Manure Injection & Nutrient Management to Close N Gap

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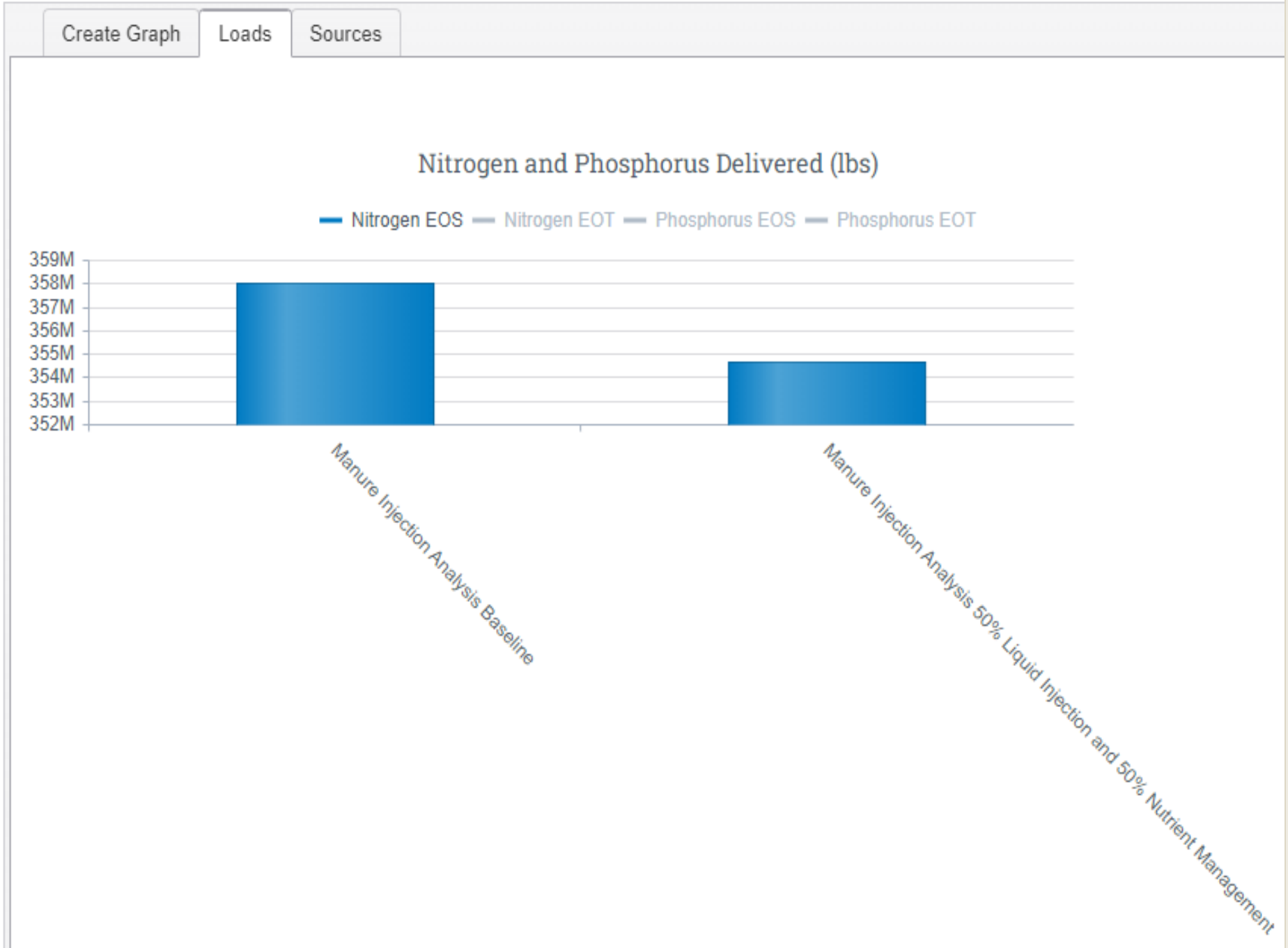
GRAPH SCENARIOS



Using CAST, we conducted an analysis to estimate the potential load reductions if 50% of liquid manure were injected in the next year. We repeated the same steps for nutrient management.

The steps of the analysis are as follows:

1. Calculate the ratio of liquid to solid manure applied by county
2. Multiply the amount of liquid manure by 0.5 and divide that number by the total manure applied to find the acreage of 50% liquid manure injection for each county
3. Create a baseline scenario by copying the progress BMPs
4. Create another scenario identical to the baseline. To this scenario, increase the manure injection levels at the county scale to 50% of liquid manure on cropland eligible for manure
5. Create a third scenario identical to the baseline + 50% manure injection and increase nutrient management to 50%
6. Run the scenarios and analyze the load and BMP submitted vs. credited reports

Analysis Results

Total Agricultural Nitrogen (lbs)

Geography	Progress	Progress + 50% Manure Injection	Progress + 50% Manure Injection + 50% Nutrient Management	WIP
Delaware	7,113,731	7,111,137	7,111,137	4,463,266
Maryland	29,276,675	29,057,700	29,057,700	25,278,980
New York	12,908,124	12,658,357	12,658,357	12,658,357
Pennsylvania	90,482,685	88,385,354	87,961,096	59,463,457
Virginia	30,190,449	30,012,115	30,012,115	21,009,221
West Virginia	5,137,015	5,116,409	5,116,409	4,281,160

Total Agricultural Nitrogen (% Toward Planning Target from 2009)

Geography	Progress	Progress + 50% Manure Injection	Progress + 50% Manure Injection + 50% Nutrient Management
Delaware	28%	28%	28%
Maryland	42%	45%	45%
New York	86%	92%	92%
Pennsylvania	12%	18%	19%
Virginia	19%	20%	20%
West Virginia	-31%	-28%	-28%

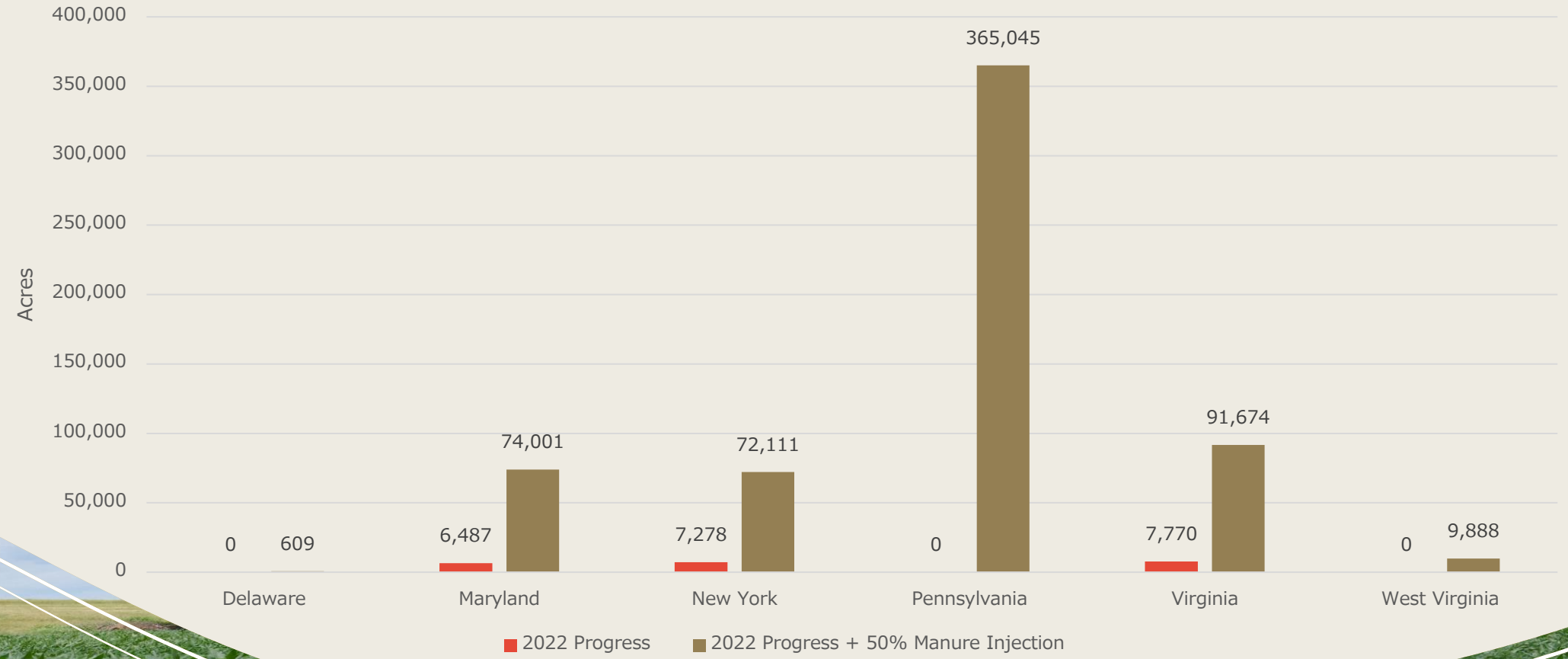
Total Agricultural Phosphorus (lbs)

Geography	Progress	Progress + 50% Manure Injection	Progress + 50% Manure Injection + 50% Nutrient Management	WIP
Delaware	79,943	79,876	79,876	29,657
Maryland	984,718	975,864	975,864	677,187
New York	478,441	459,076	459,076	460,118
Pennsylvania	3,680,050	3,557,653	3,556,163	2,157,051
Virginia	2,439,032	2,426,501	2,426,501	1,731,350
West Virginia	260,369	258,667	258,667	175,409

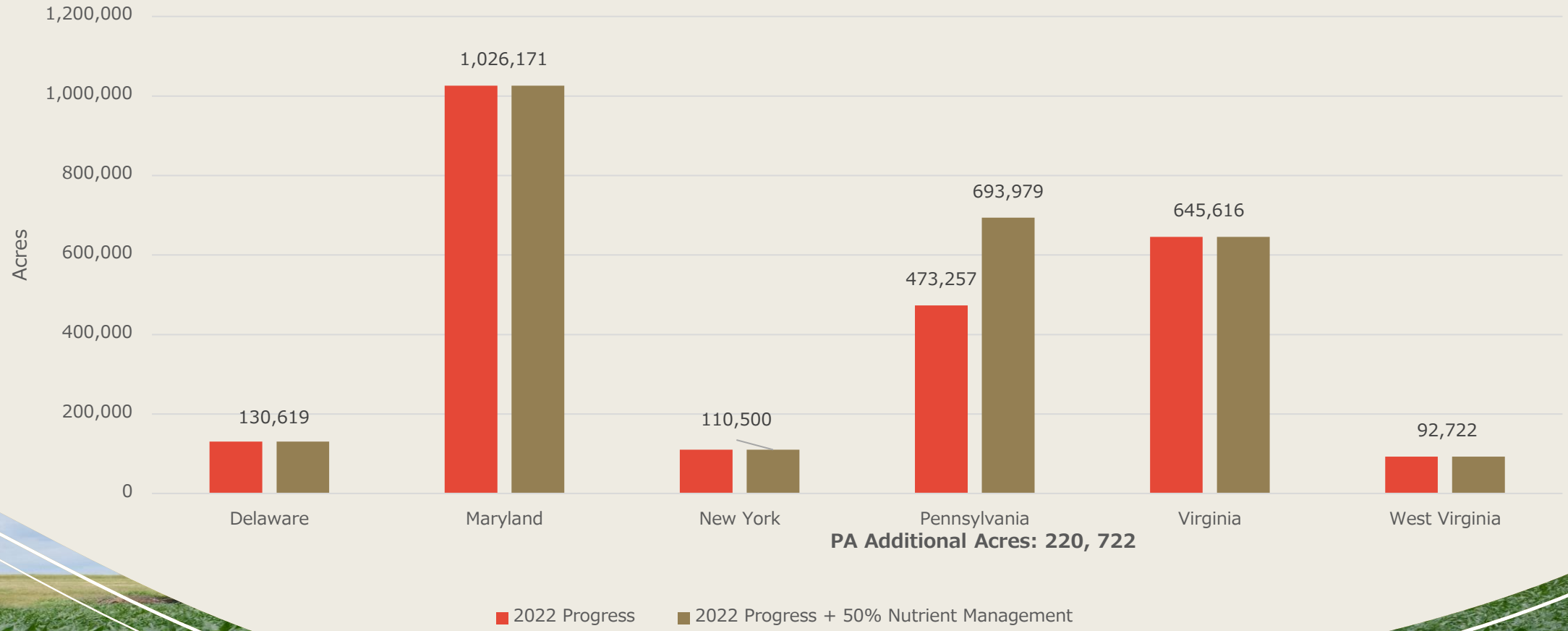
Total Agricultural Phosphorus (% Toward Planning Target from 2009)

Geography	Progress	Progress + 50% Manure Injection	Progress + 50% Manure Injection + 50% Nutrient Management
Delaware	21%	21%	21%
Maryland	28%	30%	30%
New York	82%	101%	101%
Pennsylvania	22%	29%	29%
Virginia	25%	26%	26%
West Virginia	16%	17%	17%

Acres of Manure Injection



Acres of Nutrient Management



Manure Injection Annualized Cost

Geography	Cost per Acre	Nitrogen Pounds Reduced per Acre	Nitrogen $/lb reduced/year
Delaware	$85.28	4.18	$20.40
Maryland	$81.70	2.63	$31.04
New York	$92.45	0.94	$98.64
Pennsylvania	$85.28	2.86	$29.80
Virginia	$85.28	1.04	$81.63
West Virginia	$85.28	1.06	$80.77

Nutrient Management Annualized Cost

County	Cost per Acre	Nitrogen Pounds Reduced per Acre	Nitrogen $/lb reduced/year
Delaware	$6.06	2.74	$2.21
Maryland	$6.11	1.65	$3.70
New York	$5.65	0.49	$11.46
Pennsylvania	$6.15	1.65	$3.73
Virginia	$5.98	0.38	$15.68
West Virginia	$6.41	0.22	$29.48

Summary

If 50% of liquid manure applied in the Chesapeake Bay watershed were injected, rather than surface applied, we would be closer to reaching the EPA TMDL goals. The same is true for nutrient management planning. These practices are certainly a benefit for improving water quality in local streams and the Chesapeake Bay, and showing this benefit is crucial to increasing implementation.

Thank You

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