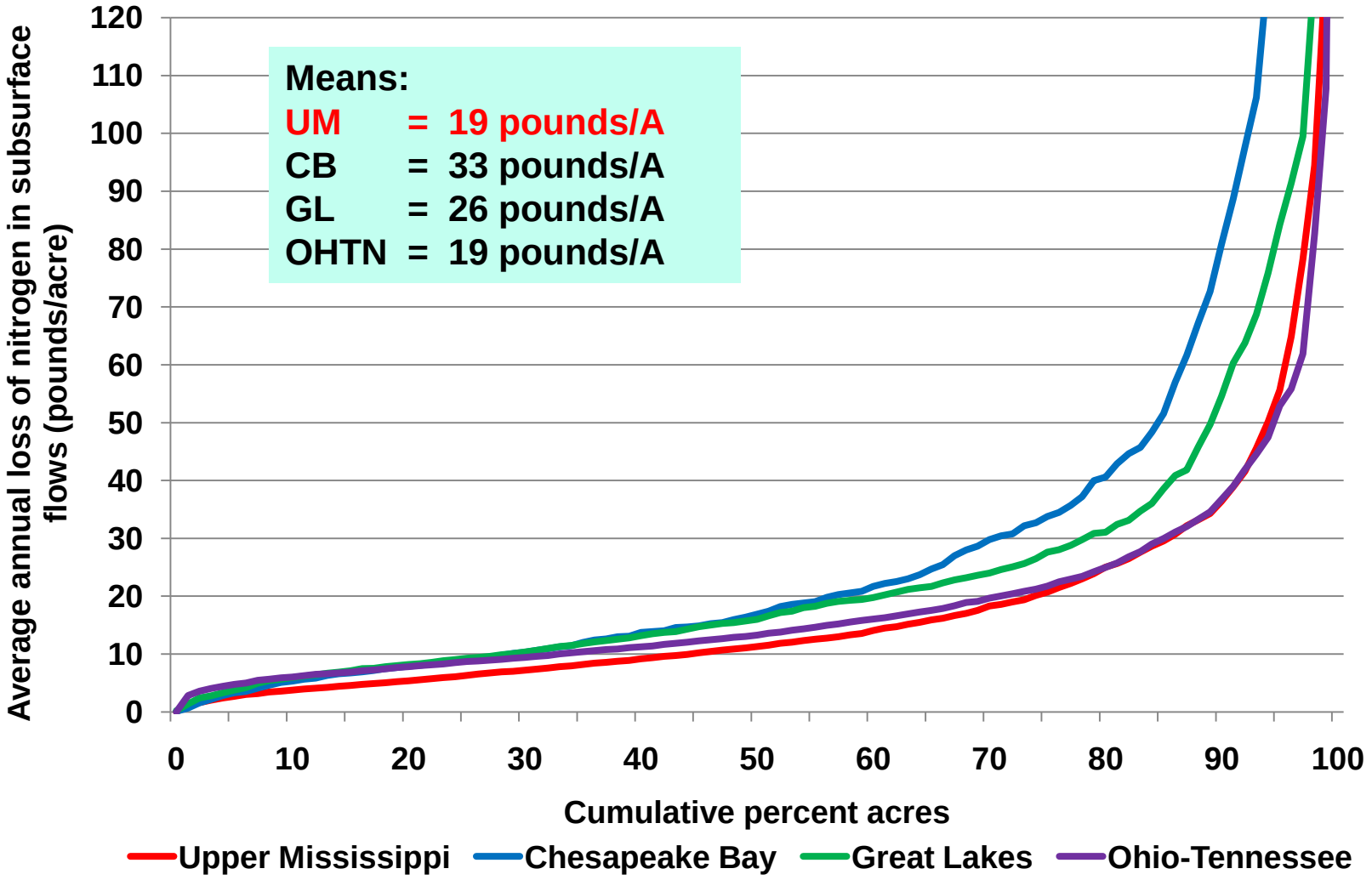
Sediment Loss, Baseline



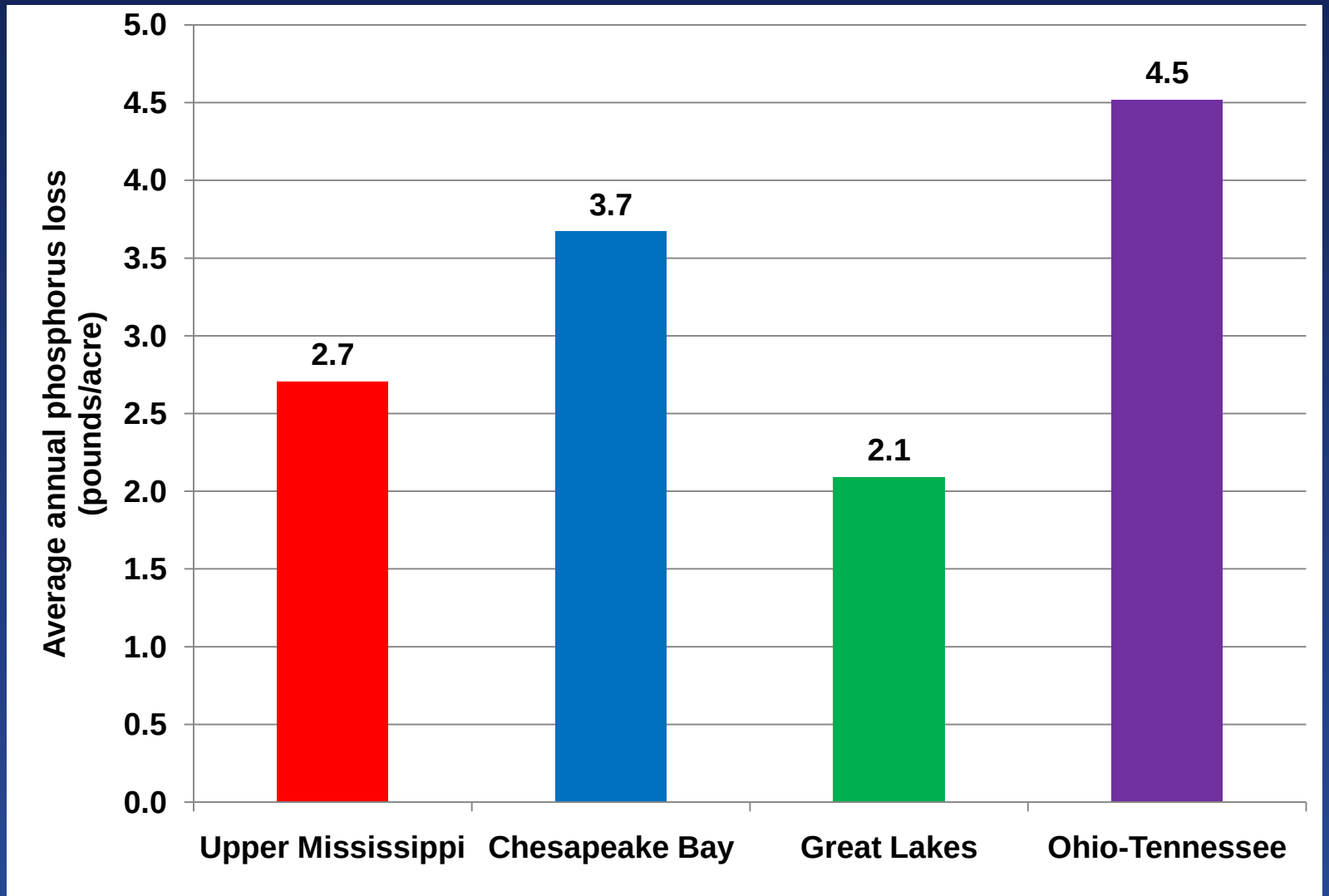
Nitrogen Loss (pounds/acre), Baseline



Nitrogen Loss in Subsurface Flows, Baseline



Phosphorus Lost to Surface Water (pounds/acre), Baseline



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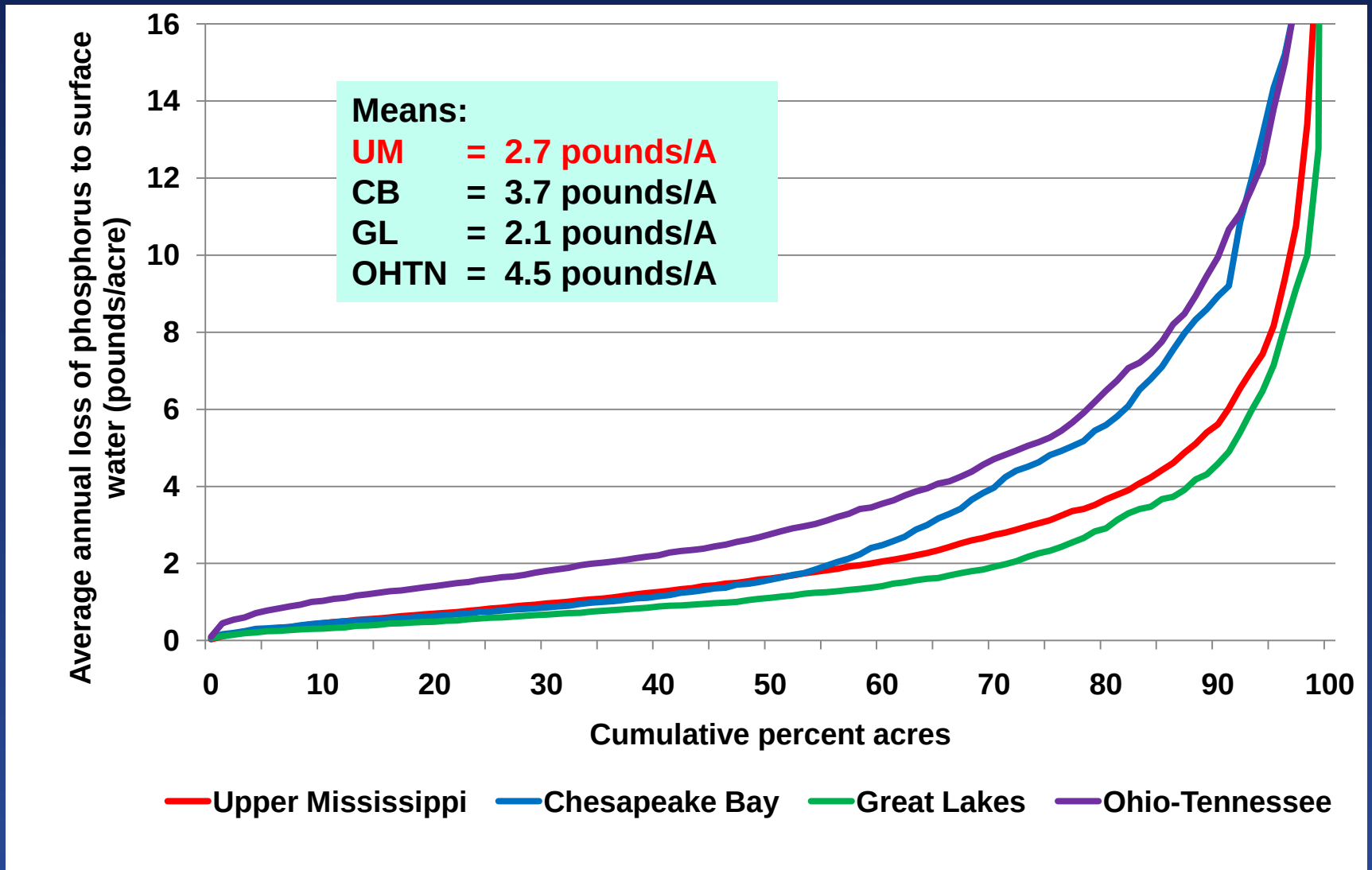

Conservation Treatment Needs

Five resource concerns:

- **Edge-of-field sediment loss**
- **Edge-of-field nitrogen lost with surface runoff**
- **Edge-of-field nitrogen loss in subsurface flows**
- **Edge-of-field phosphorus loss**
- **Wind erosion**

Under-treated acres were identified as those with an imbalance between the level of potential loss—inherent vulnerability—and the level of conservation treatment.

Average annual loss of nitrogen in subsurface flows (pounds/acre/yr), Upper Mississippi River Basin

Soil leaching potential	Low treatment	Moderate treatment	Moderately high treatment	High treatment
Low	21	13	6	5
Moderate	**31**	23	9	6
Moderately high	**53**	**29**	14	7
High	**78**	**52**	24	22

Percent of acres with nitrogen loss in subsurface flows >25 pounds/acre/yr Upper Mississippi River Basin

Soil leaching potential	Low treatment	Moderate treatment	Moderately high treatment	High treatment
Low	18	10	1	0
Moderate	**35**	**32**	3	1
Moderately high	**53**	**47**	13	0
High	**88**	**79**	22	16

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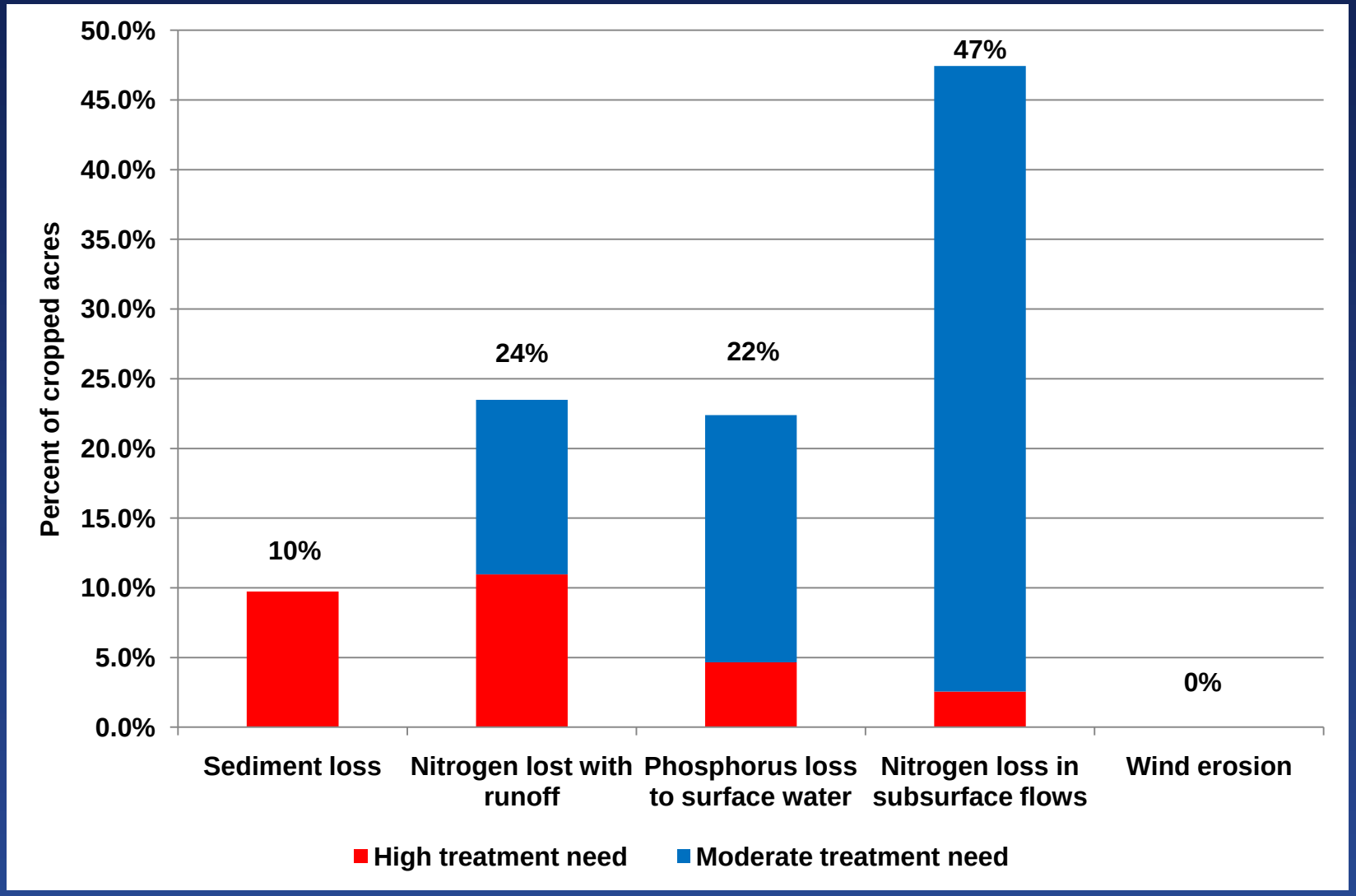
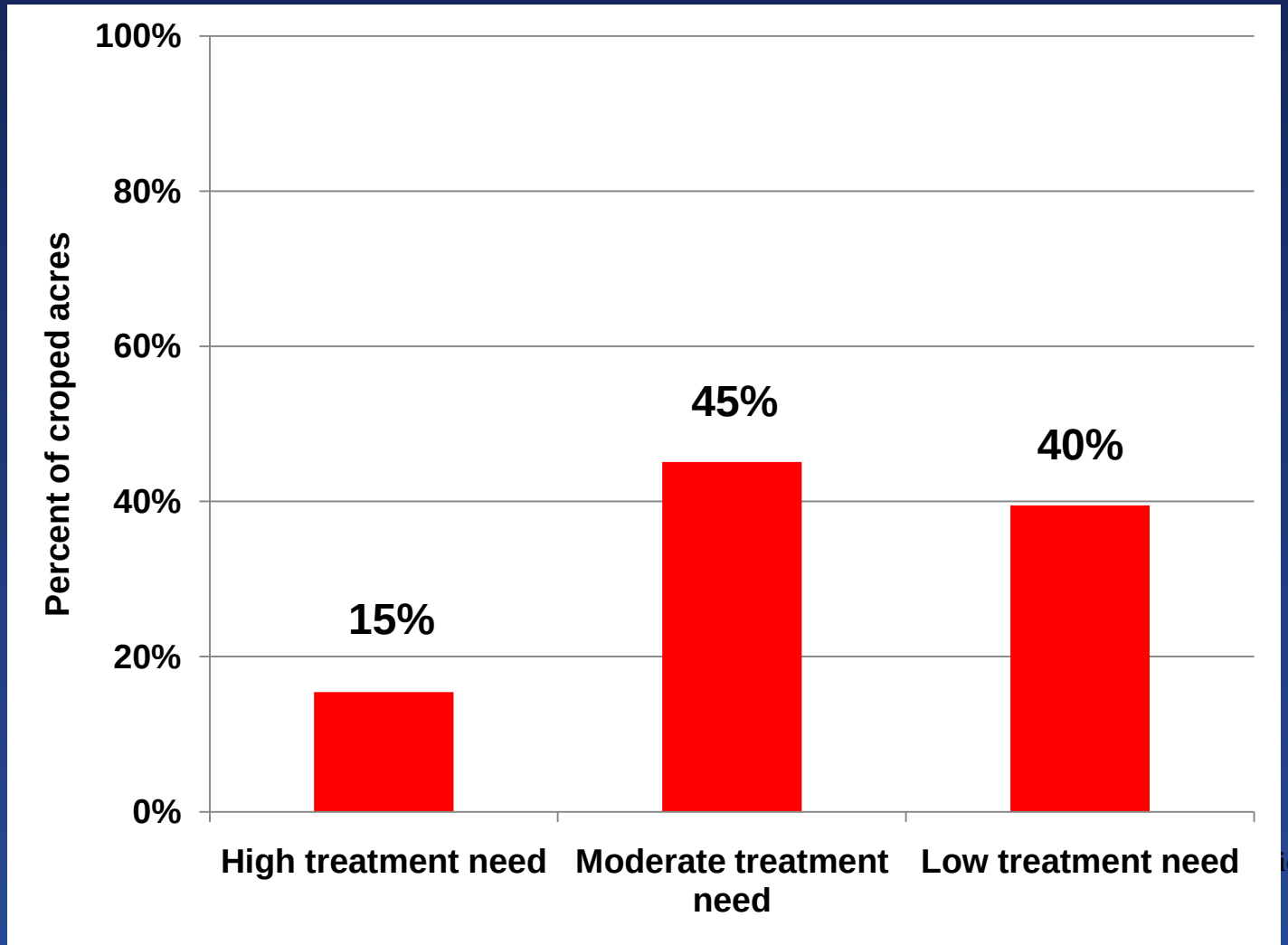
Under-Treated Acres--UMRB



Percent Acres Needing Conservation Treatment Upper Mississippi River Basin



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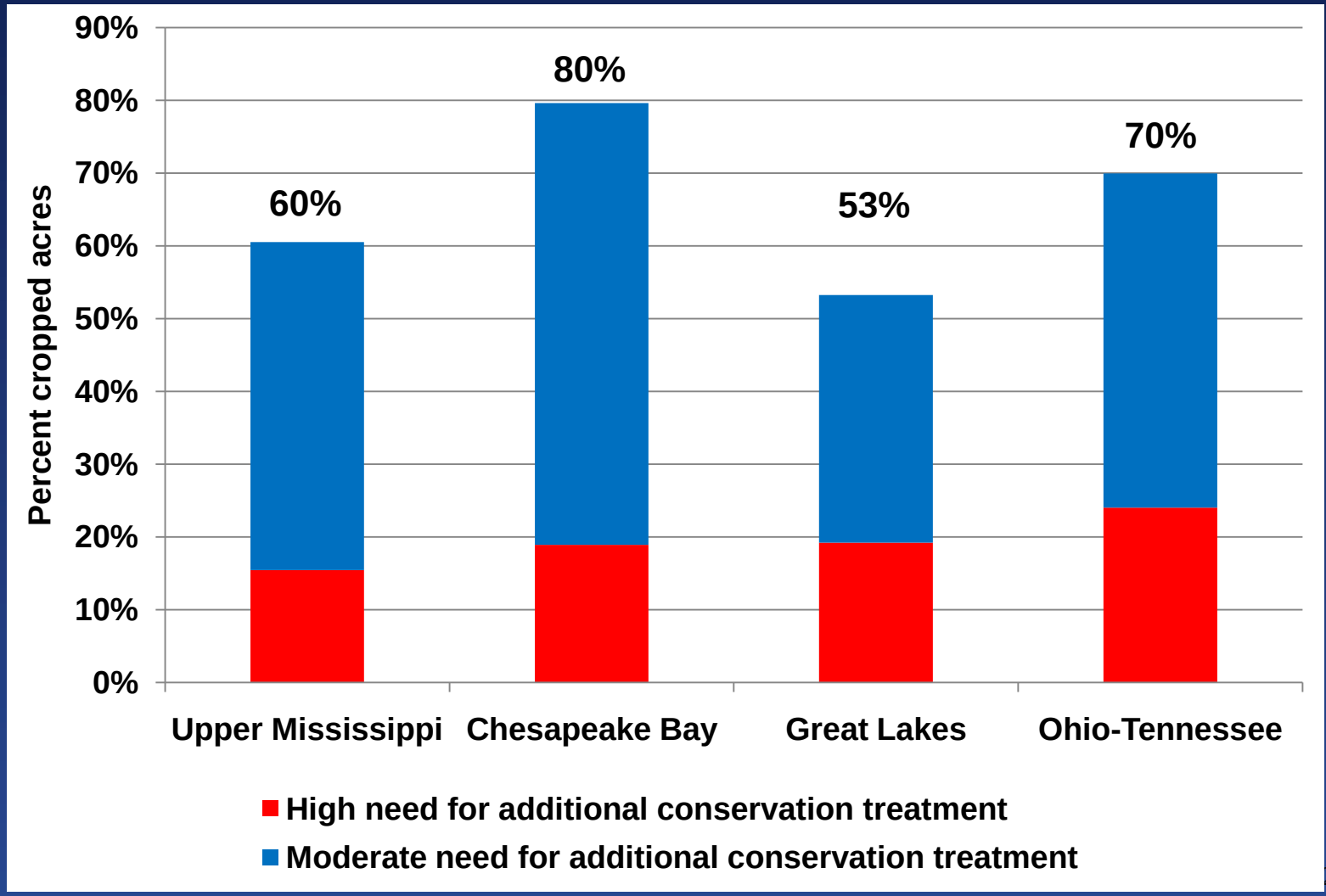

Information on CEAP can be found at:

http://www.nrcs.usda.gov/Technical/nri/ceap/