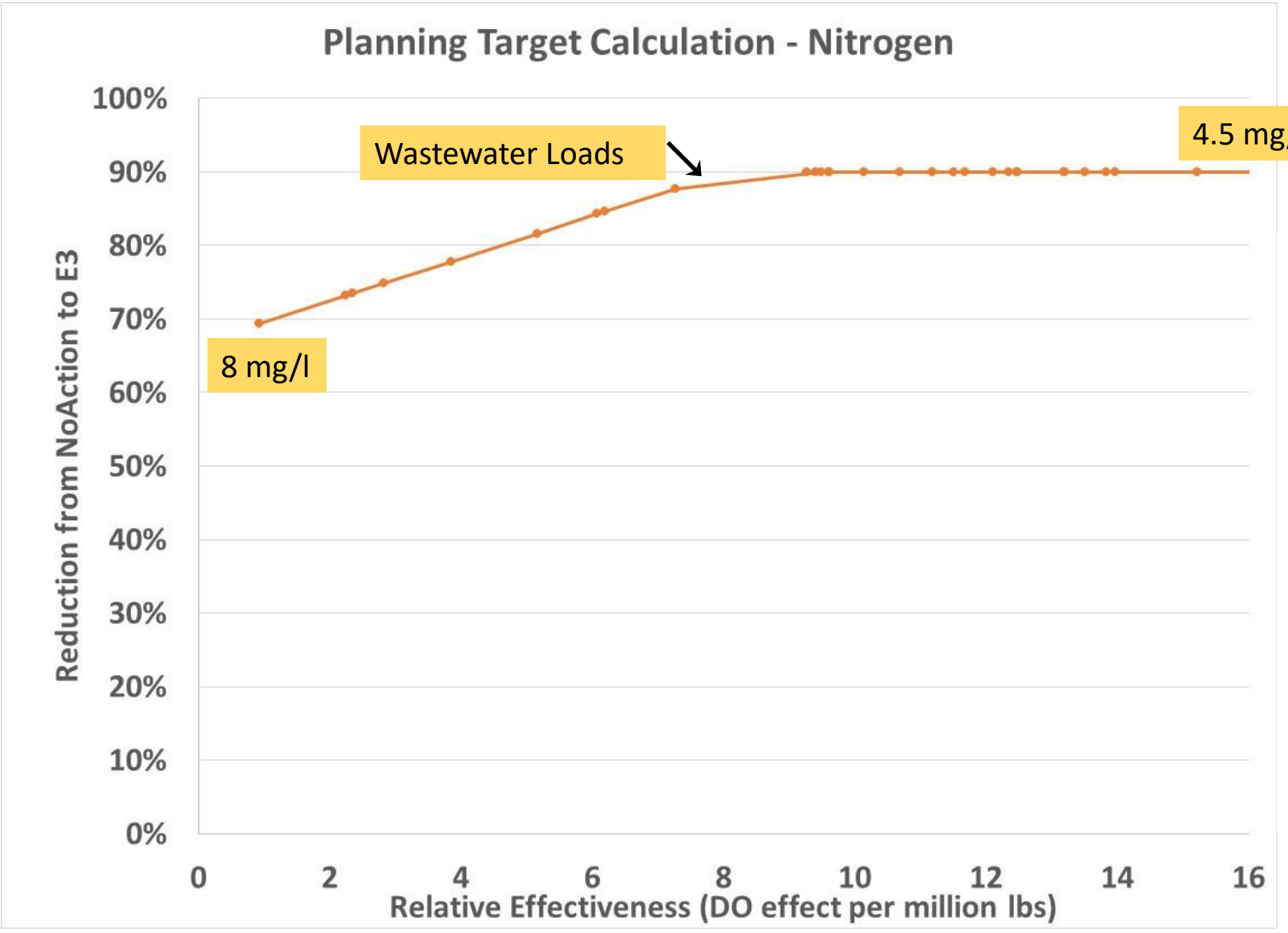
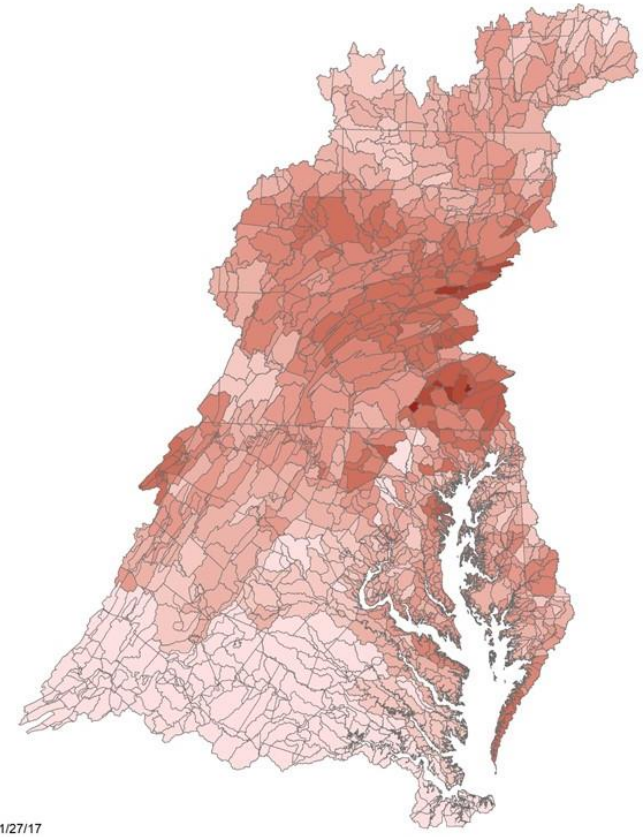
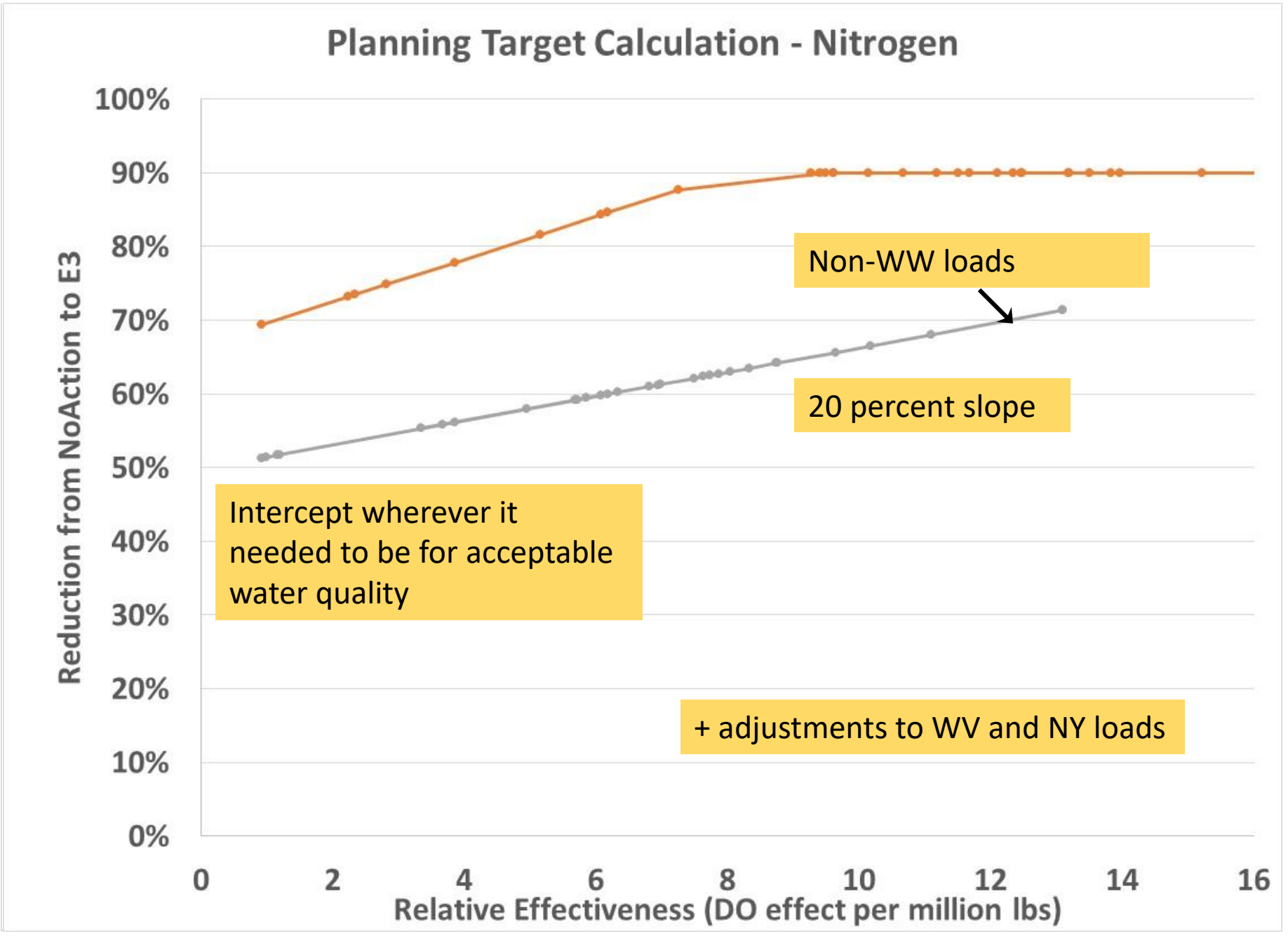
Climate Allocation Decisions

Update to WQGIT 6/22/2020 presentation with:

- Additional graphics showing combined N and P
- An additional option for WWTP line at 8 and 4 mg/l
- An analysis of WIP load trends vs climate loads


Planning Target Calculation - Nitrogen
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Reduction from NoAction to E3
Wastewater Loads
4.5 mg/l
8 mg/l
0
2
4
6
8
10
12
14
16
Relative Effectiveness (DO effect per million lbs)


11/27/17


Planning Target Calculation - Nitrogen
Reduction from NoAction to E3
100%
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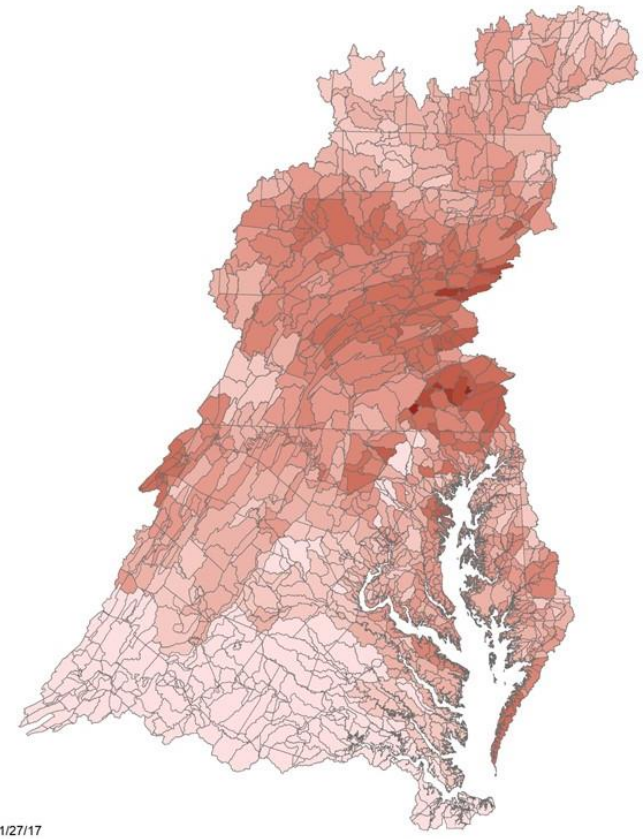
20%
10%
0%
0
2
4
6
8
10
12
14
16
Relative Effectiveness (DO effect per million lbs)
Non-WW loads
20 percent slope
Intercept wherever it needed to be for acceptable water quality
+ adjustments to WV and NY loads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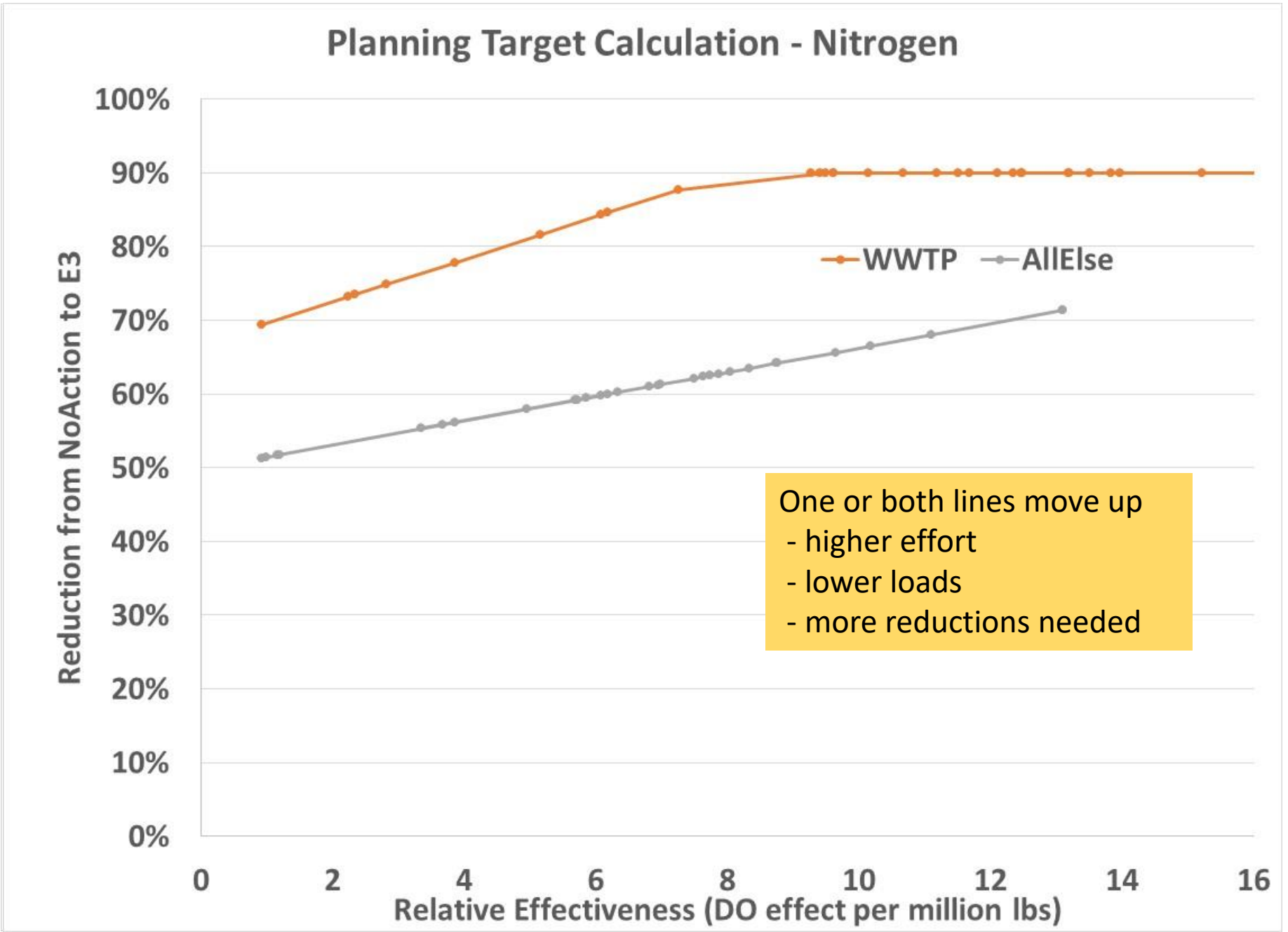
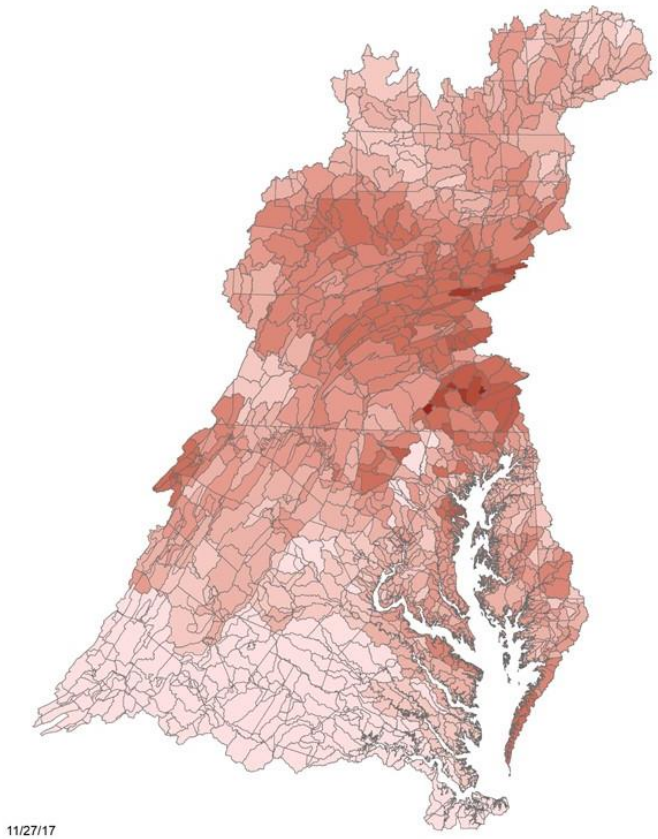


One or both lines move up
- higher effort
- lower loads
- more reductions needed



WQGIT Climate Allocation Decisions

- Year
  - 2025 or 2035?
  - Link target year and implementation?
- Watershed loads first
  - Allocate all necessary reductions through planning target method
    - or
  - Take out jurisdictional climate-related increases in loads first and allocate any remainder
- WWTP loads included in jurisdictional allocation calculations
  - Only non-WWTP sources
  - Increase WWTP with non-WWTP
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    - .22 and .364 TP
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- Open Water
  - Do not consider open water at this time for climate allocations

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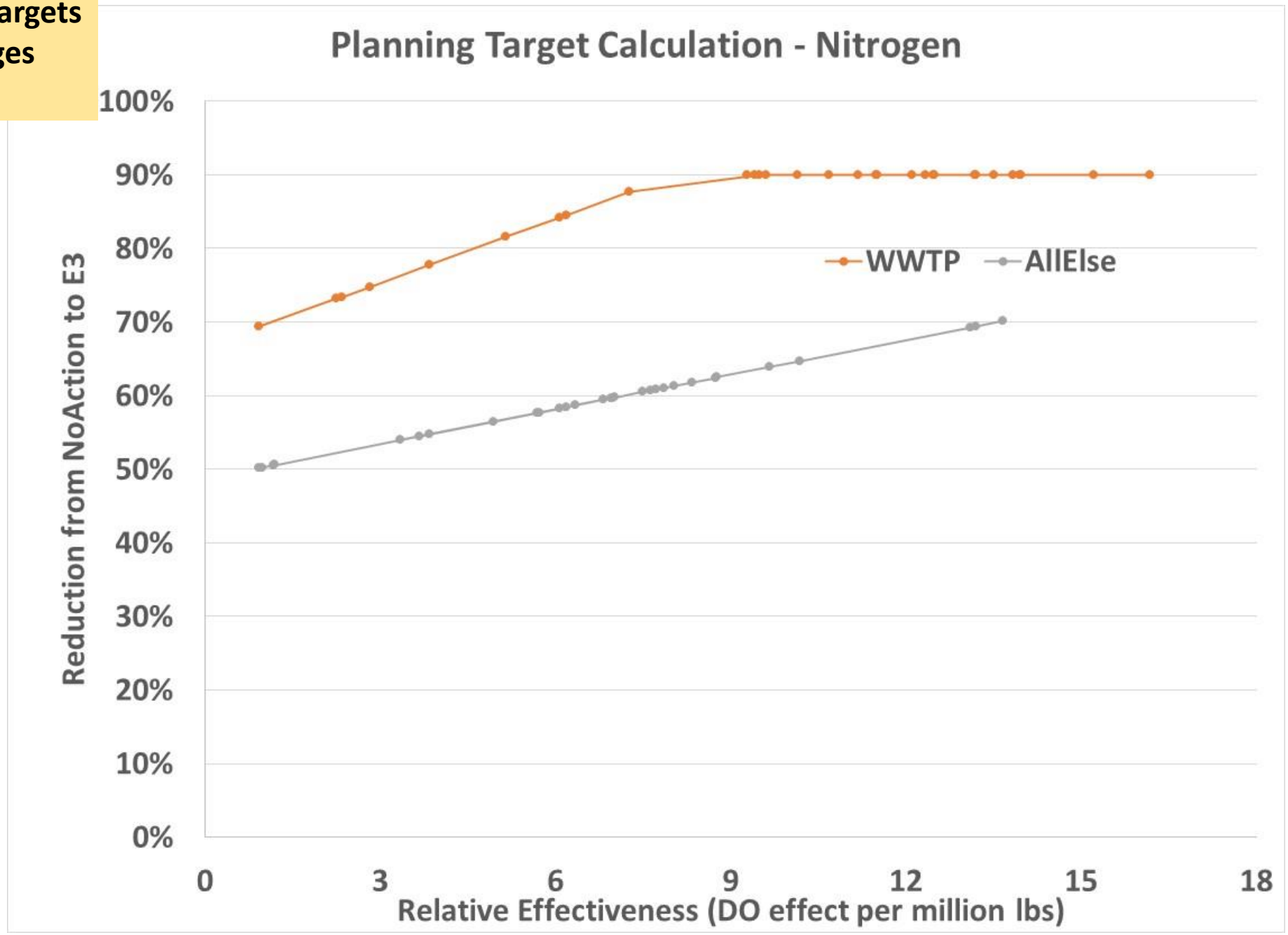
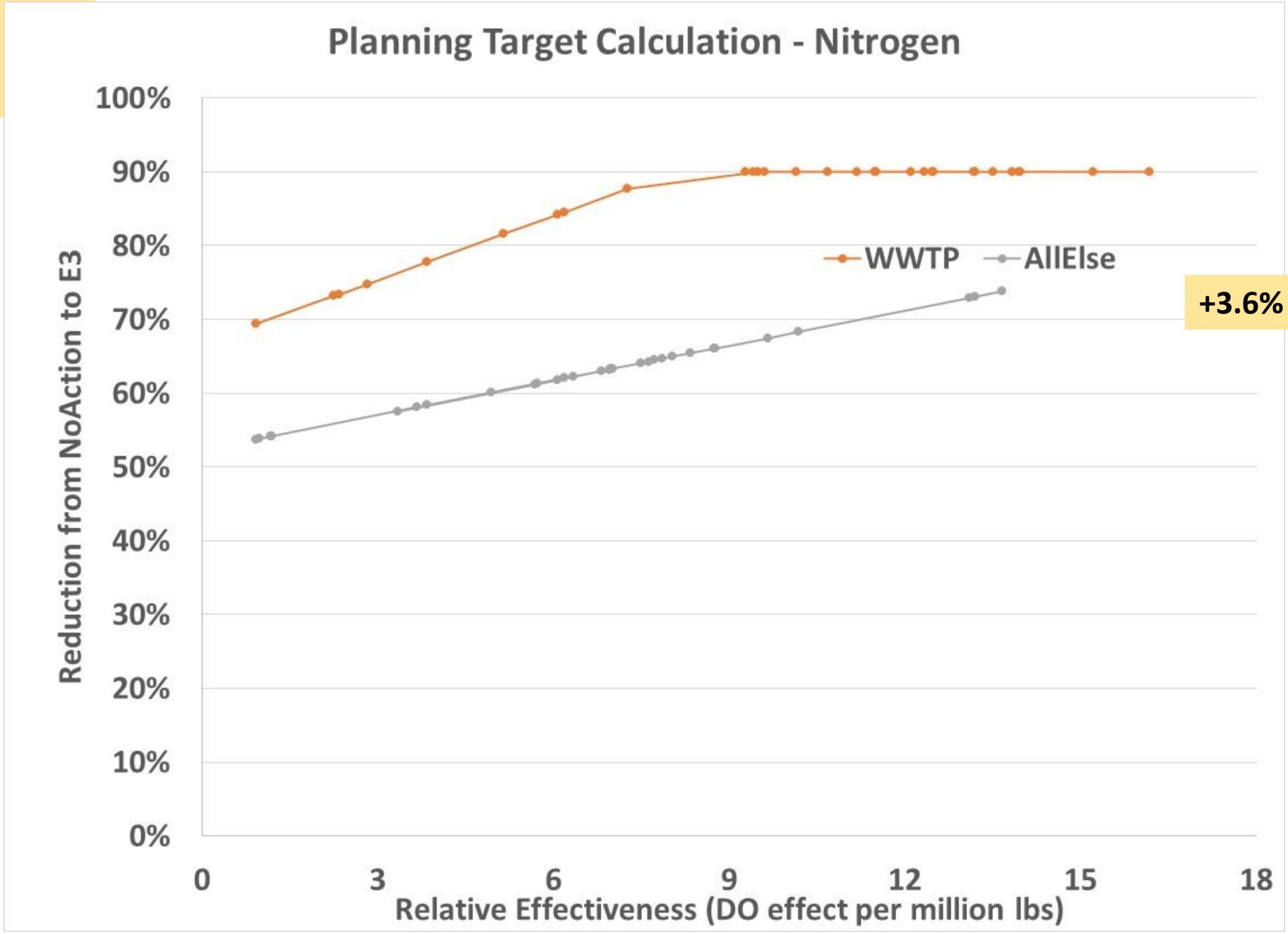
2017 Planning Targets
Prior to exchanges and exceptions

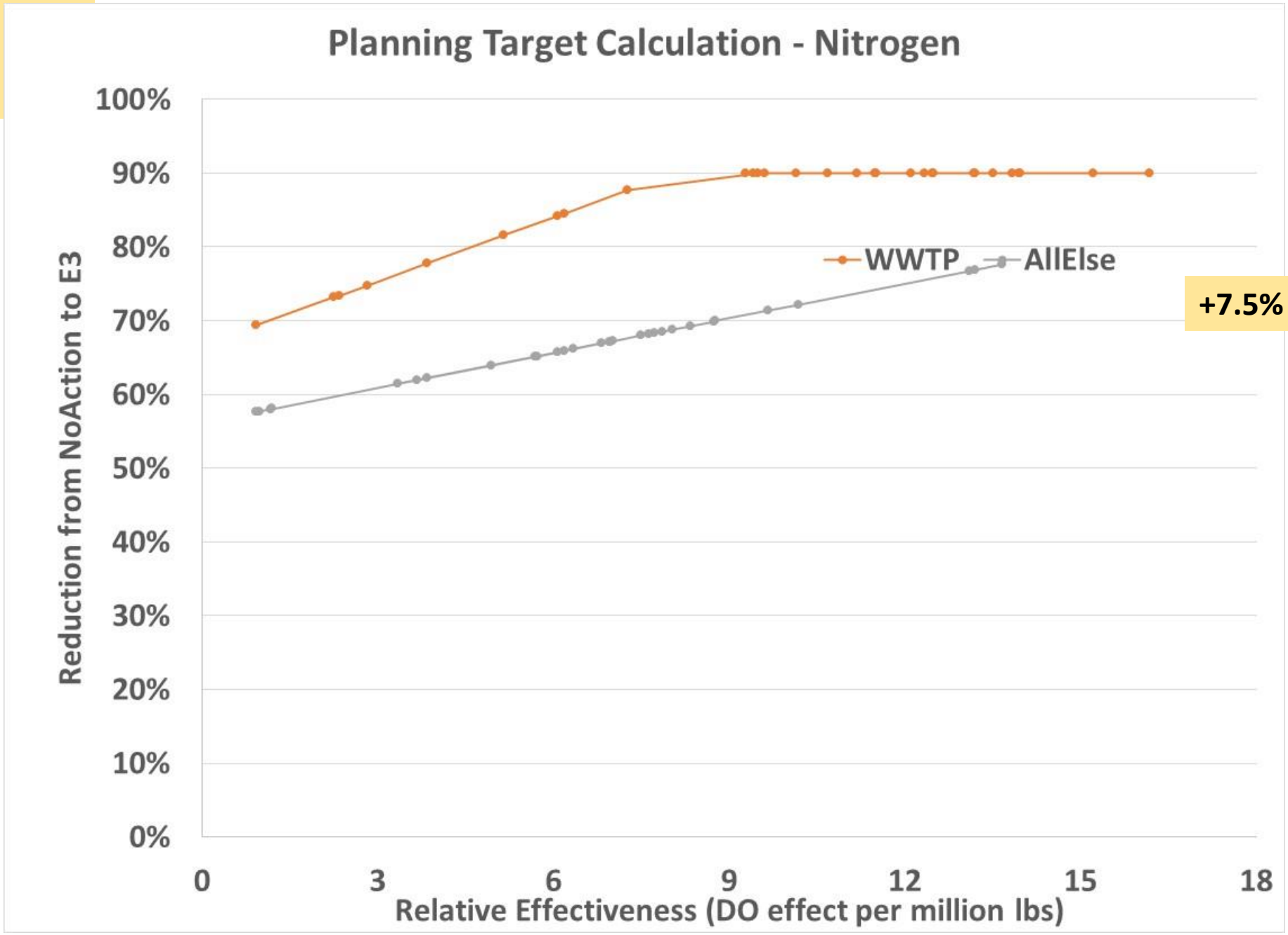


2025 climate
All Allocation
NPS only



+3.6%

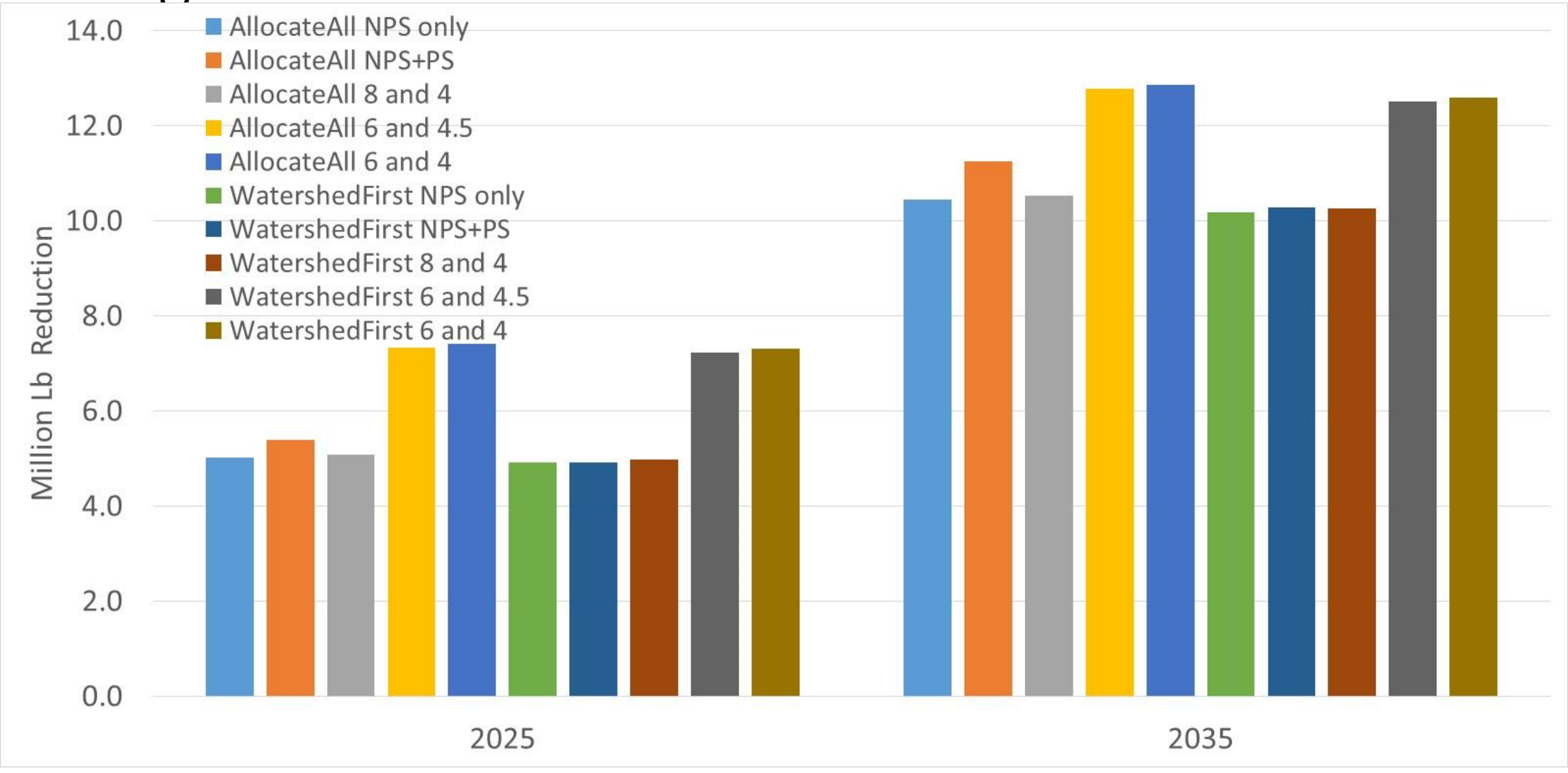
2035 climate
All Allocation
NPS only



+7.5%

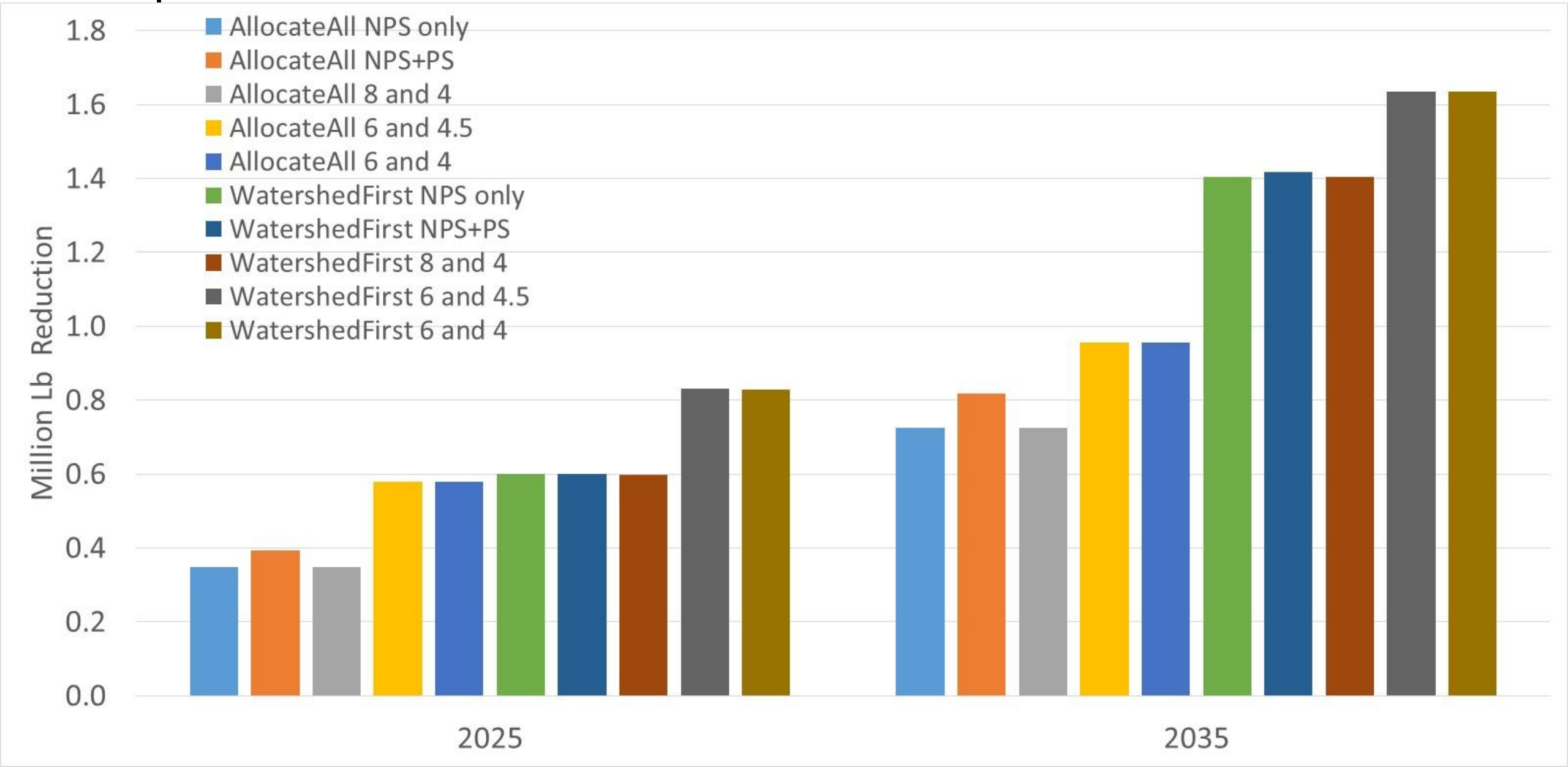
- 2035 increases effort from about 6 Mlbs to about 11 Mlbs

Nitrogen Total Reductions



- 2035 increases effort from about .5 Mlbs to about 1 Mlbs

Phosphorus Total Reductions



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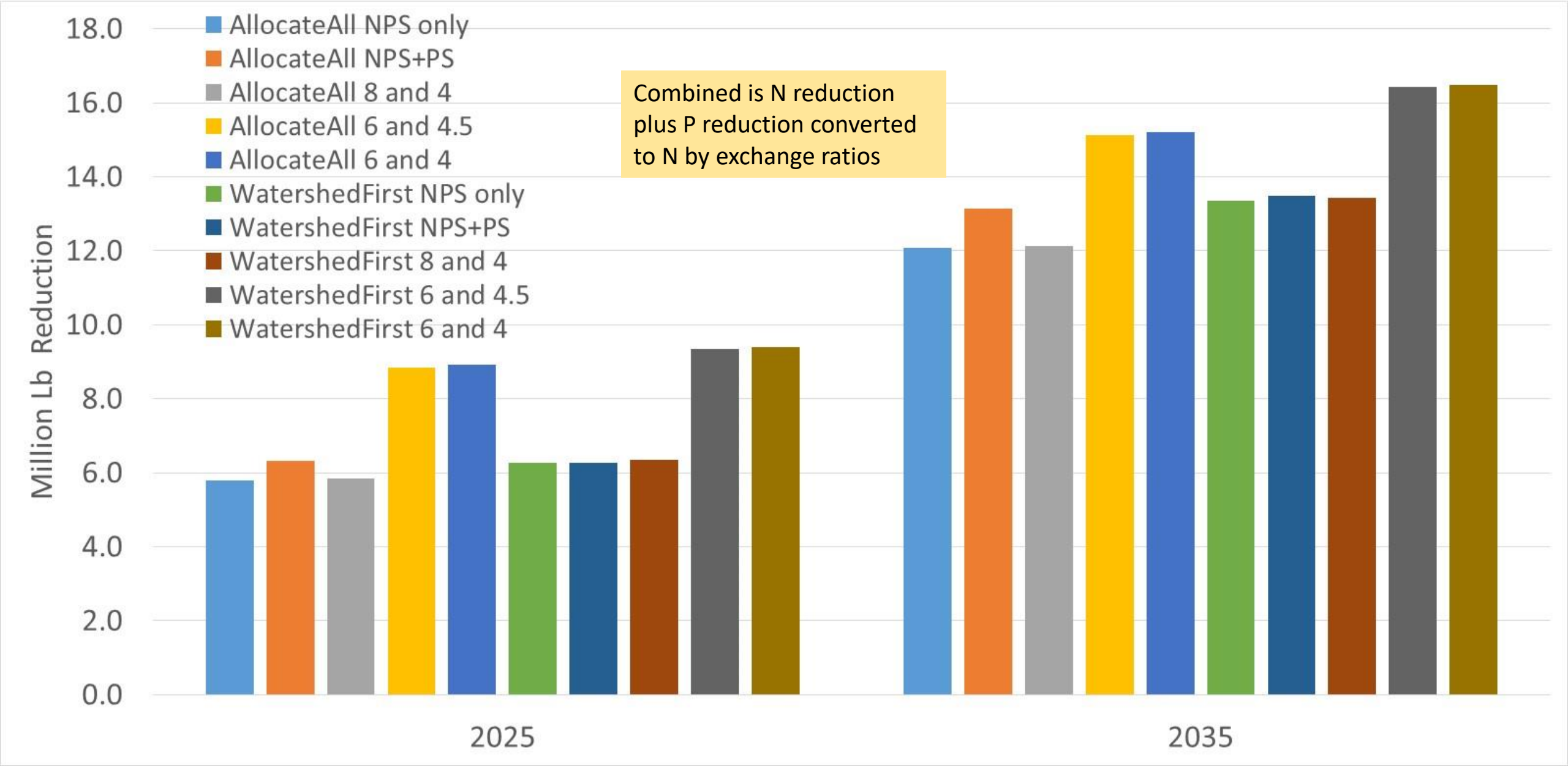
Combined Total Reductions



WQGIT Climate Allocation Decisions

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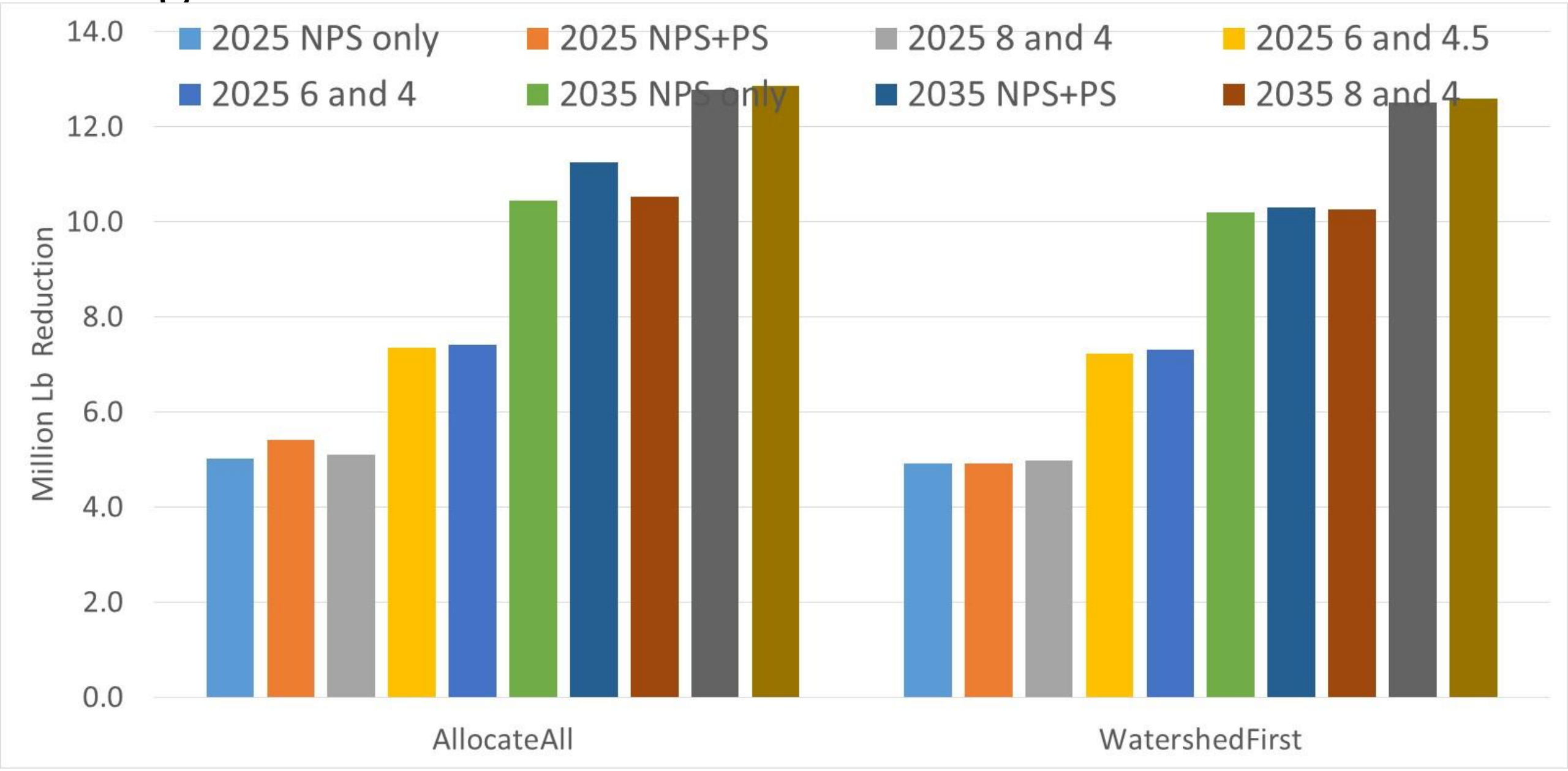
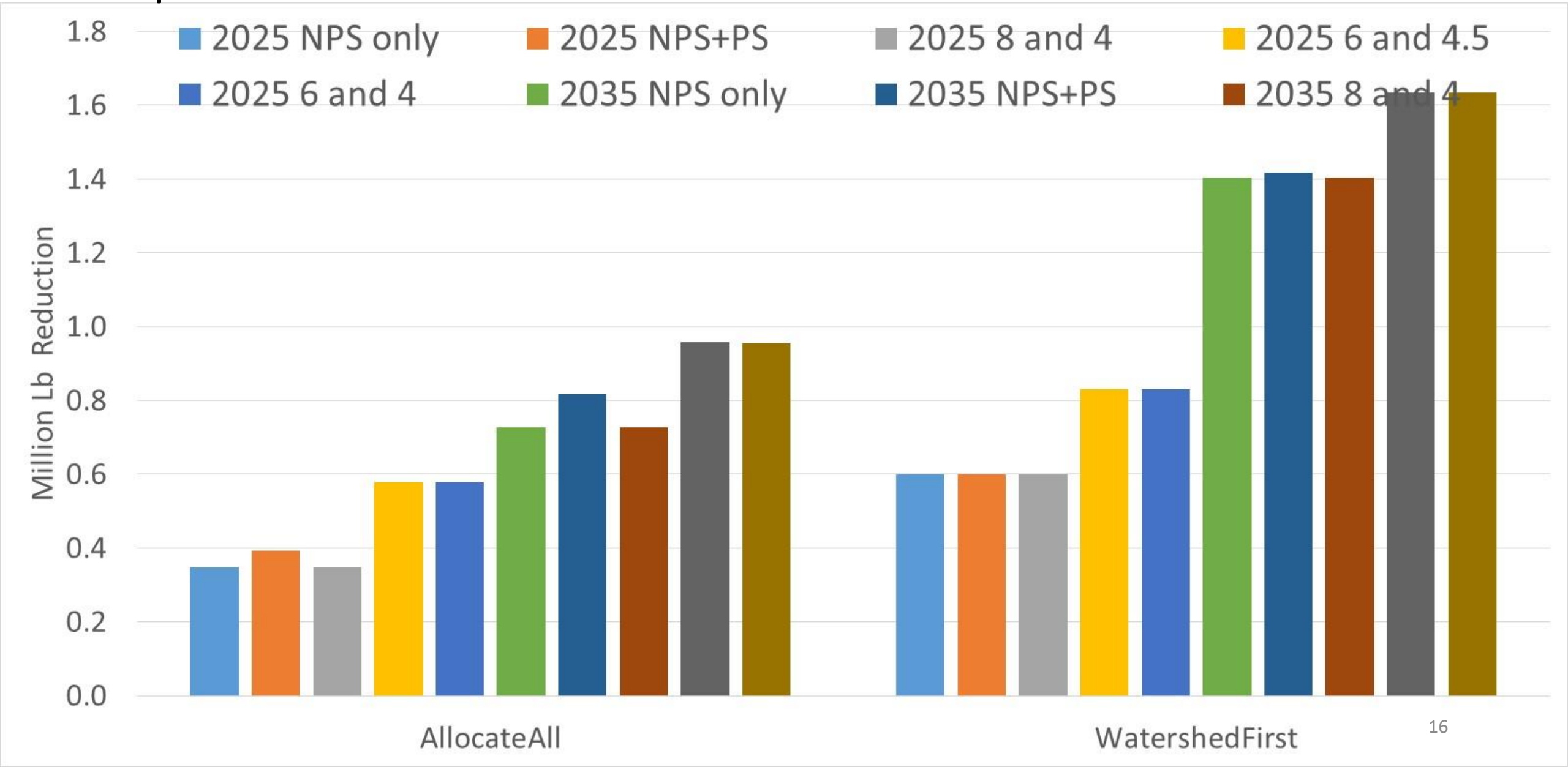
Nitrogen Total Reductions

- ‘Watershed first’ doesn’t make much difference for N at the CB watershed scale



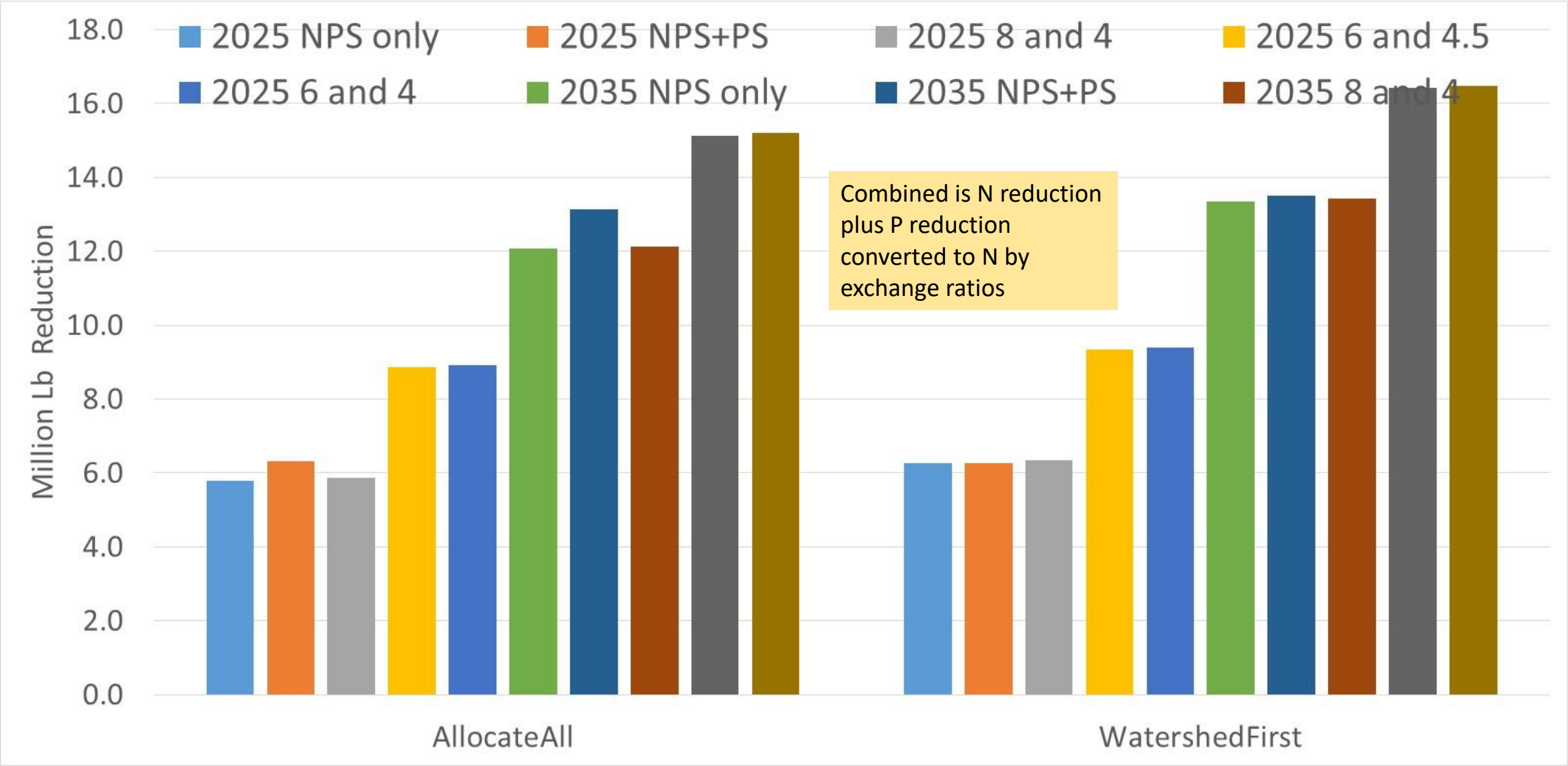
Phosphorus Total Reductions

- ‘Watershed first’ increases P reductions because P loads increase more from climate than N.



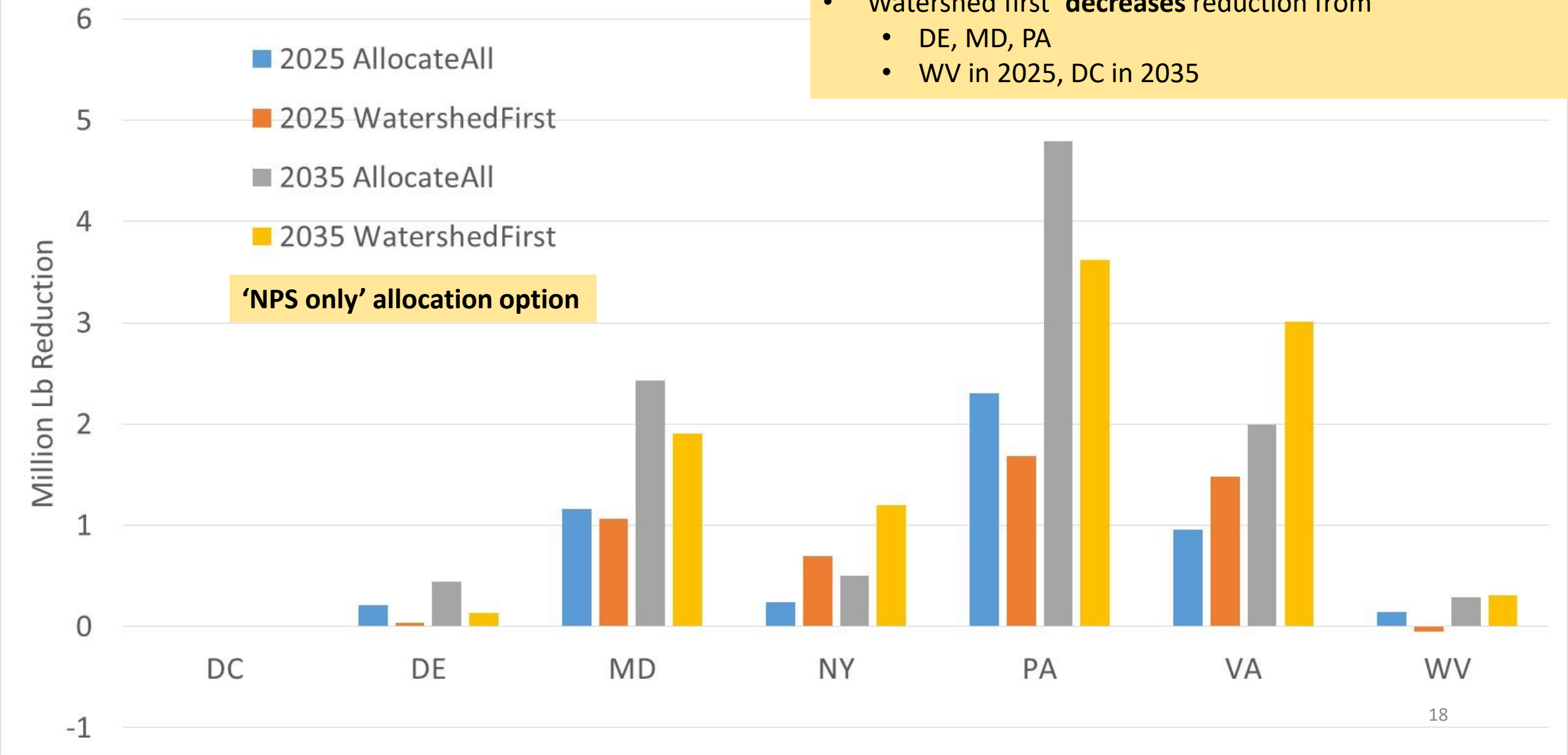
Combined Total Reductions

- After conversion of P to N, Watershed First is a slightly higher load reduction scenario.



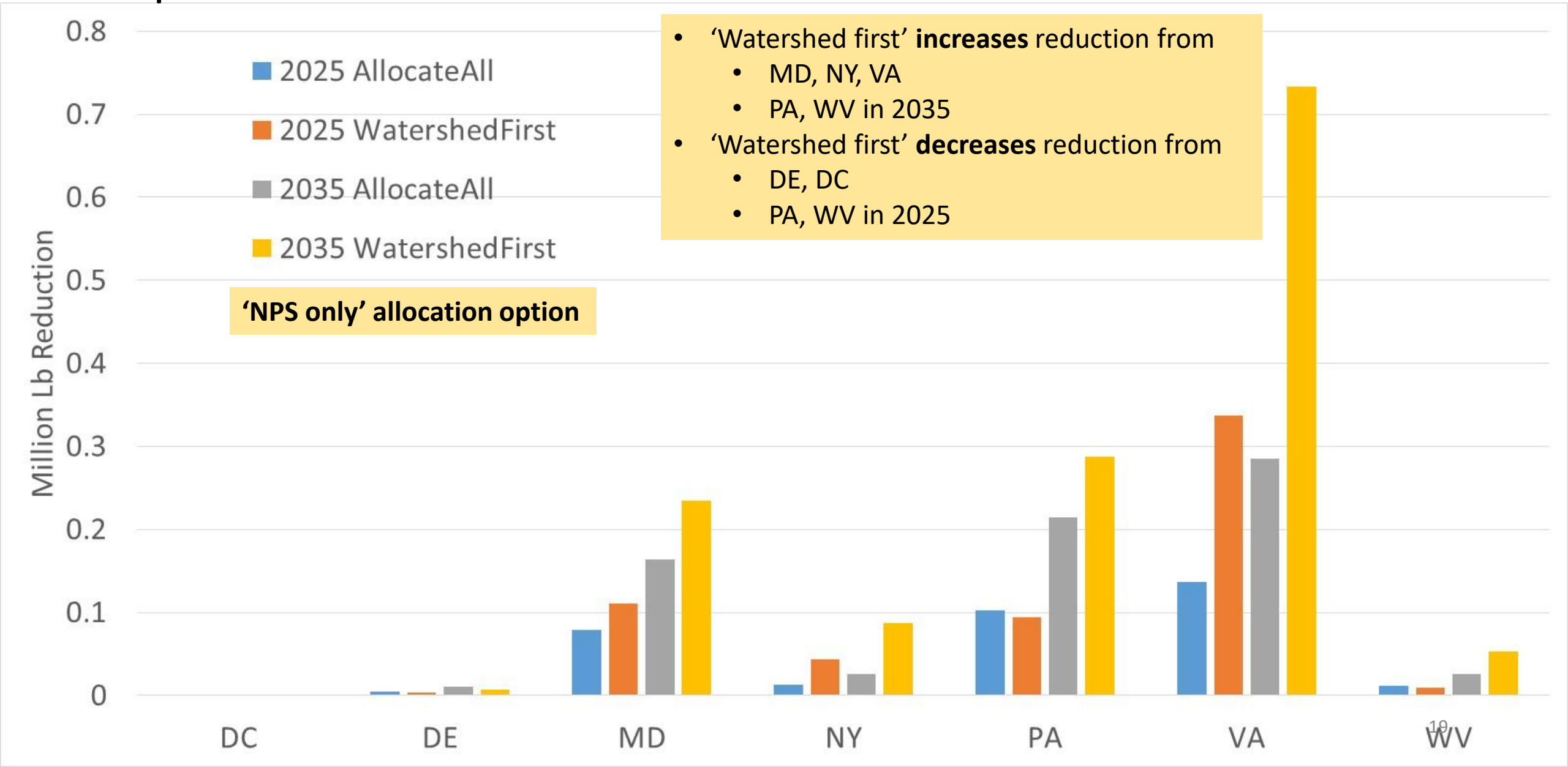
Nitrogen Total Reductions

- ‘Watershed first’ **increases** reduction from
  - NY, VA
  - DC in 2025, WV in 2035
- ‘Watershed first’ **decreases** reduction from
  - DE, MD, PA
  - WV in 2025, DC in 2035



‘NPS only’ allocation option

Phosphorus Total Reductions



- ‘Watershed first’ **increases** reduction from
  - MD, NY, VA
  - PA, WV in 2035
- ‘Watershed first’ **decreases** reduction from
  - DE, DC
  - PA, WV in 2025

‘NPS only’ allocation option

Combined Total Reductions

- ‘Watershed first’ **increases** reduction from
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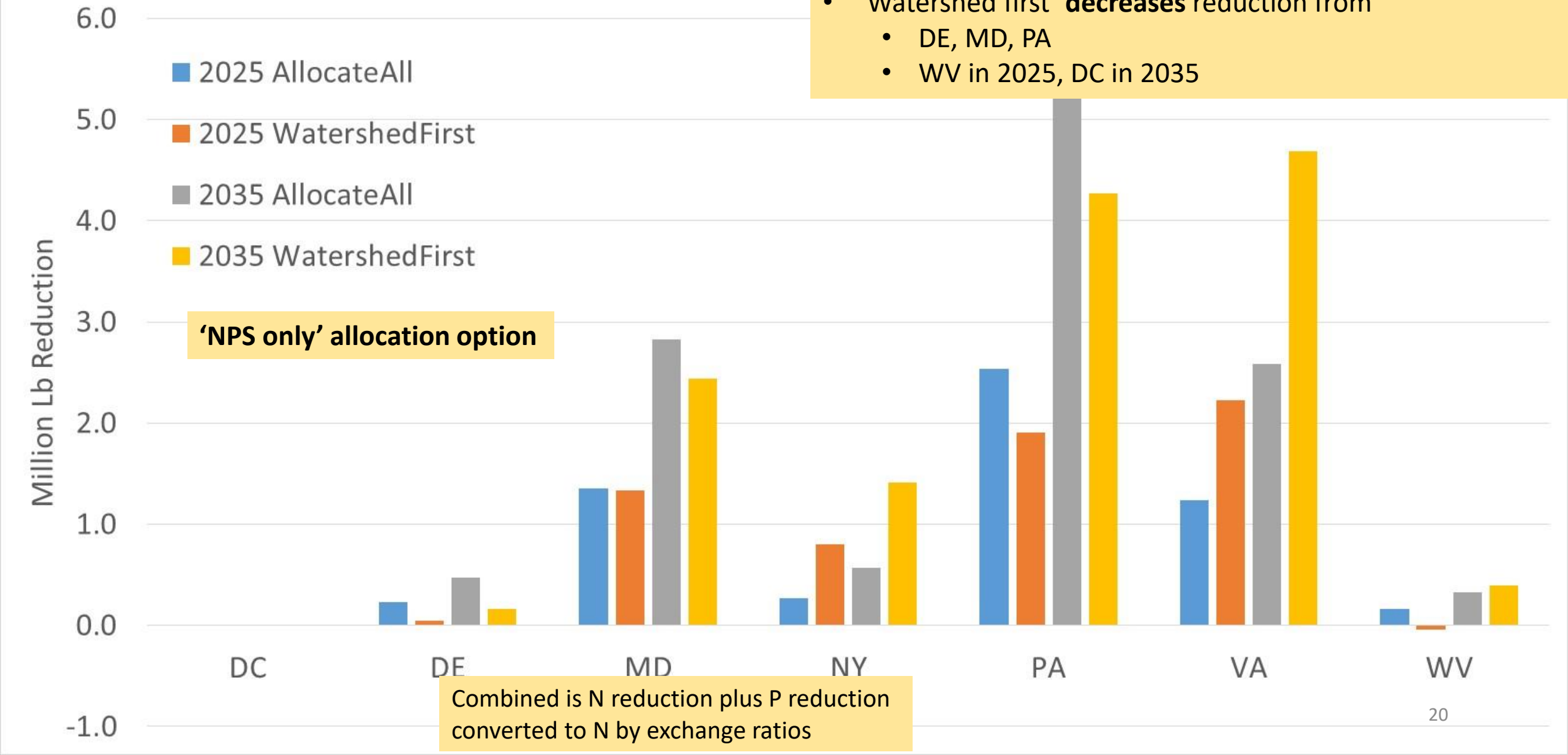


‘NPS only’ allocation option

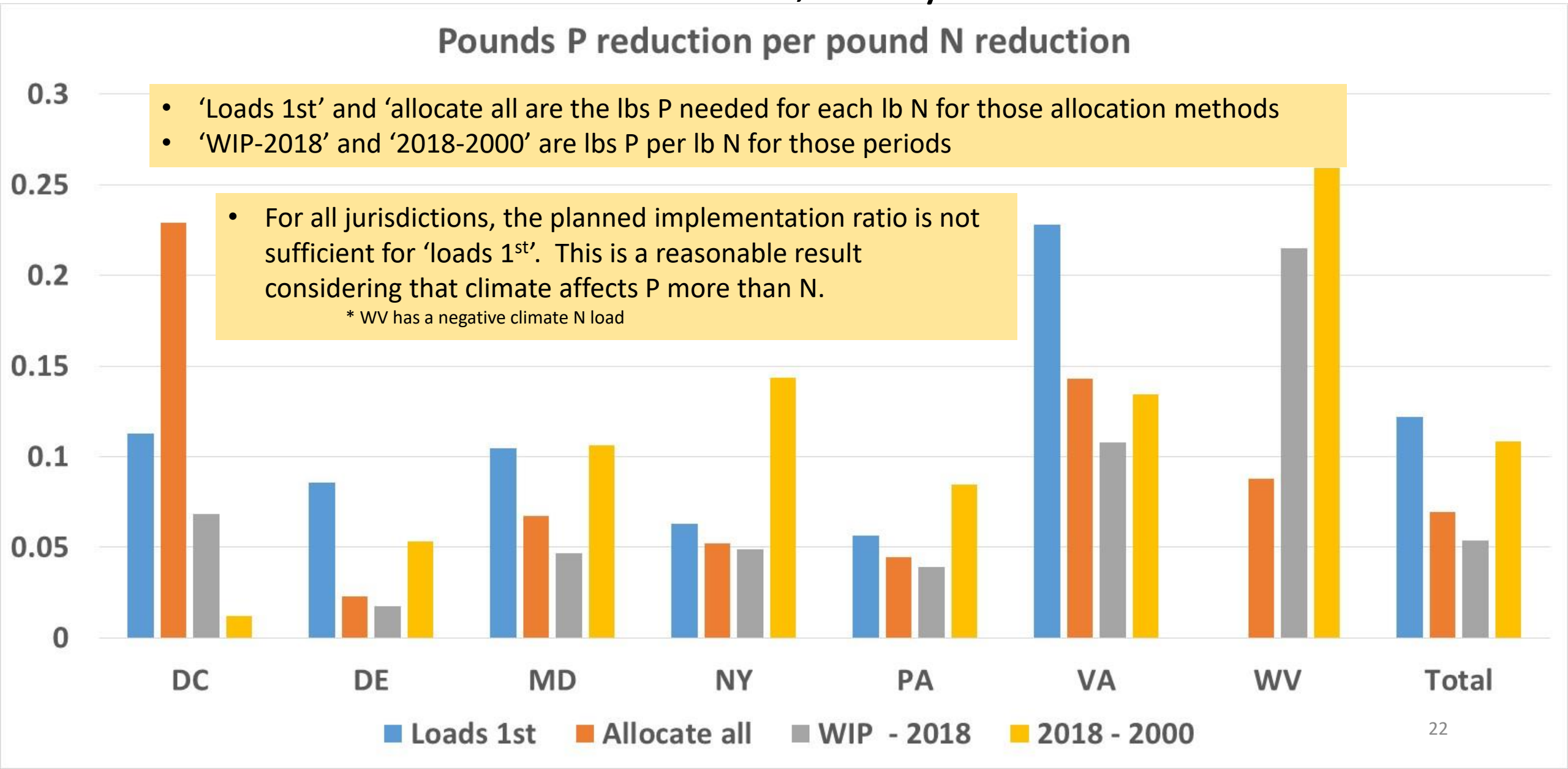
Combined is N reduction plus P reduction converted to N by exchange ratios

Question from WQGIT

- Assuming more of the same types of practices that are in our WIPs are implemented for climate change…
  - And
- Assuming we aim at the nitrogen reduction

- Will we hit the P reduction?

Answer: Not for ‘loads first’, maybe for ‘allocate all’



- ‘Loads 1st’ and ‘allocate all are the lbs P needed for each lb N for those allocation methods
- ‘WIP-2018’ and ‘2018-2000’ are lbs P per lb N for those periods

- For all jurisdictions, the planned implementation ratio is not sufficient for ‘loads 1st’. This is a reasonable result considering that climate affects P more than N.

  * WV has a negative climate N load

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Year and watershed loads decisions

- At the 6/22/2020 WQGIT, members indicated strong interest in the ‘year 2025’ scenarios. There was also considerable interest in the ‘watershed loads first’ scenario.

- If these two scenarios are chosen, then there is no allocation beyond the watershed loads and there is no need to choose a WWTP scenario.

- The WWTP scenarios that specify concentrations for the WWTP line (6and4, 6and4.5, 8and4) cause the ‘all other’ line to decrease for the ‘2025 watershed load first’ scenarios.

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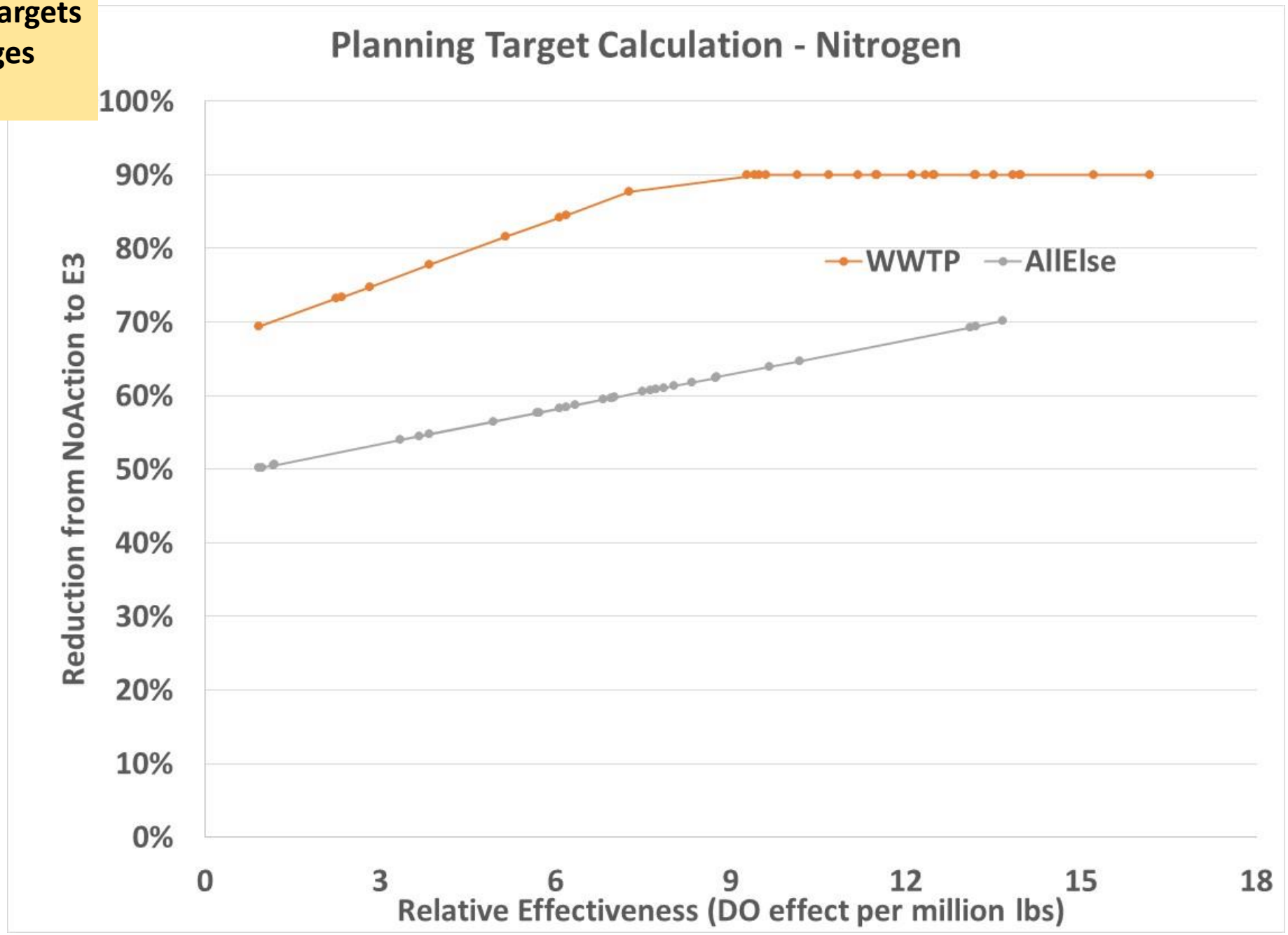
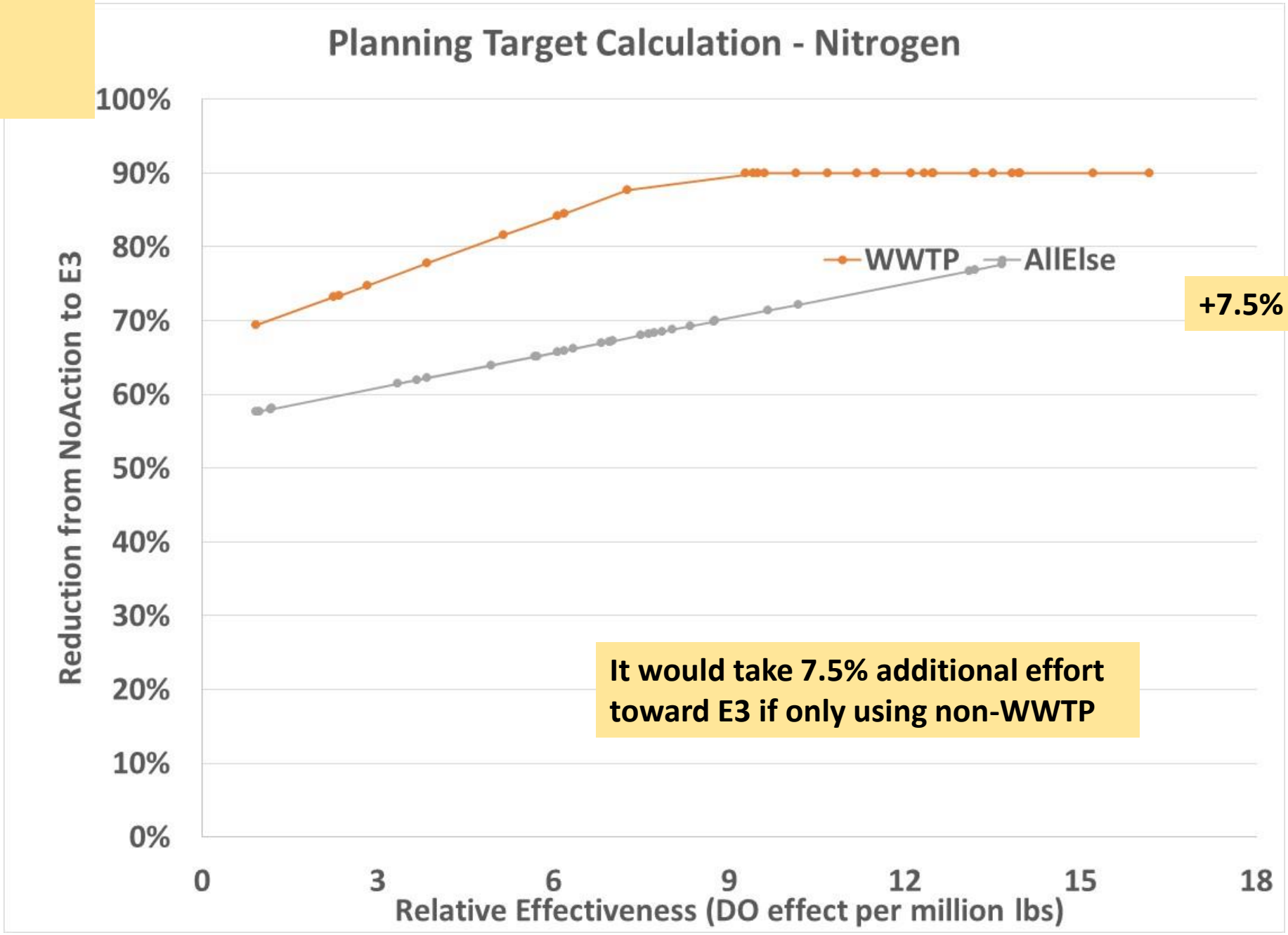
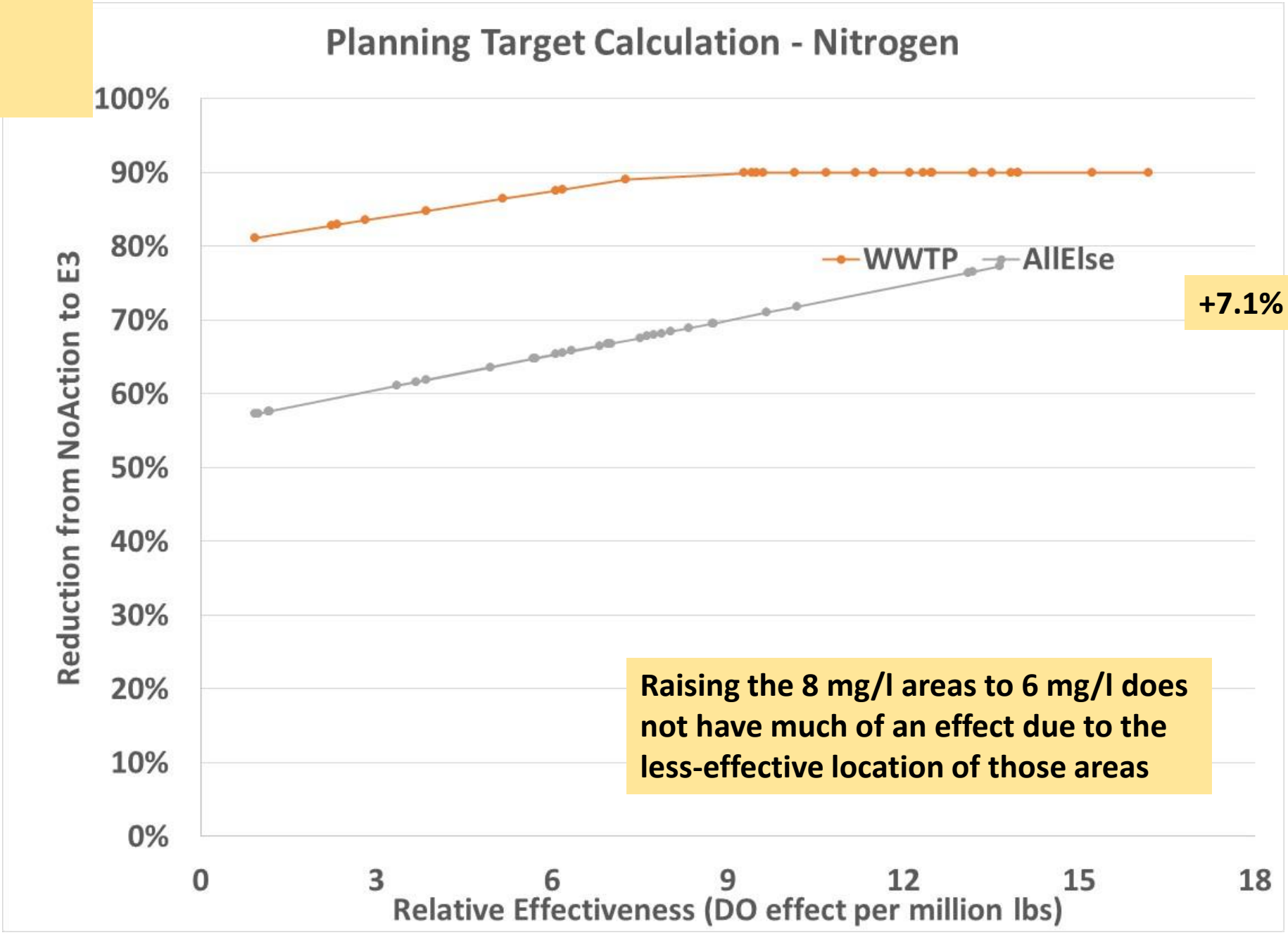
2017 Planning Targets
Prior to exchanges and exceptions



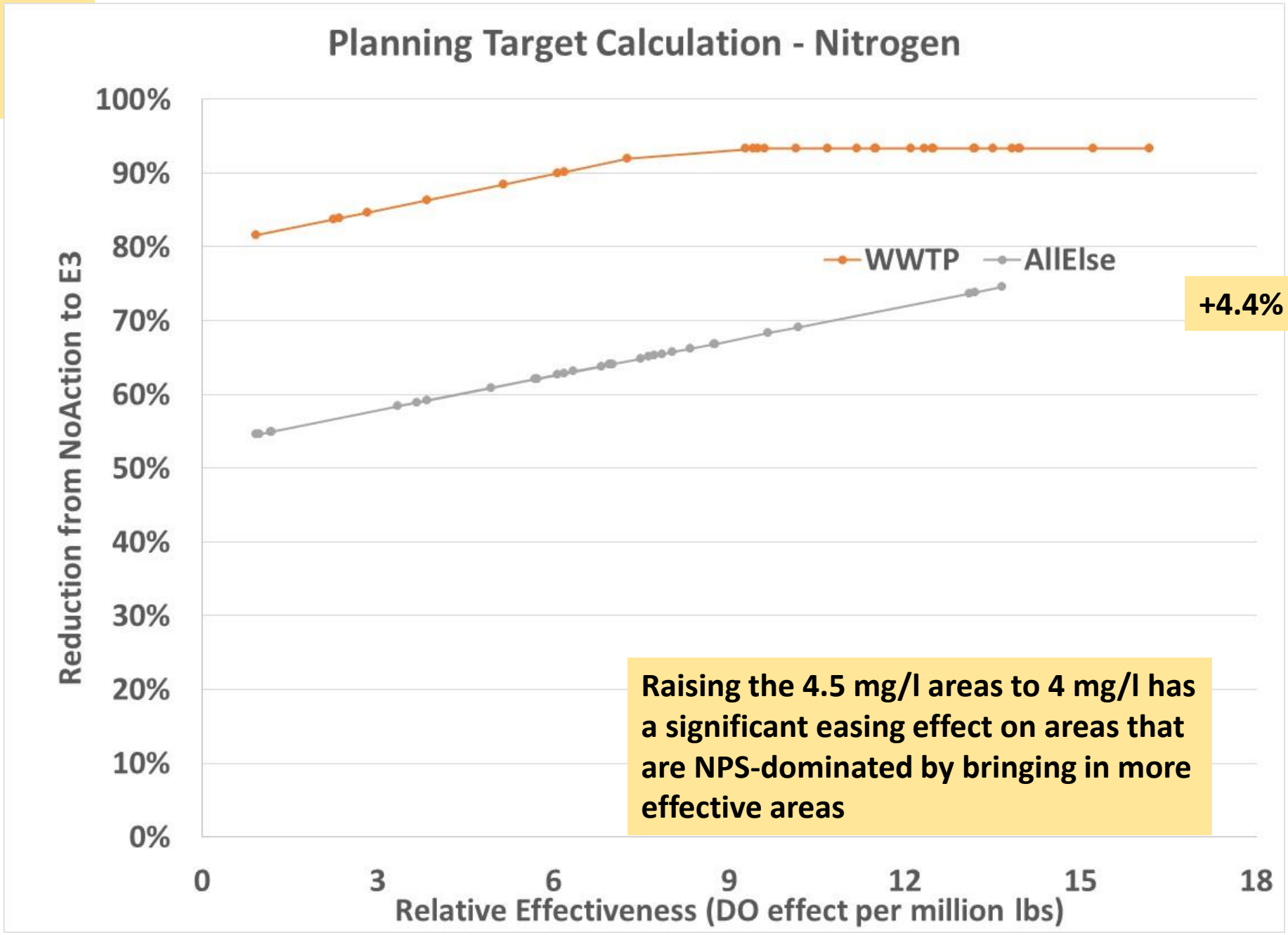
2035 climate
All Allocation
NPS only



2035 climate
All Allocation
6 and 4.5 mg/l



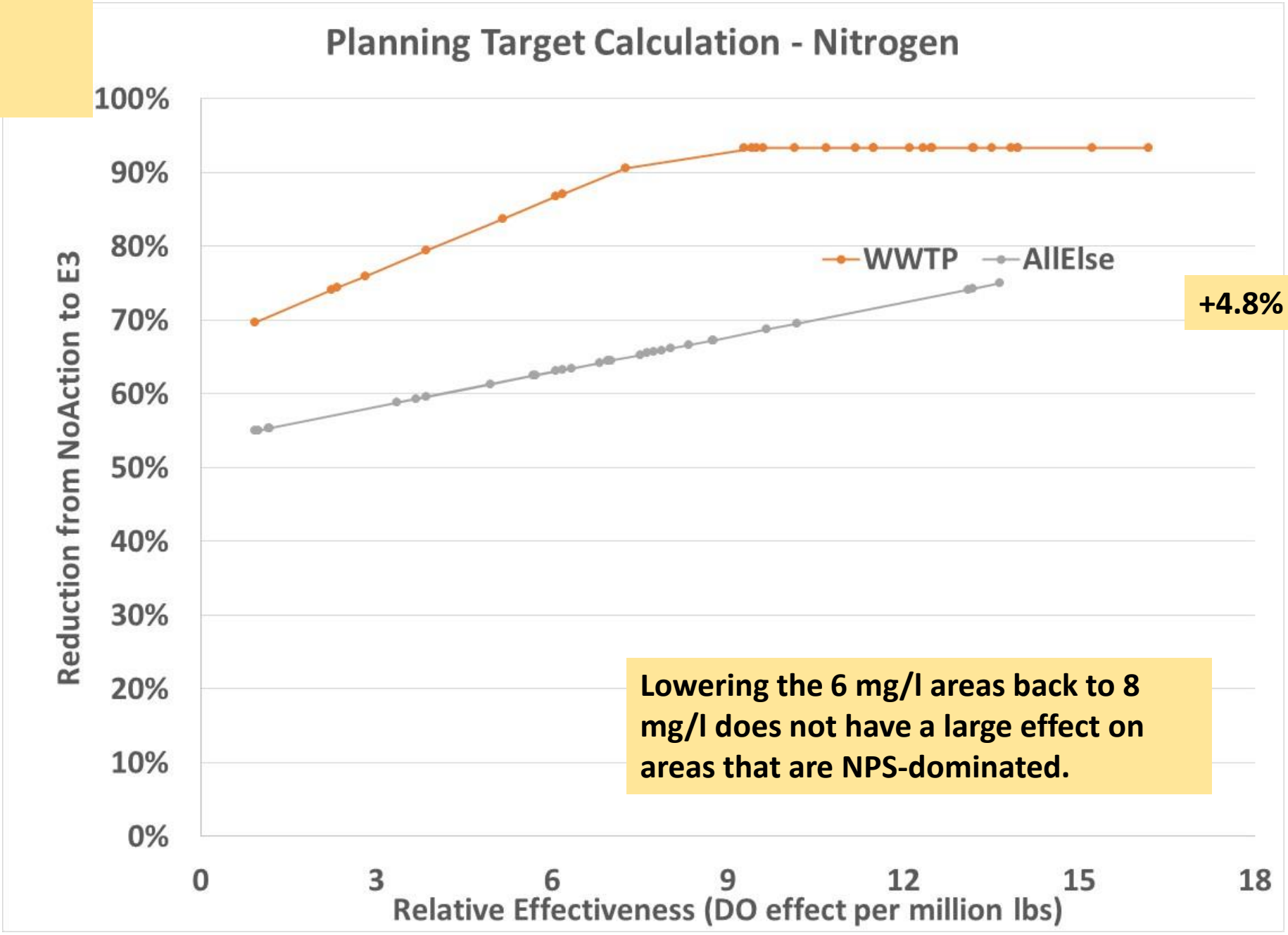
2035 climate
All Allocation
6 and 4 mg/l



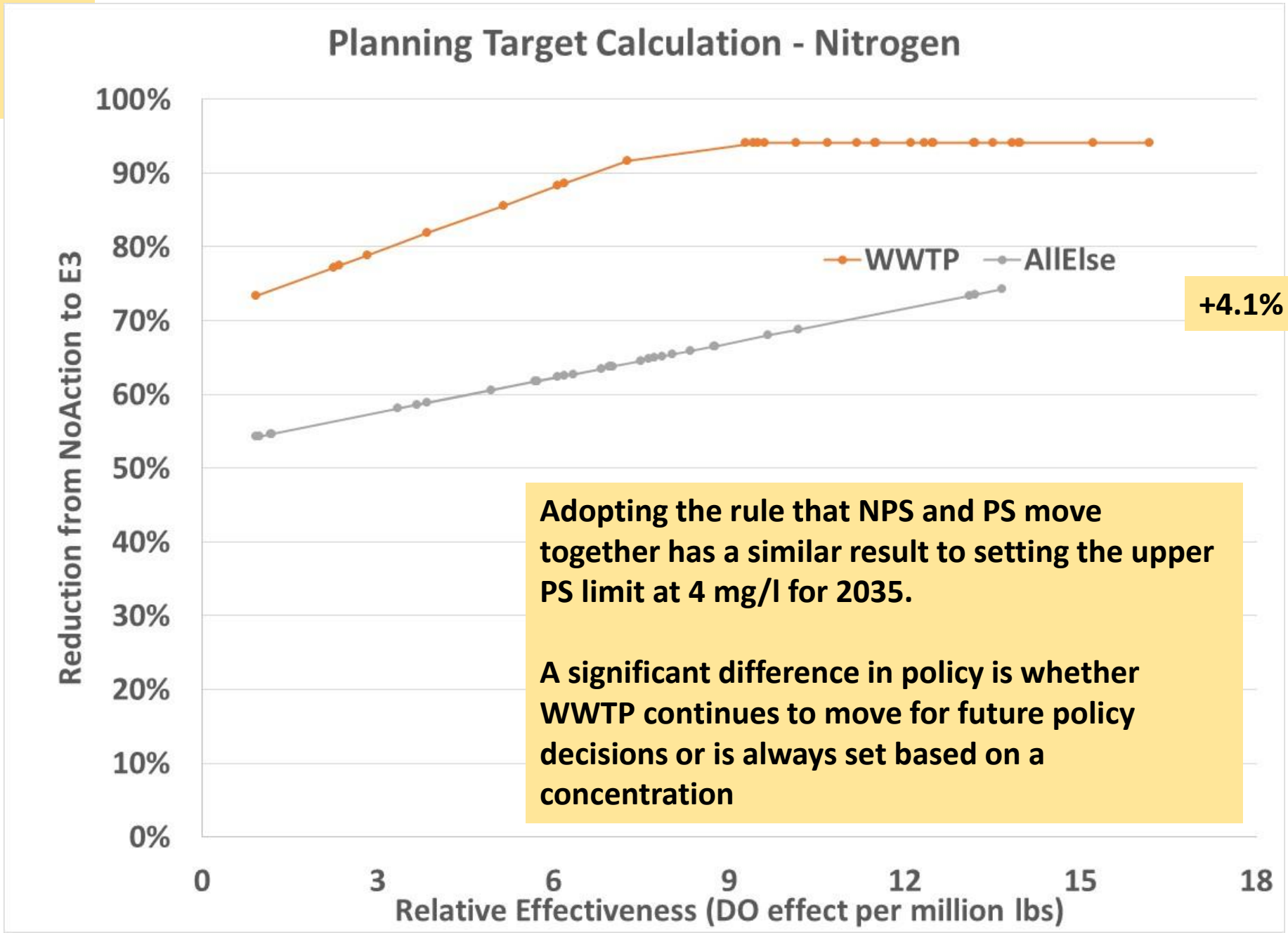
+4.4%

Raising the 4.5 mg/l areas to 4 mg/l has a significant easing effect on areas that are NPS-dominated by bringing in more effective areas

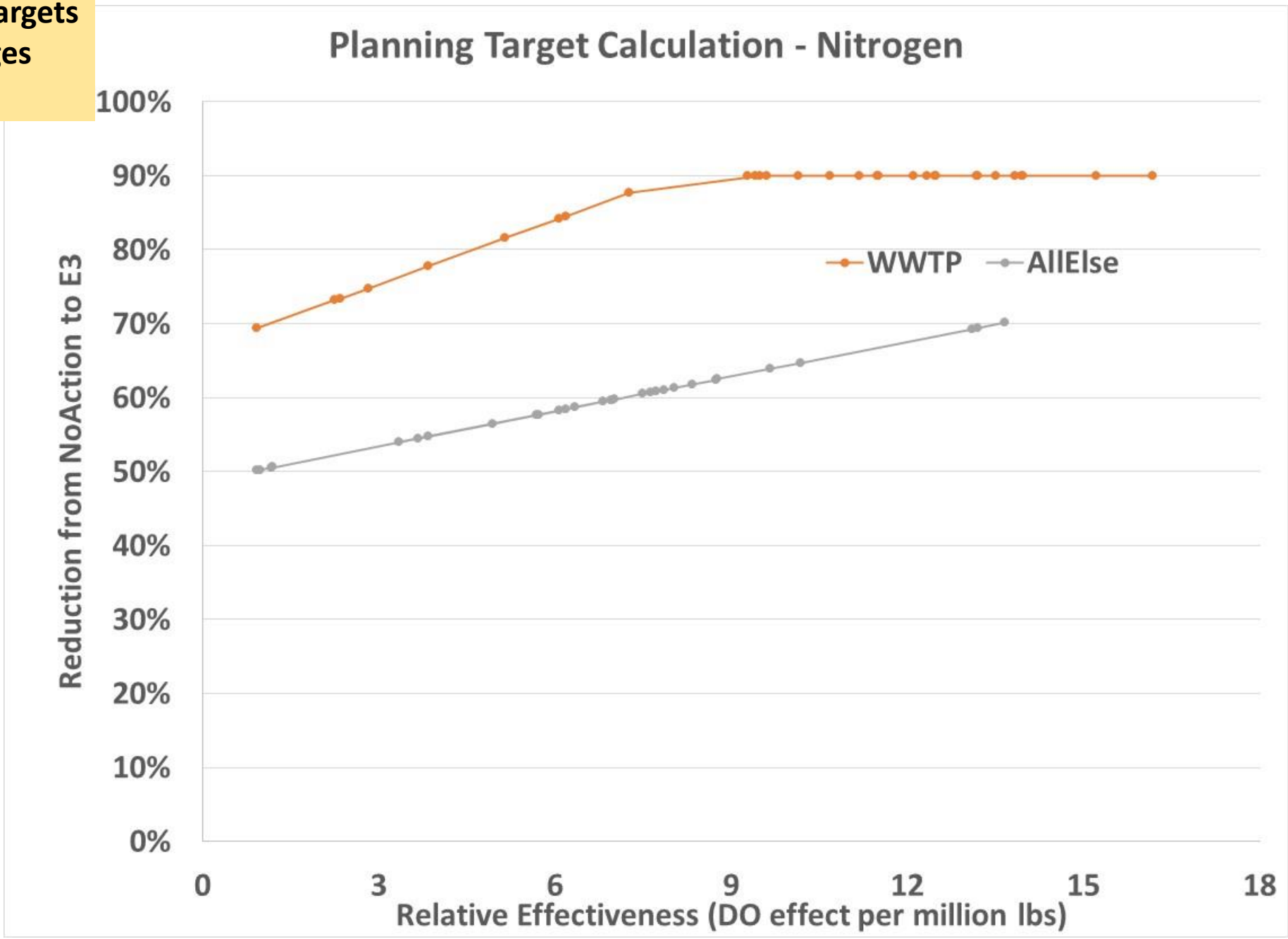
2035 climate
All Allocation
8 and 4 mg/l



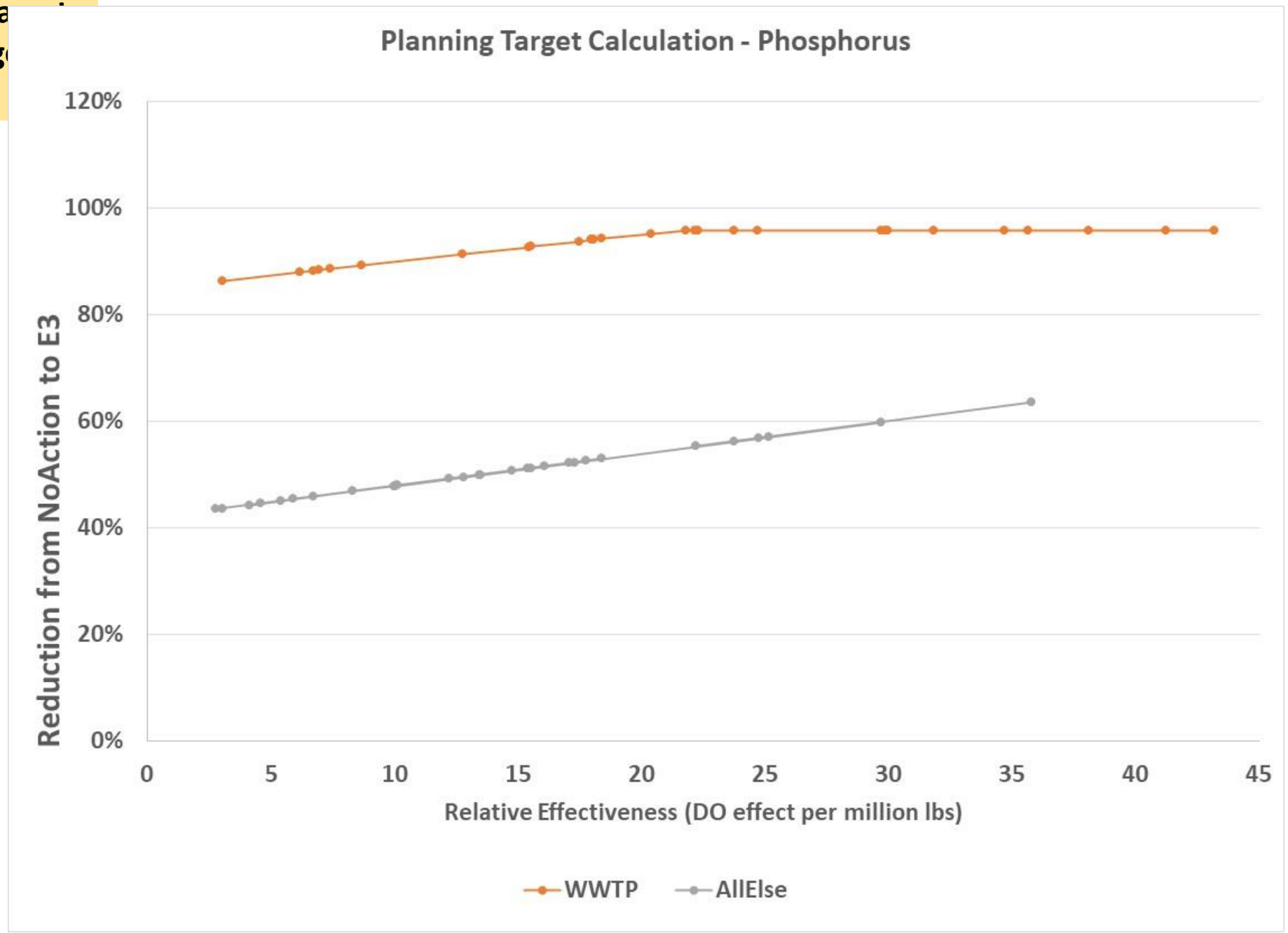
2035 climate
All Allocation
NPS + WWTP



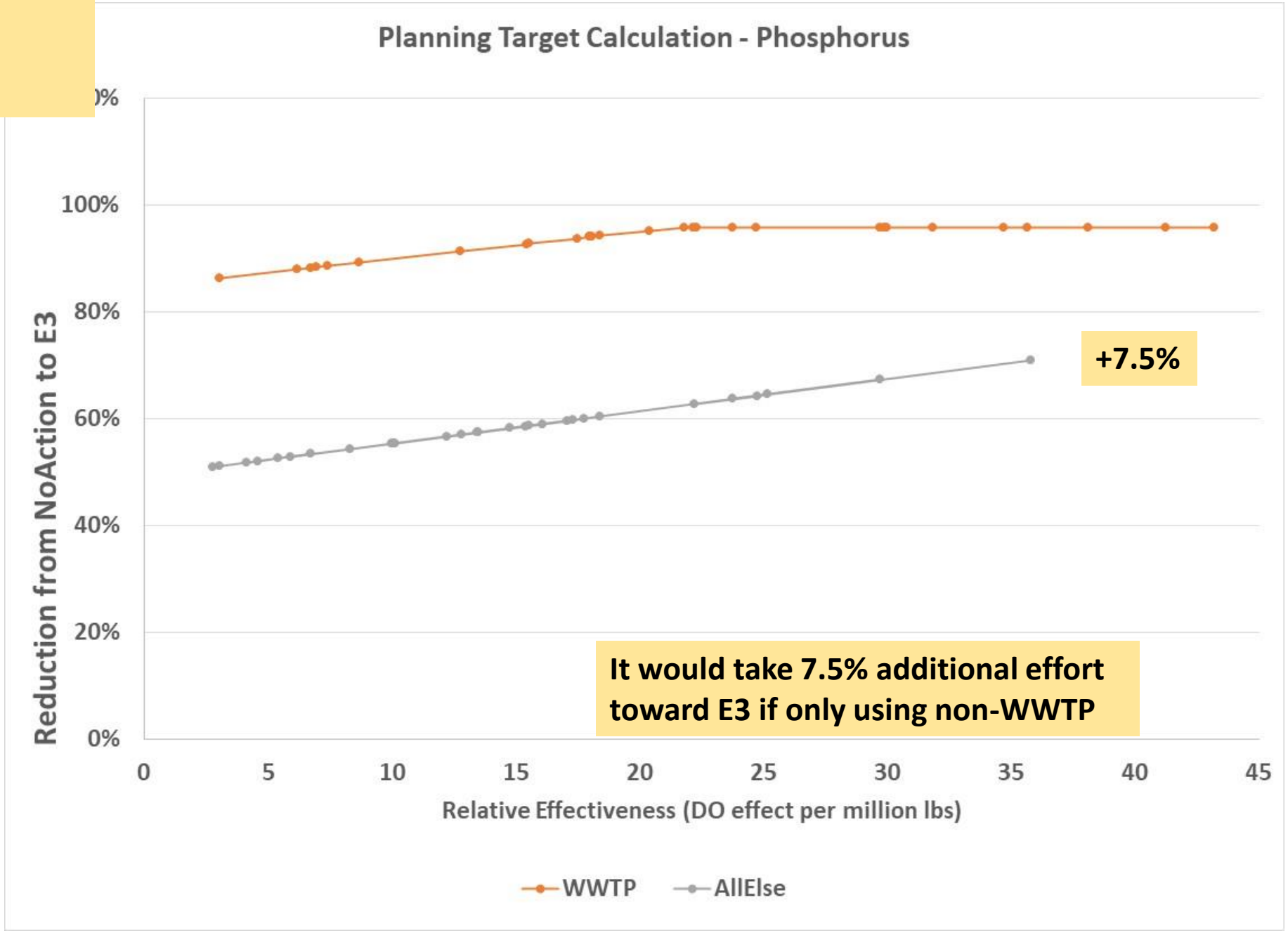
2017 Planning Targets
Prior to exchanges and exceptions



2017 Planning Ta
Prior to exchang
and exceptions

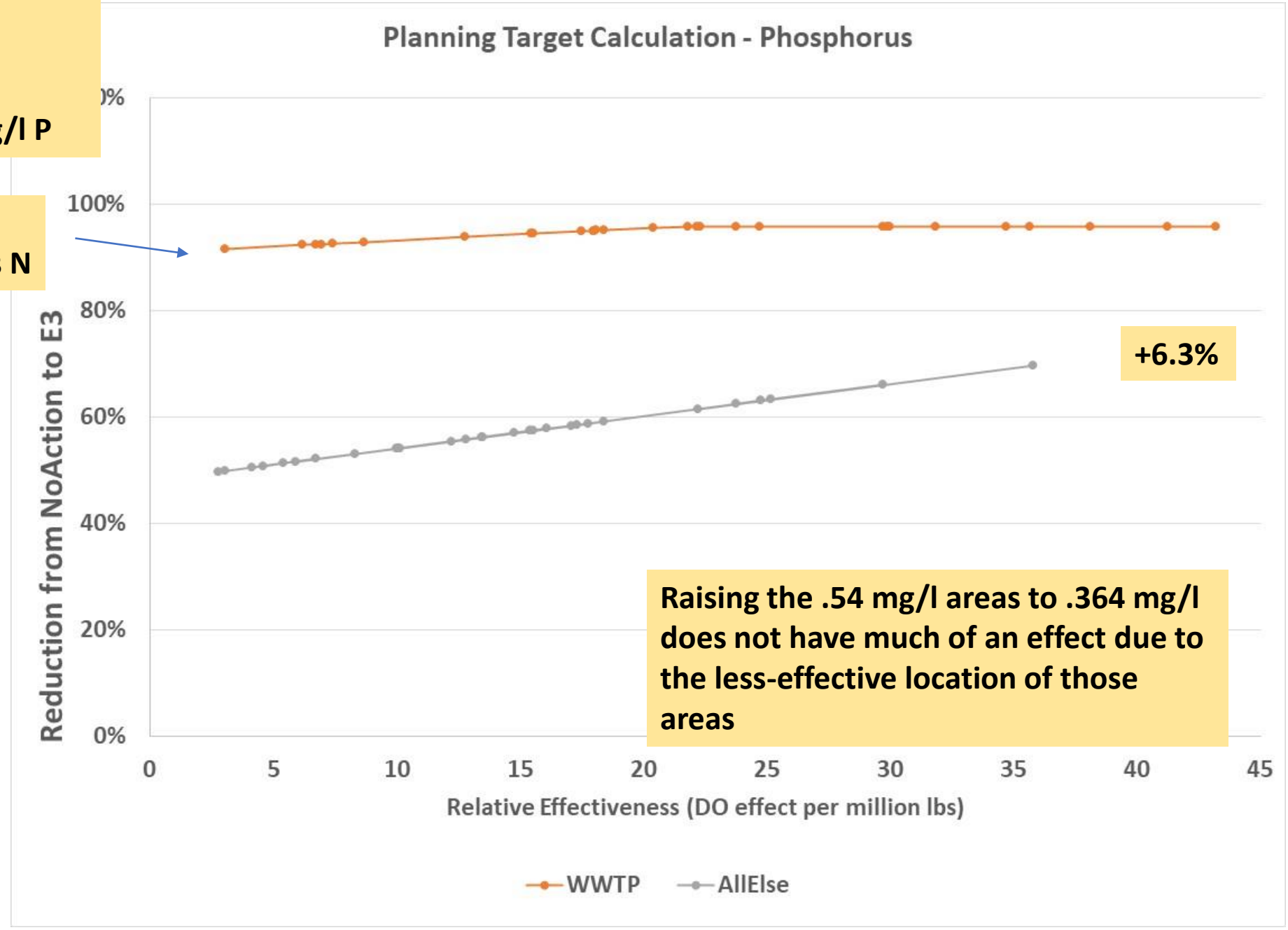


2035 climate
All Allocation
NPS only

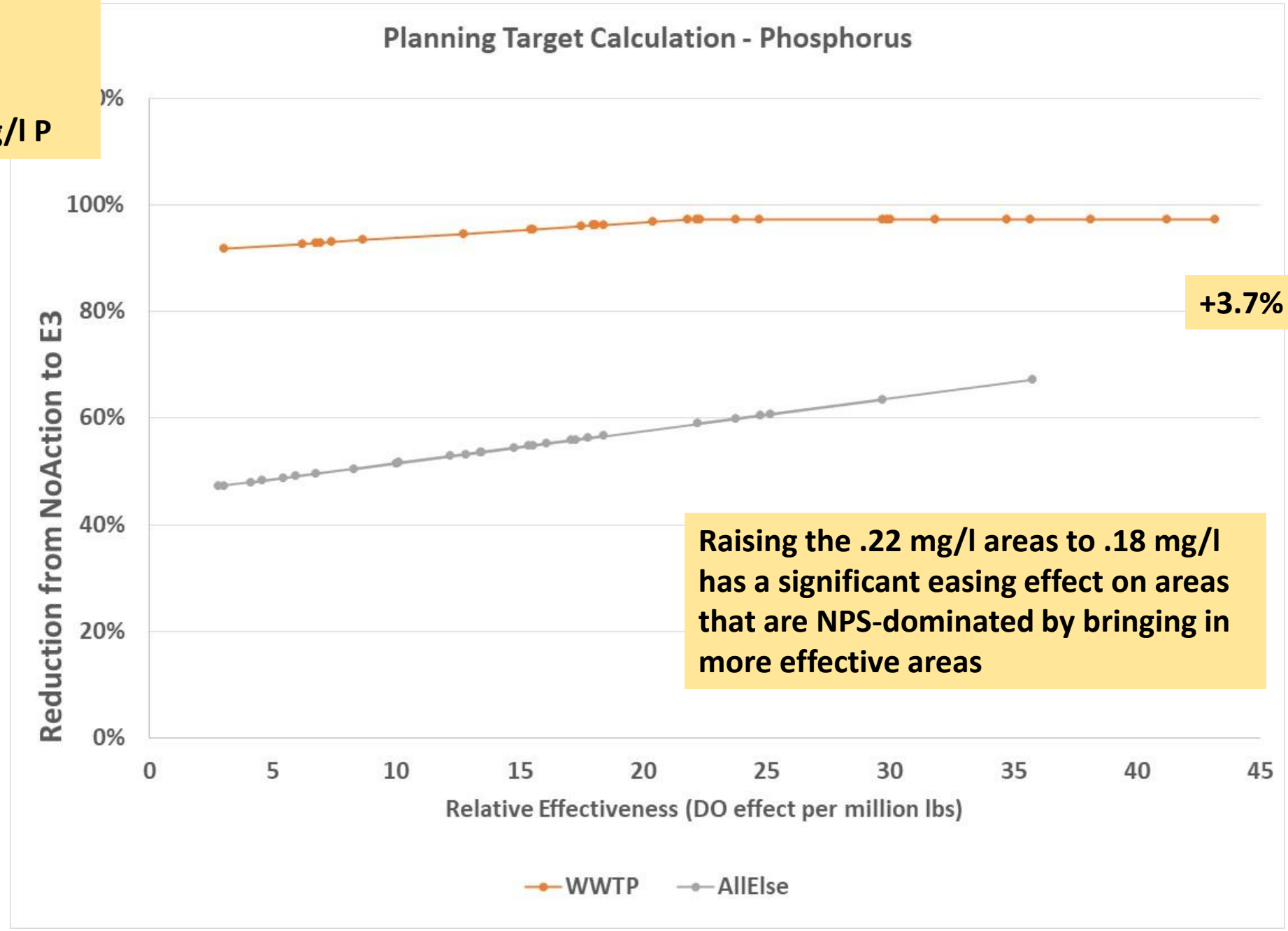


2035 climate
All Allocation
6 and 4.5 mg/l
.364 and .22 mg/l P

Same fraction toward 100% as N



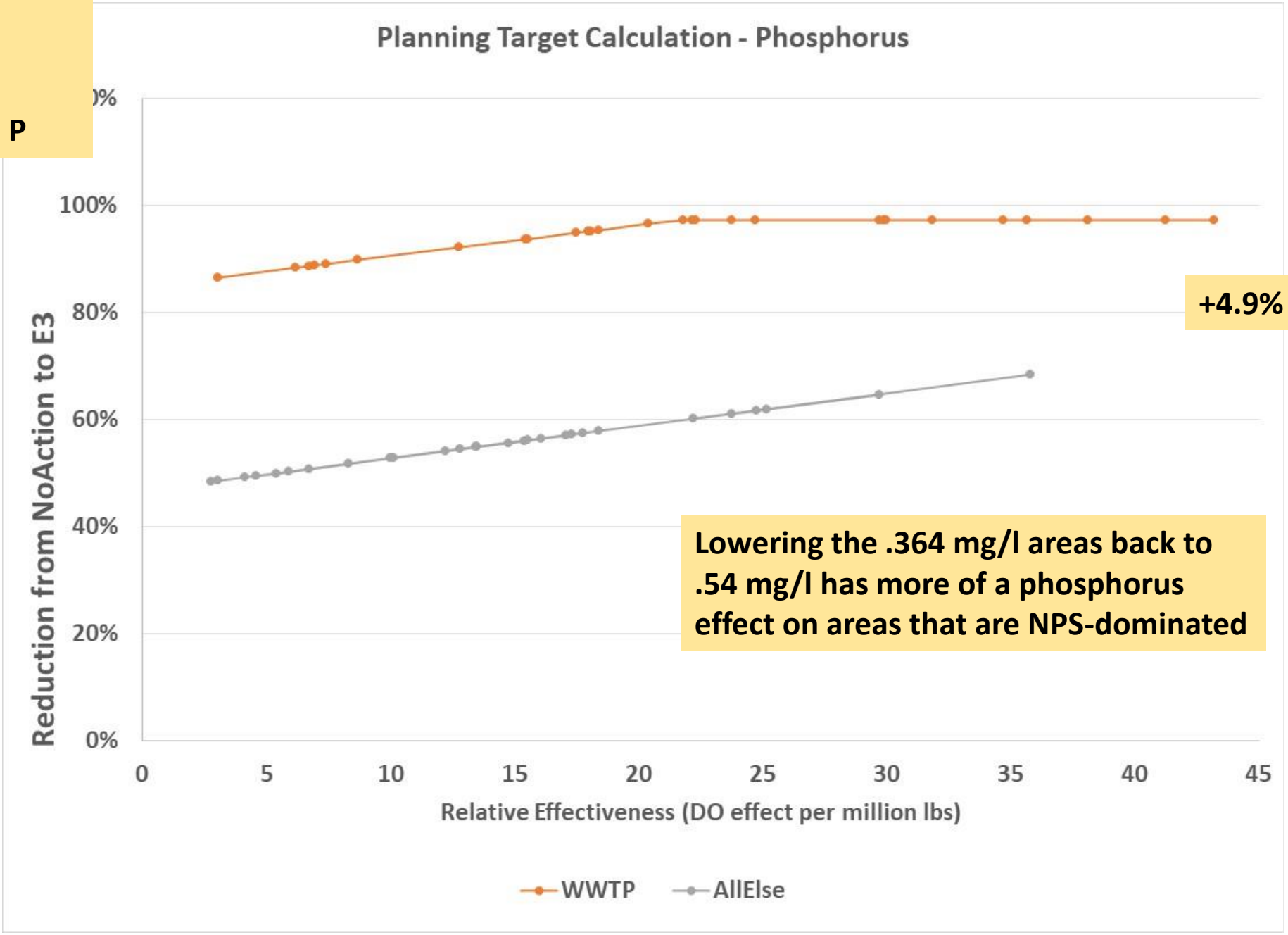
2035 climate
All Allocation
6 and 4 mg/l
.364 and .18 mg/l P



+3.7%

Raising the .22 mg/l areas to .18 mg/l has a significant easing effect on areas that are NPS-dominated by bringing in more effective areas

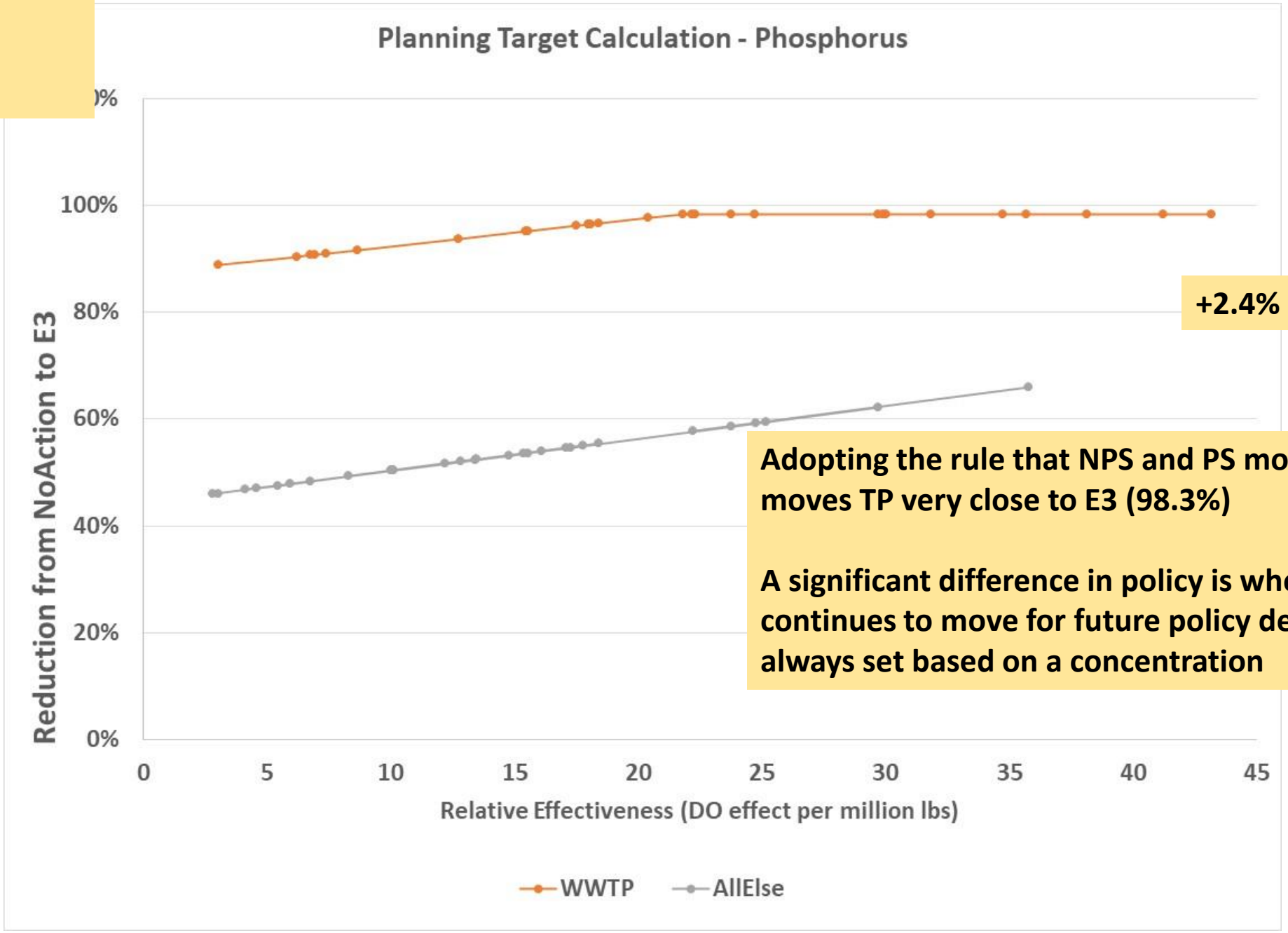
2035 climate
All Allocation
8 and 4 mg/l
.54 and .18 mg/l P



+4.9%

Lowering the .364 mg/l areas back to .54 mg/l has more of a phosphorus effect on areas that are NPS-dominated

2035 climate
All Allocation
NPS + WWTP

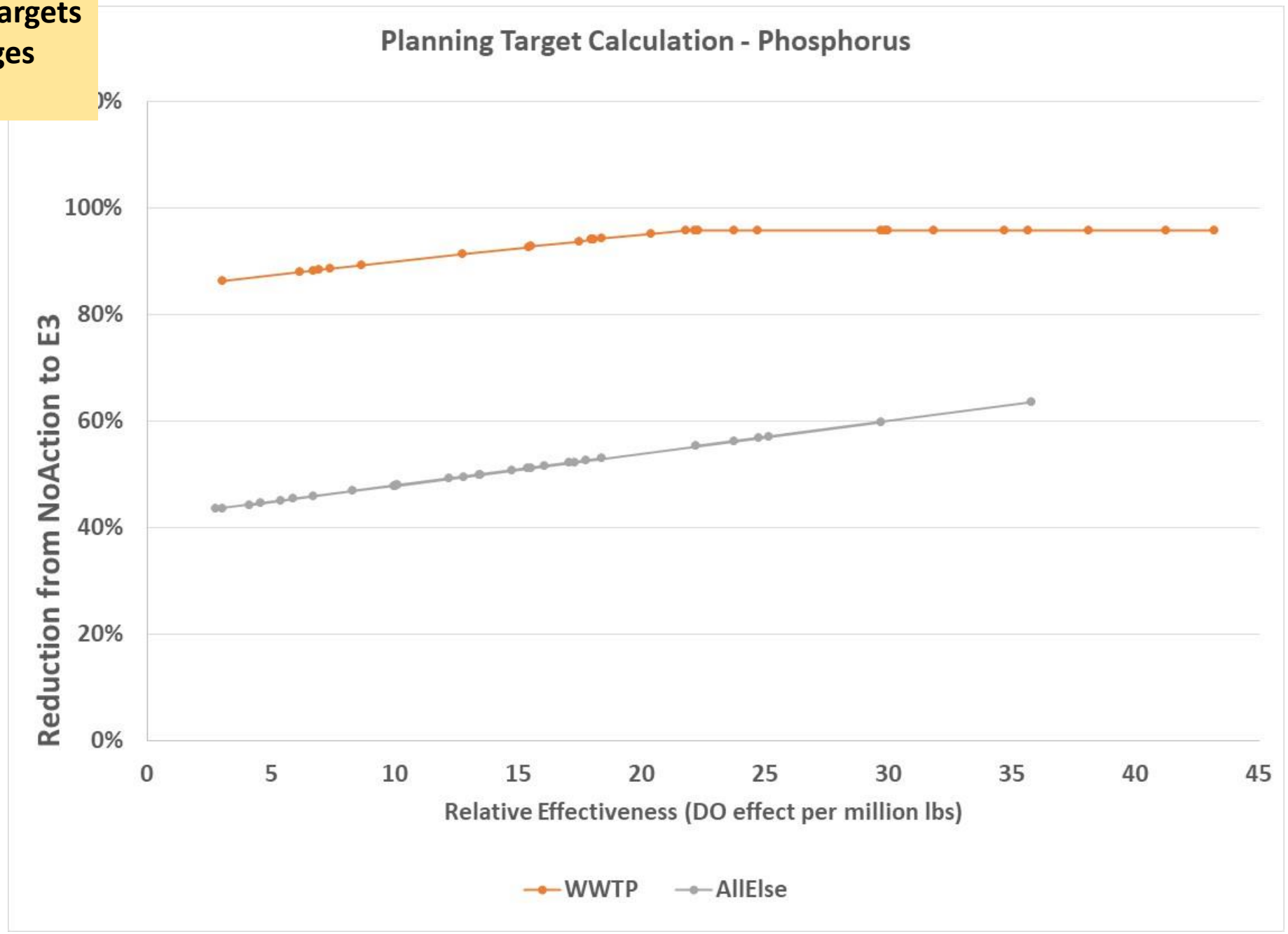


+2.4%

Adopting the rule that NPS and PS move together moves TP very close to E3 (98.3%)

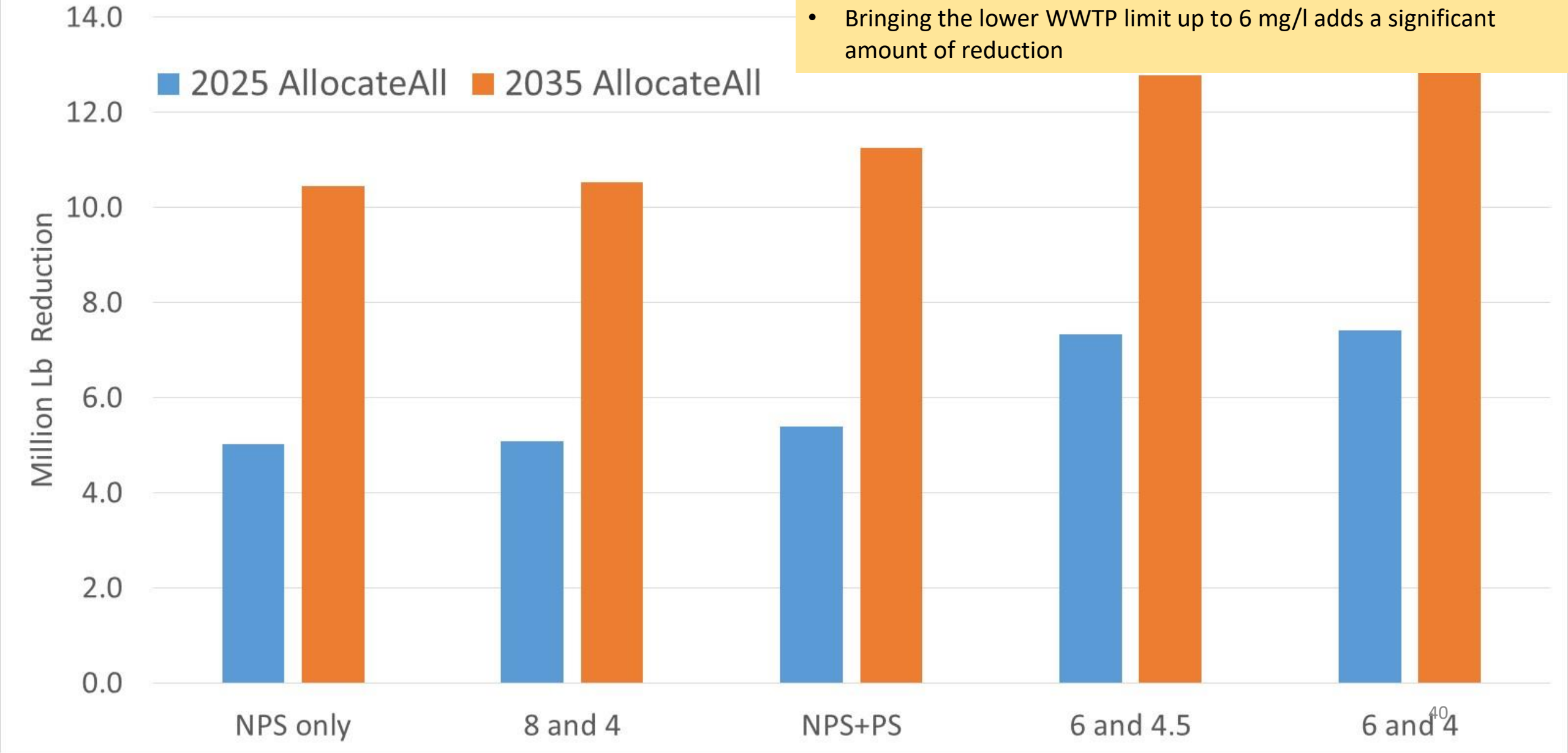
A significant difference in policy is whether WWTP continues to move for future policy decisions or is always set based on a concentration

2017 Planning Targets
Prior to exchanges and exceptions



Nitrogen Total Reductions

- Raising the upper part of the WWTP line (8and4) adds no reduction
- Shifting the lower part of the WWTP (other scenarios) adds reduction
- Bringing the lower WWTP limit up to 6 mg/l adds a significant amount of reduction



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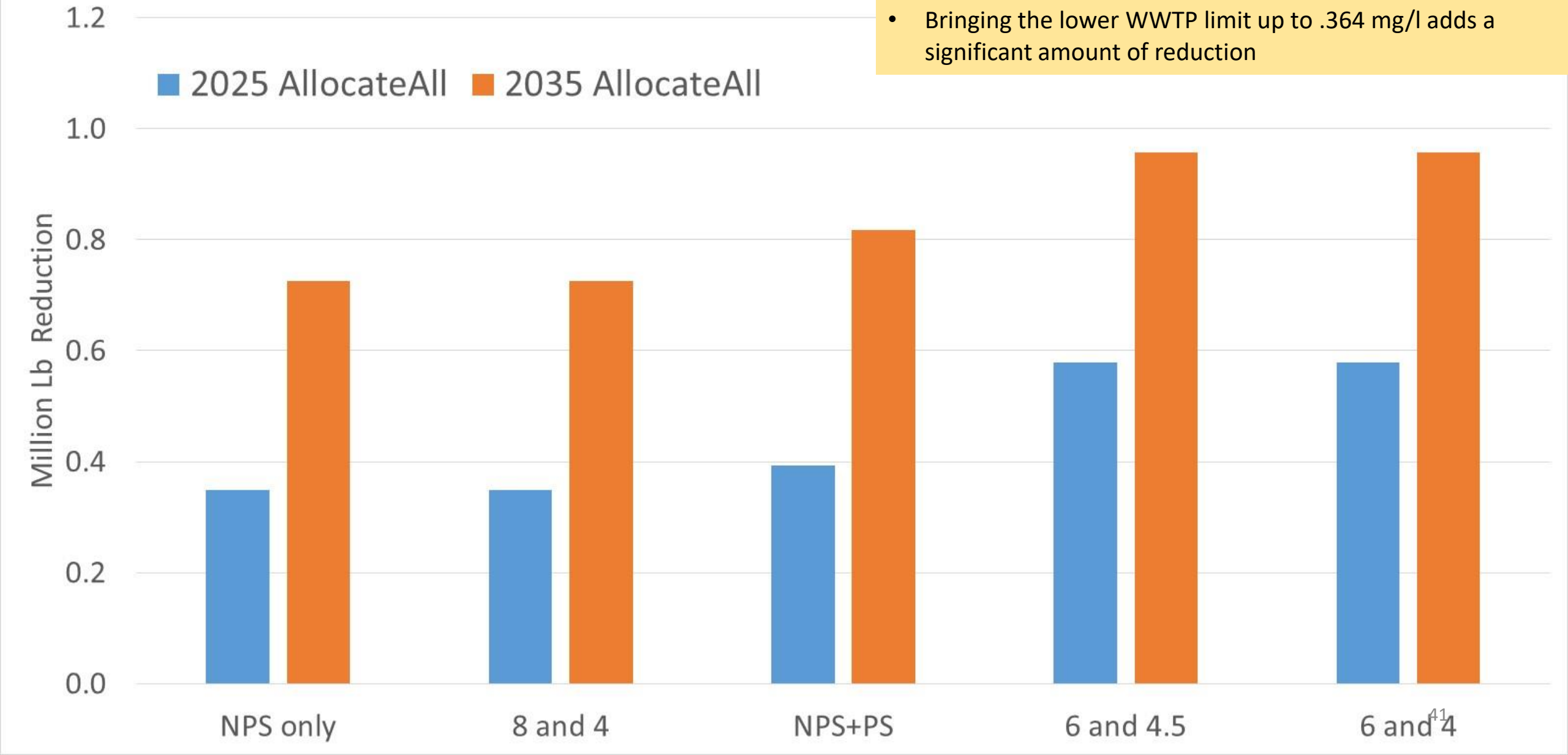

Combined Total Reductions

- Raising the upper part of the WWTP line (8and4) adds no reduction
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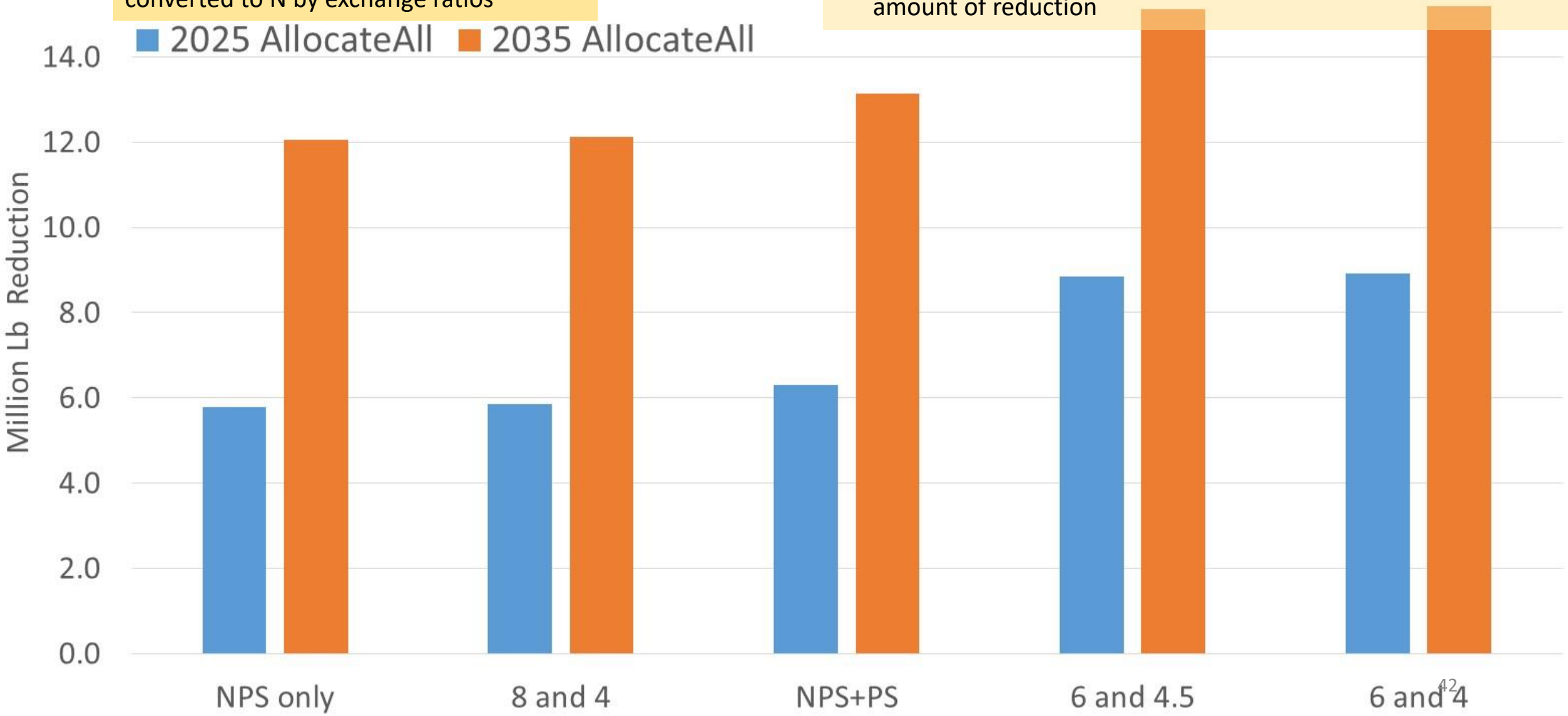
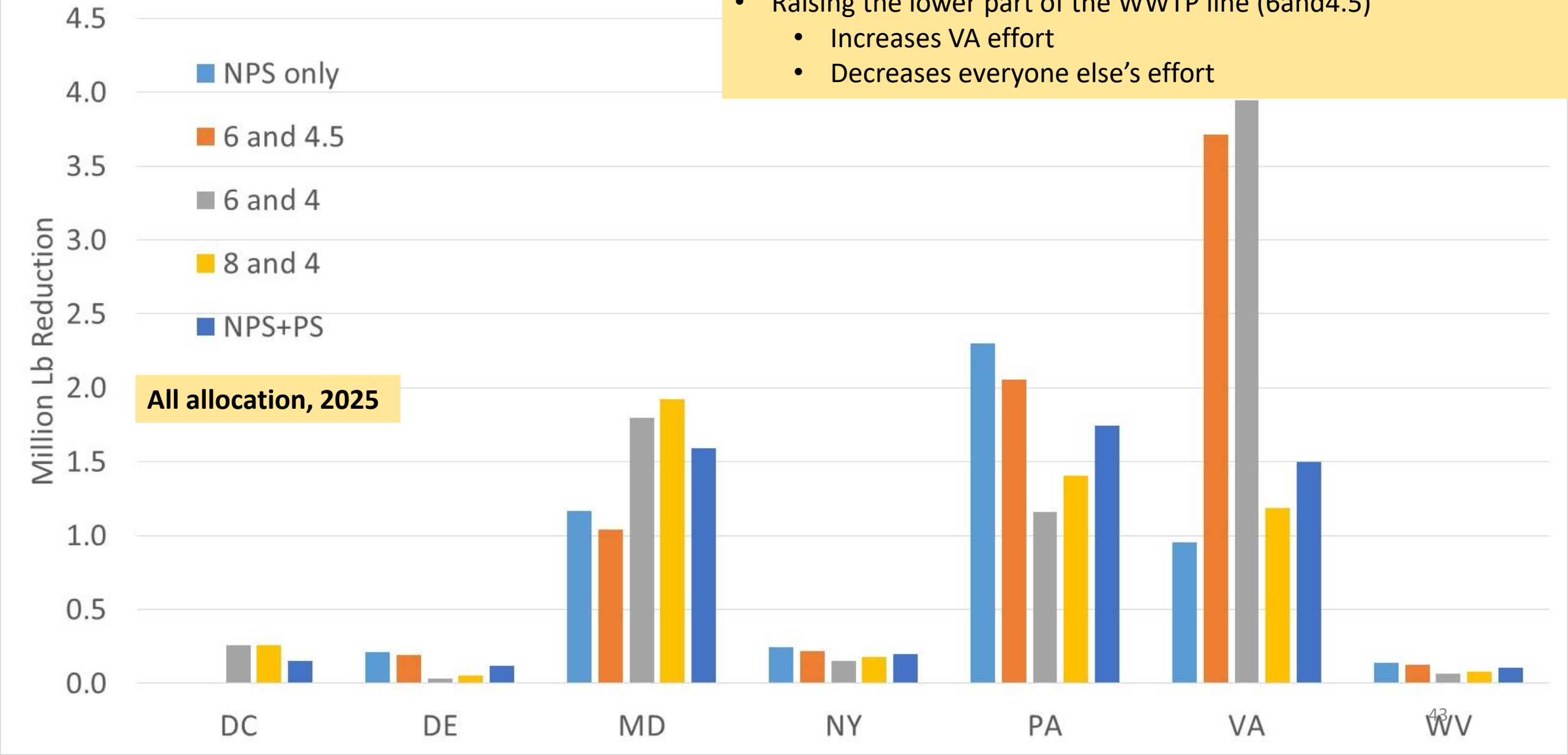
Combined is N reduction plus P reduction converted to N by exchange ratios



Nitrogen Total Reduction

- Raising the upper part of the WWTP line (8and4, 6and4, NPS+PS)
  - Decreases DE, NY, PA, WV effort
  - Increases DC, MD, VA effort
- Raising the lower part of the WWTP line (6and4.5)
  - Increases VA effort
  - Decreases everyone else's effort



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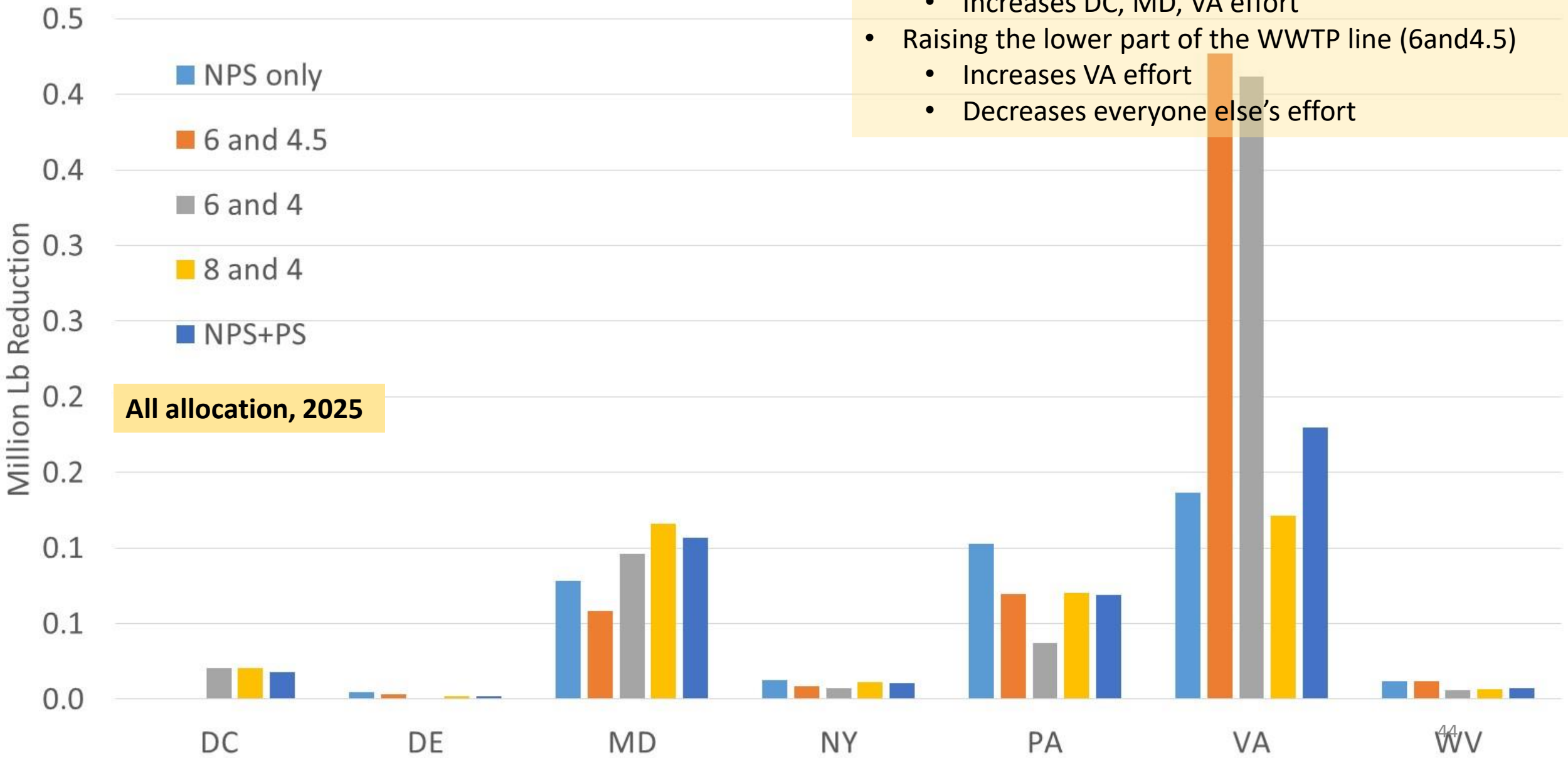

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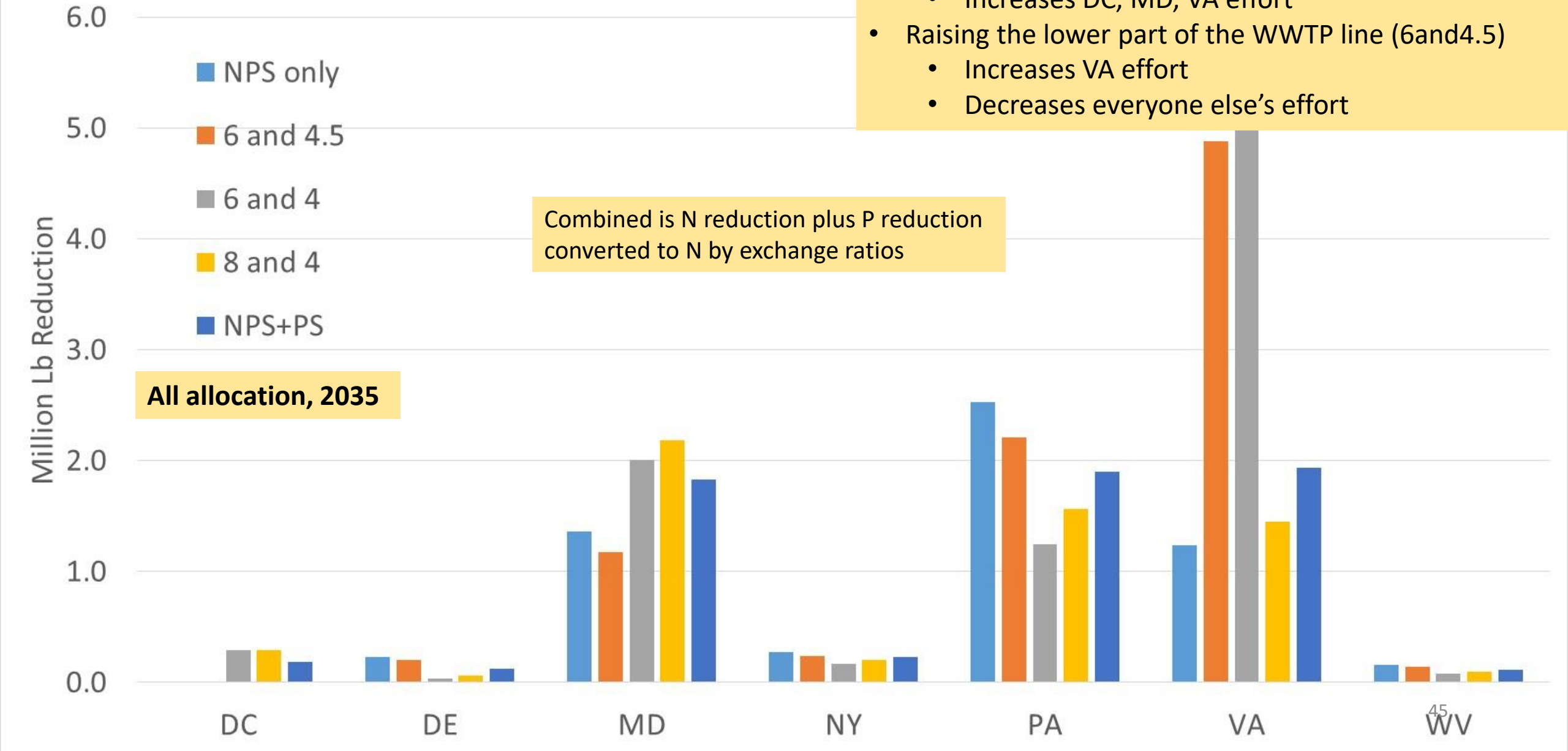

Combined is N reduction plus P reduction converted to N by exchange ratios

All allocation, 2035

WQGIT Climate Allocation Decisions

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WWTP Scenario	NPS only	NPS only	NPS only	NPS only	NPS only	NPS only	NPS only	NPS only	NPS+PS	NPS+PS	NPS+PS	NPS+PS	NPS+PS	NPS+PS	NPS+PS	NPS+PS
Year	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035
Watershed First	No	No	L1st	L1st	No	No	L1st	L1st	No	No	L1st	L1st	No	No	L1st	L1st
State	TN	TN	TN	TN	TP	TP	TP	TP	TN	TN	TN	TN	TP	TP	TP	TP
DC	0.003	0.007	0.006	0.007	0.001	0.002	0.001	0.001	0.152	0.316	0.006	0.046	0.018	0.037	0.001	0.006
DE	0.212	0.442	0.036	0.138	0.005	0.010	0.003	0.007	0.116	0.242	0.036	0.112	0.002	0.004	0.003	0.007
MD	1.164	2.426	1.061	1.905	0.079	0.164	0.111	0.235	1.590	3.315	1.061	2.017	0.107	0.222	0.111	0.242
NY	0.242	0.504	0.699	1.202	0.013	0.026	0.044	0.087	0.201	0.420	0.699	1.191	0.011	0.023	0.044	0.087
PA	2.298	4.789	1.683	3.618	0.103	0.214	0.095	0.287	1.740	3.627	1.683	3.472	0.069	0.143	0.095	0.278
VA	0.957	1.995	1.476	3.009	0.137	0.285	0.337	0.733	1.497	3.121	1.476	3.151	0.179	0.374	0.337	0.745
WV	0.138	0.288	-0.054	0.308	0.012	0.025	0.009	0.053	0.103	0.214	-0.054	0.299	0.008	0.016	0.009	0.052
Total	5.015	10.451	4.908	10.187	0.348	0.726	0.599	1.404	5.400	11.255	4.908	10.288	0.393	0.818	0.599	1.416
			See Note1				See Note1				See Note1				See Note1	
Basin																
Eastern Shore	0.864417	1.801541	0.429677	0.81372	0.040342	0.084076	0.040226	0.075385	0.527777	1.099946	0.429677	0.72526	0.019116	0.039839	0.040226	0.069808
James	0.271387	0.5656	0.280561	0.925384	0.044023	0.091748	0.143634	0.342765	0.708524	1.476643	0.280561	1.040252	0.100295	0.209026	0.143634	0.357551
Patuxent	0.064831	0.135116	0.103577	0.13694	0.008464	0.01764	0.019284	0.029576	0.103372	0.215439	0.103577	0.147067	0.011453	0.023869	0.019284	0.030362
Potomac	1.047098	2.182267	0.707406	2.455677	0.111695	0.232785	0.122763	0.417721	1.402422	2.922803	0.707406	2.549047	0.128673	0.268168	0.122763	0.422182
Rappahannock	0.168514	0.351202	0.505335	0.686219	0.019954	0.041586	0.101875	0.14204	0.131813	0.274713	0.505335	0.676575	0.010994	0.022912	0.101875	0.139686
Susquehanna	2.358417	4.915202	2.430968	4.570716	0.103634	0.215984	0.132932	0.335222	1.817232	3.787311	2.430968	4.428507	0.073427	0.15303	0.132932	0.327285
Western Shore	0.128057	0.266885	0.290333	0.380077	0.010137	0.021127	0.020412	0.032539	0.605963	1.262893	0.290333	0.505657	0.039504	0.08233	0.020412	0.040256
York	0.112106	0.233641	0.159674	0.21824	0.010195	0.021248	0.017921	0.029137	0.103232	0.215146	0.159674	0.215908	0.00915	0.019069	0.017921	0.028862
Total	5.014827	10.45145	4.90753	10.18697	0.348443	0.726195	0.599046	1.404386	5.400335	11.2549	4.90753	10.28827	0.39261	0.818242	0.599046	1.415991
StateBasin																
DC Potomac	0.003406	0.007099	0.006281	0.006793	0.000779	0.001624	0.000707	0.001268	0.151712	0.316185	0.006281	0.045763	0.017542	0.03656	0.000707	0.005673
DE Eastern Shore	0.212187	0.442222	0.035813	0.137576	0.004837	0.010081	0.003065	0.007475	0.116319	0.242422	0.035813	0.112385	0.001873	0.003903	0.003065	0.006696
MD Eastern Shore	0.575263	1.198912	0.34271	0.587166	0.031274	0.065178	0.03191	0.058228	0.362282	0.755037	0.34271	0.531201	0.015135	0.031543	0.03191	0.053987
MD Patuxent	0.064831	0.135116	0.103577	0.13694	0.008464	0.01764	0.019284	0.029576	0.103372	0.215439	0.103577	0.147067	0.011453	0.023869	0.019284	0.030362
MD Potomac	0.351102	0.731736	0.197433	0.62567	0.02686	0.05598	0.03256	0.102778	0.493511	1.028532	0.197433	0.663091	0.039916	0.083189	0.03256	0.106209
MD Susquehanna	0.045854	0.095564	0.13016	0.18092	0.001825	0.003803	0.007059	0.011646	0.025786	0.053741	0.13016	0.175647	0.000648	0.001351	0.007059	0.011336

Load reduction options 2020 06 25.xlsx

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