Climate allocation methods

Gary Shenk

WQGIT 2/11/2020

Climate allocation options

- Open Water
  - Ignore Open Water
  - Lump OW in with other segments
  - Separate allocations for OW and DW/DC and then reconcile
- WWTP responsibility
  - Only non-WWTP sources
  - Include WWTP
- Variances
  - Assume variances can change
  - Keep variances the same

- Relative impact Conowingo
  - 1995 level as used in TMDL/2017
  - Current status
- Relative impact segments
  - Always use TMDL/2017 segments
  - Use the group of segments being protected
- Watershed loads from states
  - Take out jurisdiction loads first
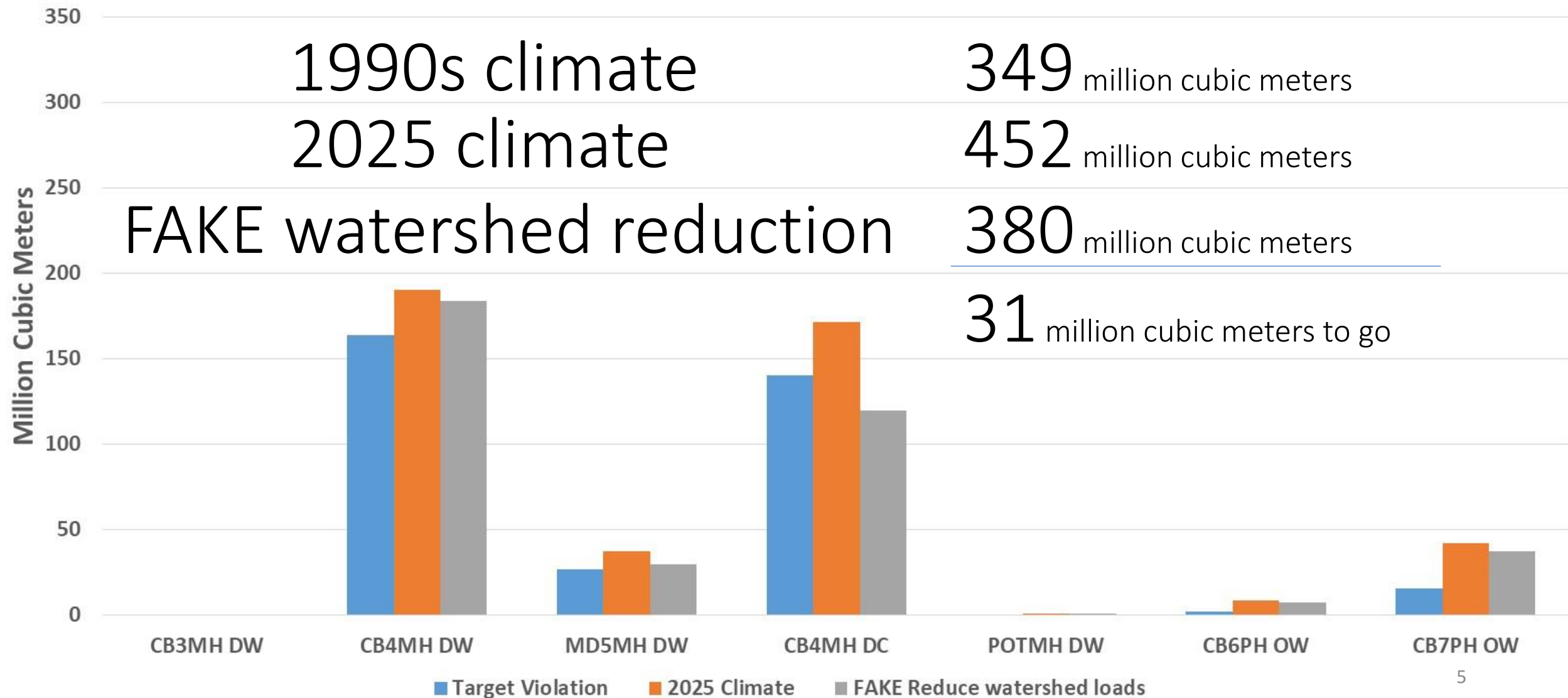 - Do not consider jurisdiction loads

Climate allocation options

- Open Water
  3
  - Ignore Open Water
  - Lump OW in with other segments
  - Separate allocations and then reconcile

- WWTP responsibility
  2
  - Only non-WWTP sources
  - Include WWTP

- Variances
  2
  - Assume variances can change
  - Keep variances the same

- Relative impact Conowingo
  2
  - 1995 level as used in TMDL/2017
  - Current status

- Relative impact segments
  2
  - Always use TMDL/2017 segments
  - Use the group of segments being protected

- Watershed loads first
  2
  - Take out jurisdiction loads first
  - Do not consider jurisdiction loads

3*2*2*2*2*2 = 96 options!!

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Watershed Loads First

1990s climate   349 million cubic meters

2025 climate   452 million cubic meters

FAKE watershed reduction   380 million cubic meters

31 million cubic meters to go

Watershed Loads First

	Option from Monday	FAKE 'Loads first' Option		
	Reduction for climate change OW,DW,DC	Climate Load Increase	FAKE Allocated additional impact	FAKE Total reduction
DC	0.00	0.01	0.00	0.01
DE	0.28	0.04	0.11	0.15
MD	1.56	1.06	0.62	1.68
NY	0.32	0.70	0.13	0.83
PA	3.08	1.68	1.23	2.91
VA	1.28	1.48	0.51	1.99
WV	0.19	-0.05	0.08	0.03
TOTAL	6.71	4.92	2.68	7.60

(Climate Load Increase) **+** (FAKE Allocated additional impact) **=** (FAKE Total reduction)

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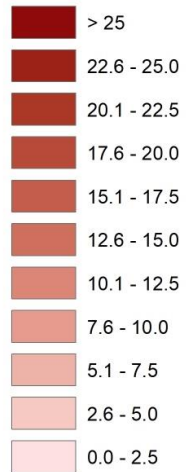 - Do not consider jurisdiction loads

Dissolved Oxygen effect per pound of nutrient released in the watershed

More Impact, Do More

Nitrogen
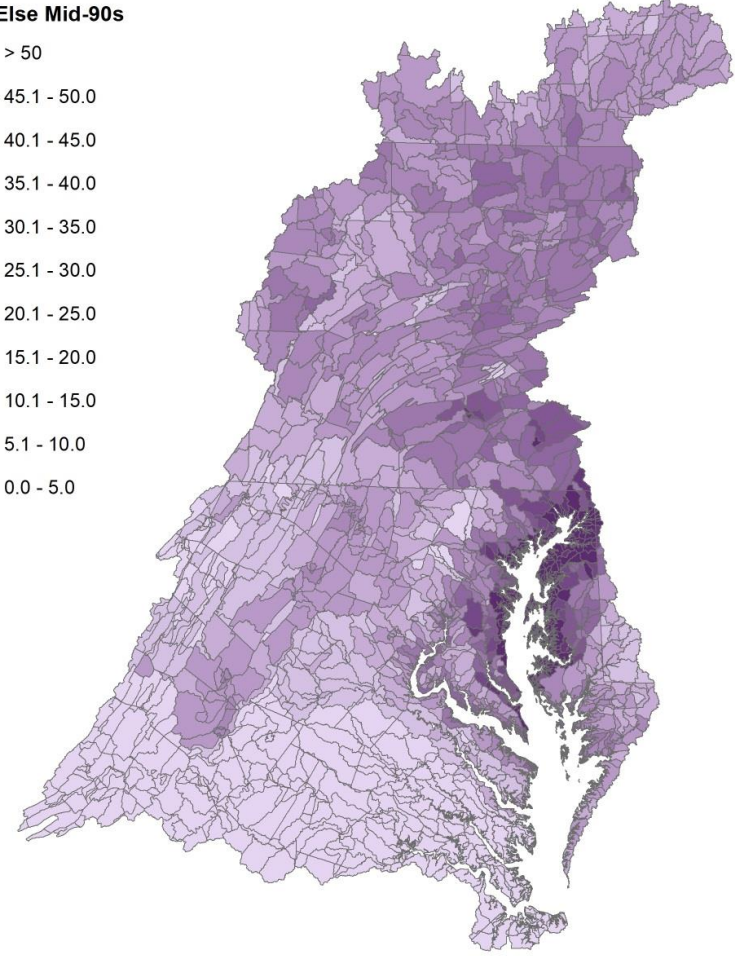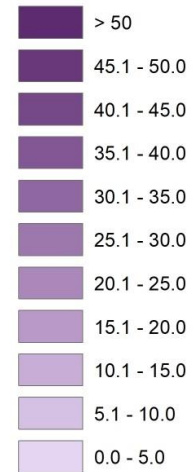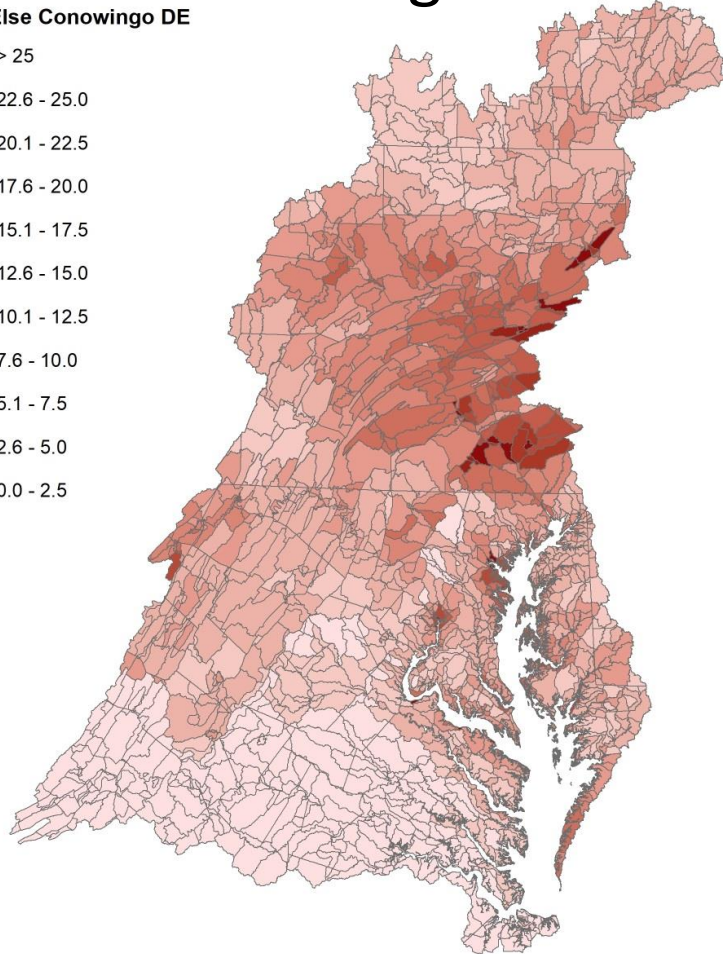
Phase 6 Phosphorus

TN All Else Mid-90s
- > 25
- 22.6 - 25.0
- 20.1 - 22.5
- 17.6 - 20.0
- 15.1 - 17.5
- 12.6 - 15.0
- 10.1 - 12.5
- 7.6 - 10.0
- 5.1 - 7.5
- 2.6 - 5.0
- 0.0 - 2.5

TP All Else Mid-90s
- > 50
- 45.1 - 50.0
- 40.1 - 45.0
- 35.1 - 40.0
- 30.1 - 35.0
- 25.1 - 30.0
- 20.1 - 25.0
- 15.1 - 20.0
- 10.1 - 15.0
- 5.1 - 10.0
- 0.0 - 5.0

Dissolved Oxygen effect per pound of nutrient released in the watershed

More Impact, Do More

Nitrogen

Phase 6 Phosphorus

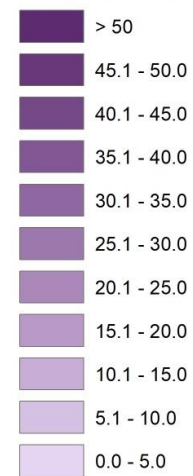TN All Else Conowingo DE
- > 25
- 22.6 - 25.0
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- 17.6 - 20.0
- 15.1 - 17.5
- 12.6 - 15.0
- 10.1 - 12.5
- 7.6 - 10.0
- 5.1 - 7.5
- 2.6 - 5.0
- 0.0 - 2.5

TP All Else Conowingo DE
- > 50
- 45.1 - 50.0
- 40.1 - 45.0
- 35.1 - 40.0
- 30.1 - 35.0
- 25.1 - 30.0
- 20.1 - 25.0
- 15.1 - 20.0
- 10.1 - 15.0
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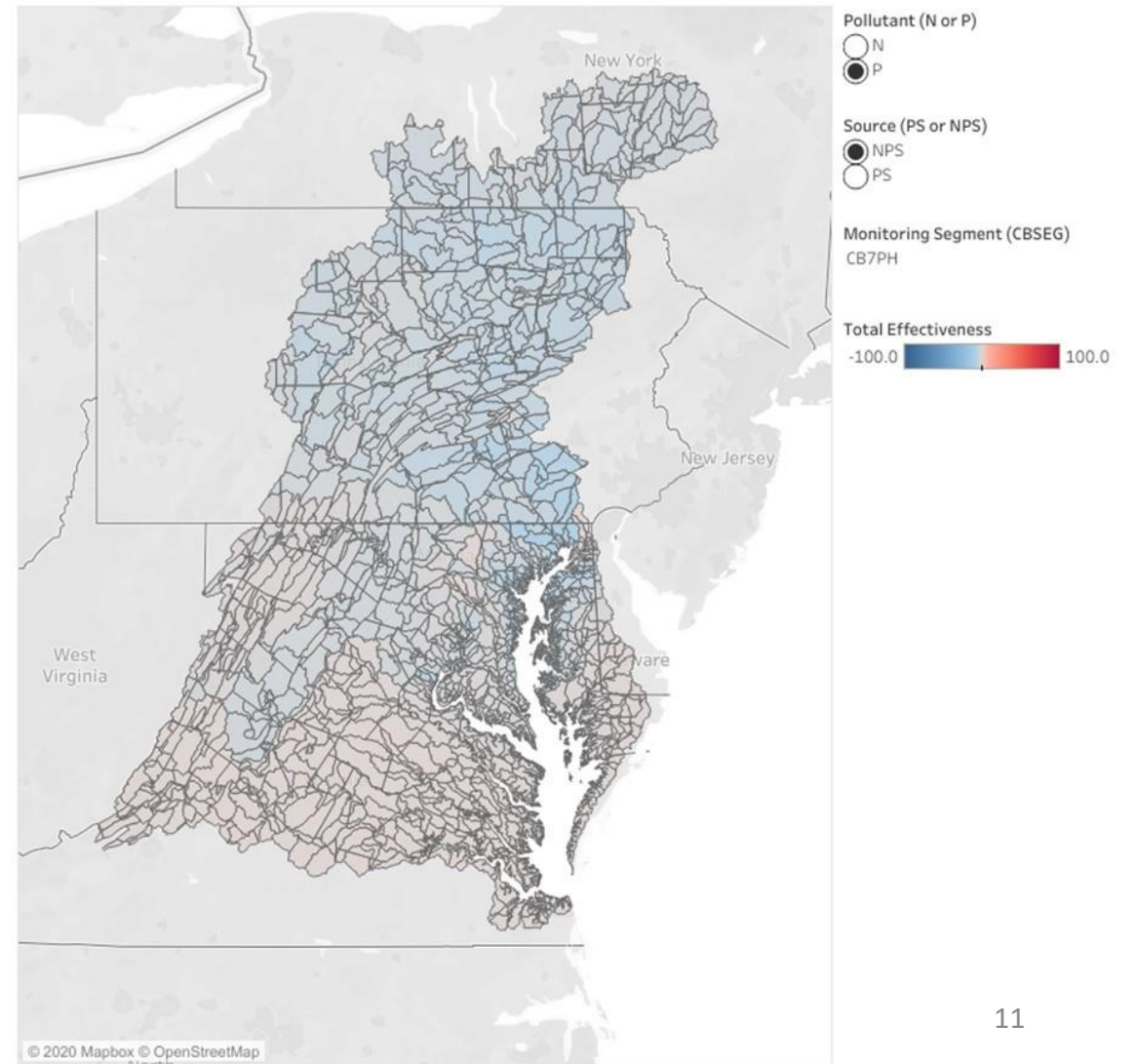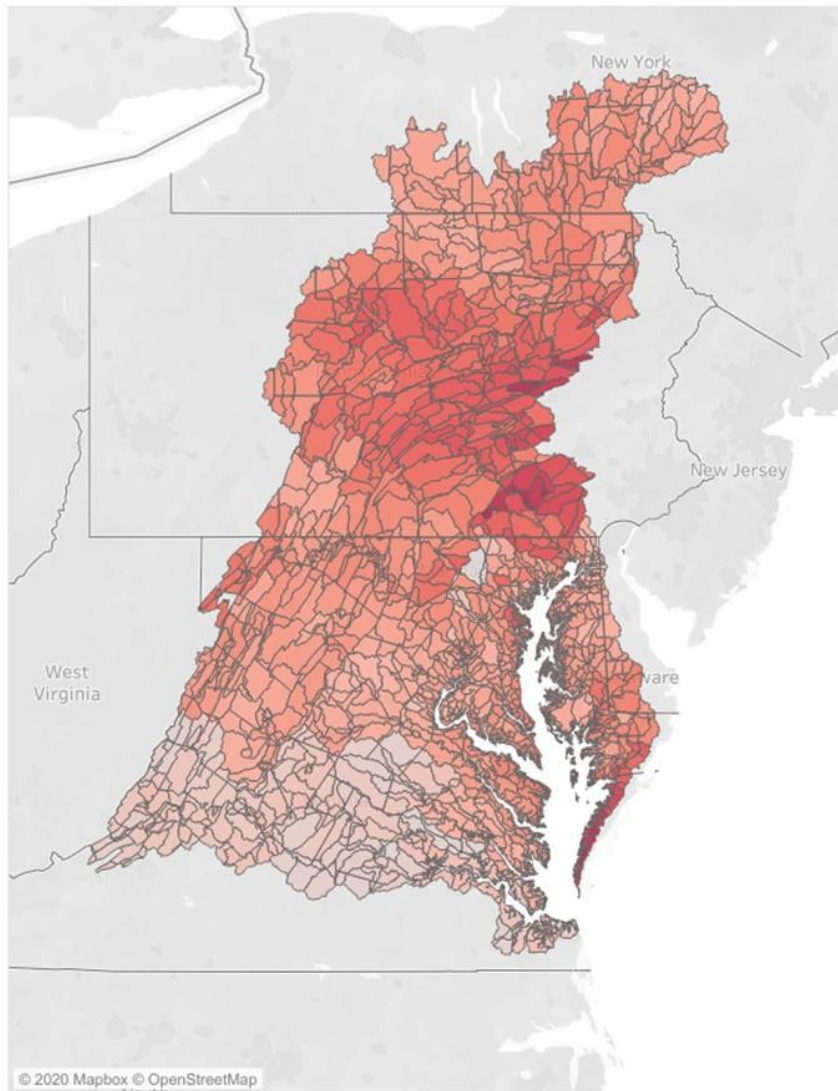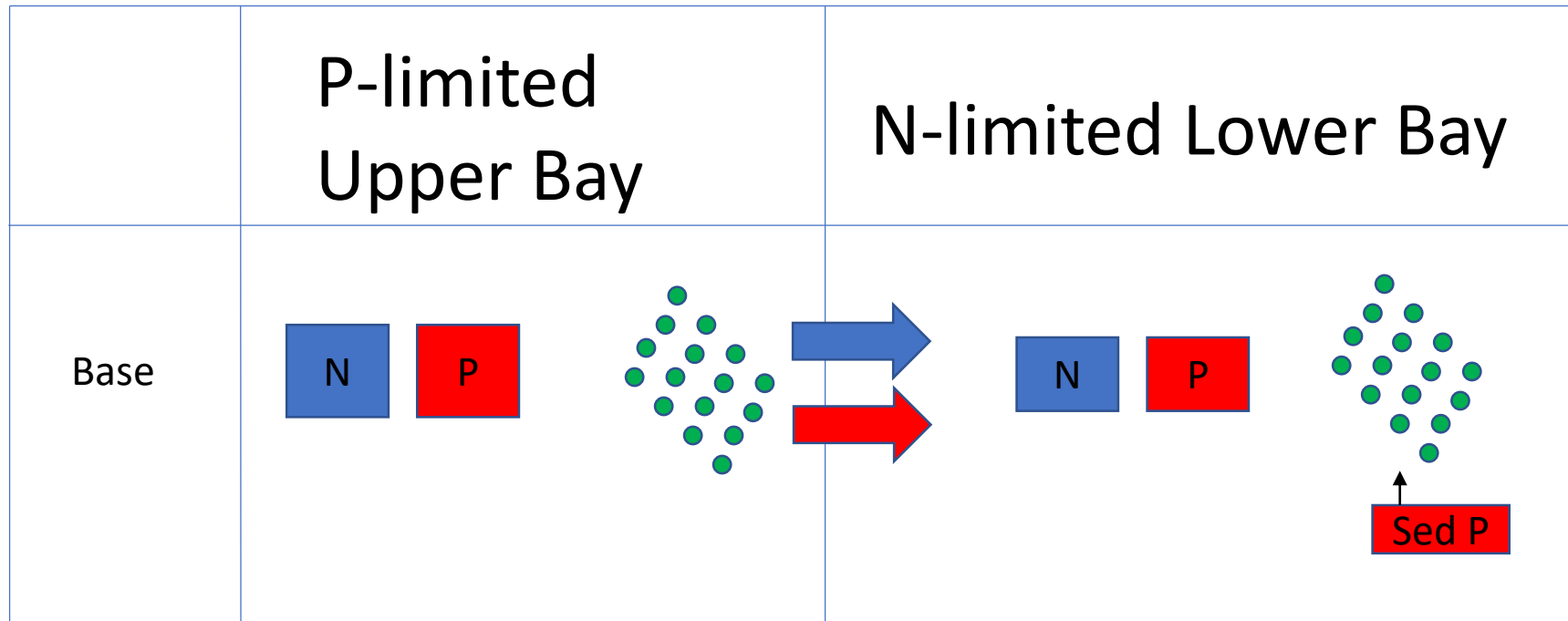
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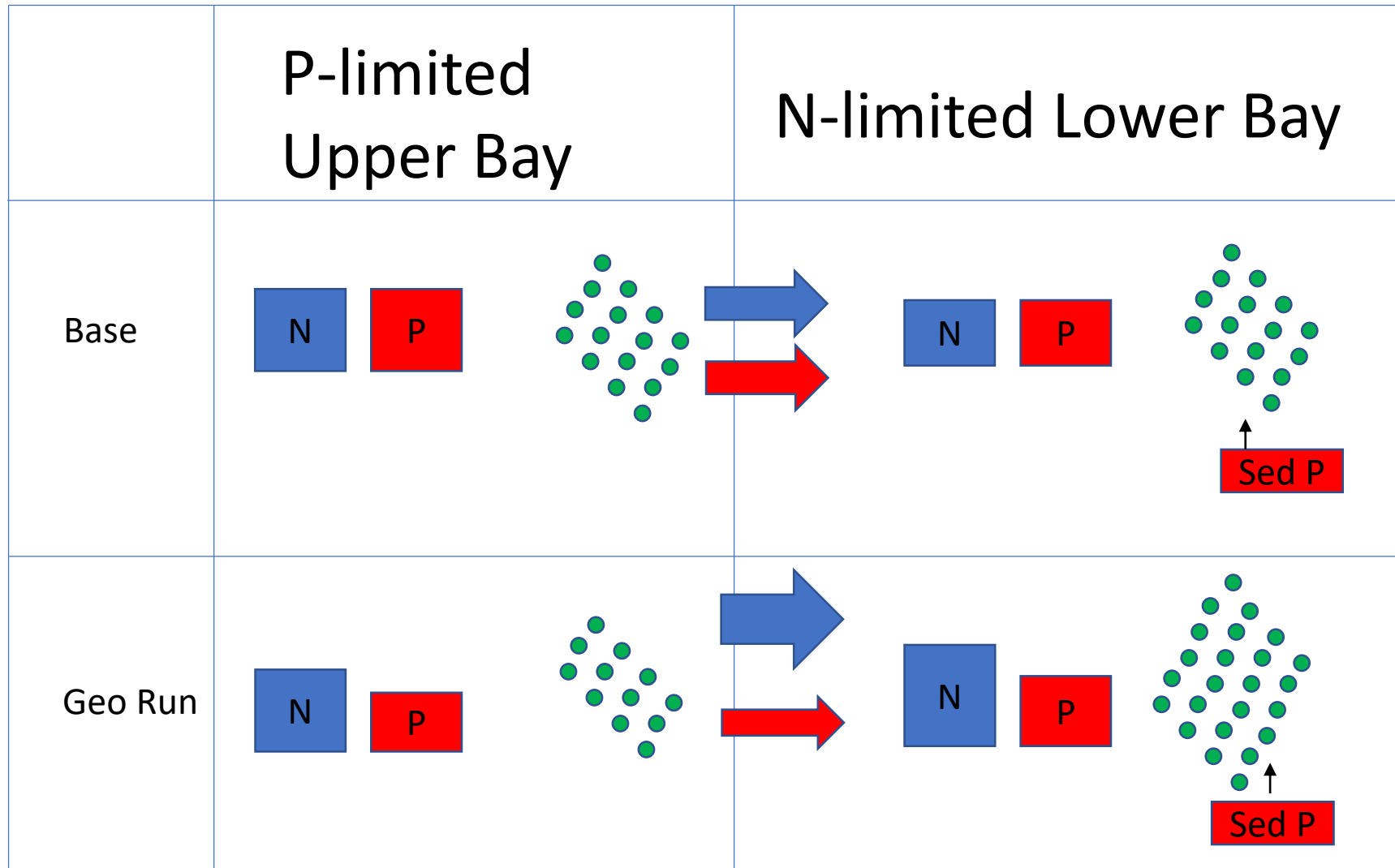 - Do not consider jurisdiction loads

CB7PH effect on Chlorophyll (scale different)

eas from Rebecca Murphy, Jeremy Testa, Danny Kaufman and others

Possible spatial limitation effect

	P-limited Upper Bay	N-limited Lower Bay
Base	N P	N P Sed P

eas from Rebecca Murphy, Jeremy Testa, Danny Kaufman and others

Possible spatial limitation effect

	P-limited Upper Bay	N-limited Lower Bay
Base	N P	N P Sed P
Geo Run	N P	N P Sed P

Preliminary Information-Subject to Revision. Not for Citation or Distribution
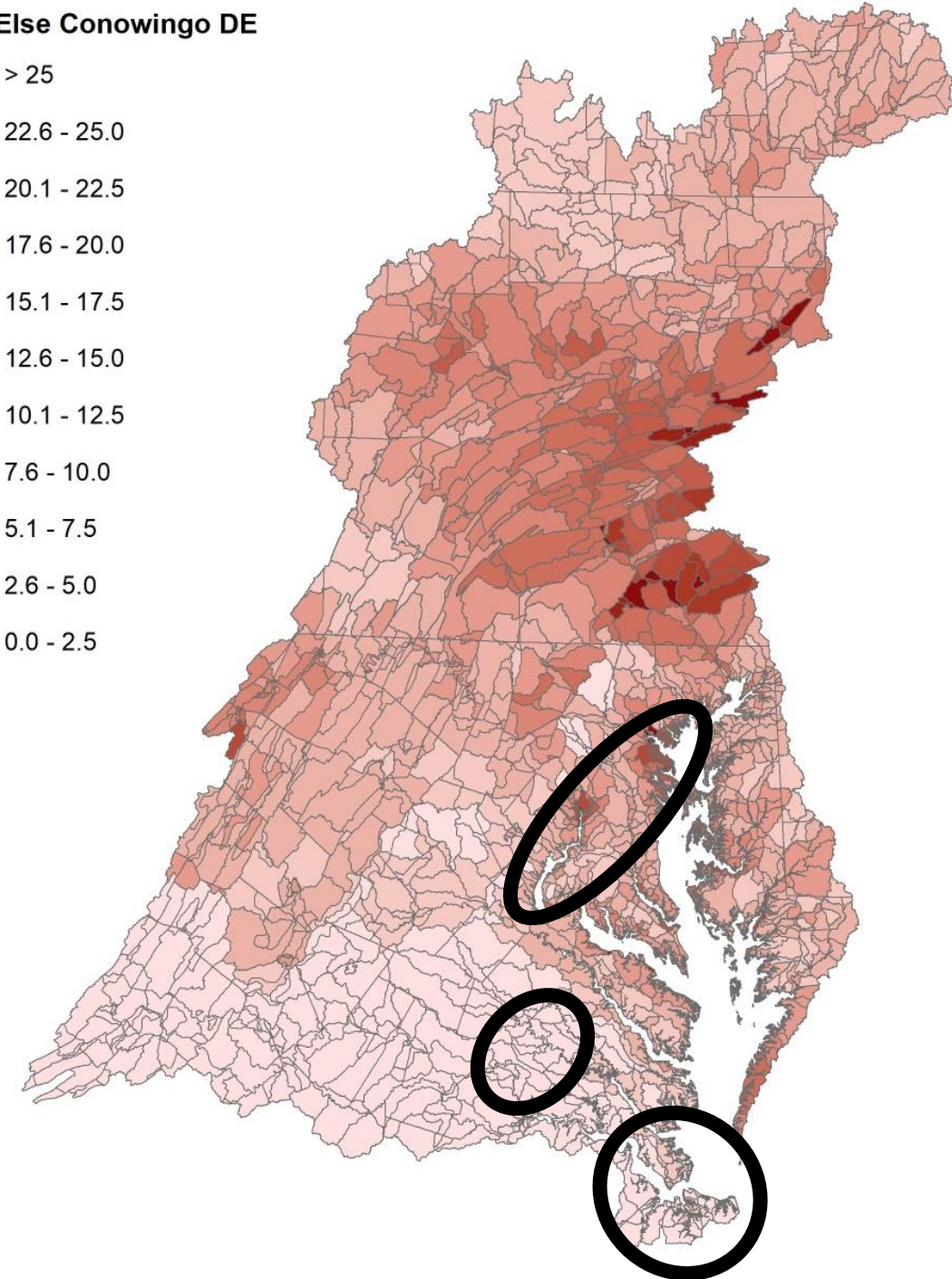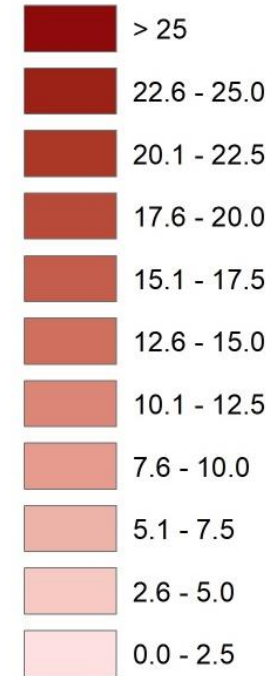
13

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WWTP responsibility

	Reduction for climate change OW,DW,DC	
	non-WWTP	All Sources
DC	0.00	0.20
DE	0.28	0.16
MD	1.56	2.13
NY	0.32	0.27
PA	3.08	2.33
VA	1.28	2.01
WV	0.19	0.14
TOTAL	6.71	7.24

WWTP in lower-impact areas

TN All Else Conowingo DE

- > 25
- 22.6 - 25.0
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Tradeoffs
OW DW and DC

CB Seg	Designated Use	Planning Target 1995 climate	Planning Target 2025 climate	PT + reductions 2025 climate	Change between Planning Target and Draft CC reductions
CB6PH	OW	0.13%	0.49%	0.38%	-0.25%
CB7PH	OW	0.64%	1.74%	1.43%	-0.79%
CB3MH	DW	0.05%	0.06%	0.06%	-0.01%
CB4MH	DW	5.74%	6.67%	5.89%	-0.16%
CB5MH_MD	DW	1.27%	1.79%	1.31%	-0.03%
CB5MH_VA	DW	0.00%	0.00%	0.00%	0.00%
POTMH_MD	DW	0.03%	0.06%	0.04%	-0.01%
CB3MH	DC	0.00%	0.00%	0.00%	0.00%
CB4MH	DC	6.59%	8.06%	5.23%	1.36%
CB5MH_MD	DC	0.00%	0.00%	0.00%	0.00%
CB5MH_VA	DC	0.00%	0.00%	0.00%	0.00%

Tradeoffs
OW DW and DC

CB Seg	Designated Use	Planning Target 1995 climate	Planning Target 2035 climate	PT+ reductions 2035 climate	Change between Planning Target and Draft CC reductions
CB6PH	OW	0.13%	0.81%	0.45%	-0.32%
CB7PH	OW	0.64%	2.43%	1.58%	-0.94%
CB3MH	DW	0.05%	0.20%	0.06%	-0.01%
CB4MH	DW	5.74%	7.35%	6.00%	-0.26%
CB5MH_MD	DW	1.27%	2.28%	1.46%	-0.18%
CB5MH_VA	DW	0.00%	0.00%	0.00%	0.00%
POTMH_MD	DW	0.03%	0.18%	0.05%	-0.02%
CB3MH	DC	0.00%	0.00%	0.00%	0.00%
CB4MH	DC	6.59%	9.75%	4.70%	1.89%
CB5MH_MD	DC	0.00%	0.00%	0.00%	0.00%
CB5MH_VA	DC	0.00%	0.00%	0.00%	0.00%

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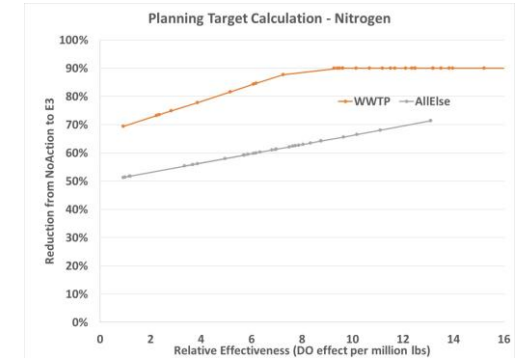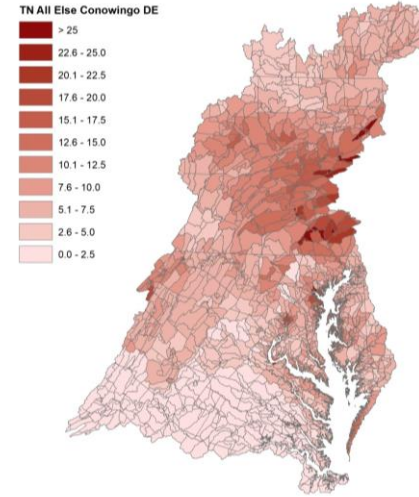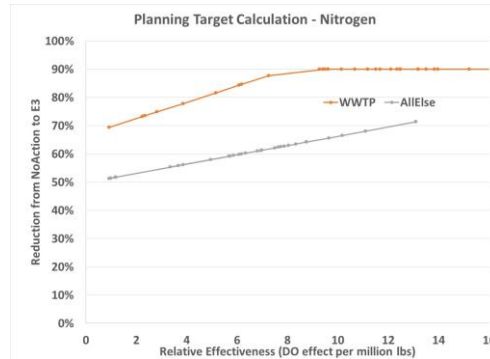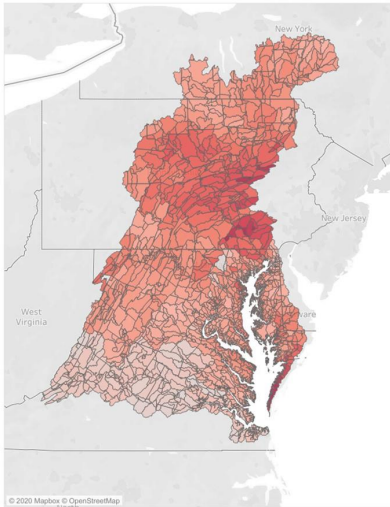 - Do not consider jurisdiction loads

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	Reduction for climate change OW,DW,DC	
	DW DC	OW DW DC
DC	0.15	0.20
DE	0.12	0.16
MD	1.59	2.13
NY	0.20	0.27
PA	1.74	2.33
VA	1.50	2.01
WV	0.10	0.14
Total	5.40	7.24

Open Water

Deep Water Deep Channel

Compare

Much more N
Negative for P

	Reduction for change OW
	DW DC
DC	0.15
DE	0.12
MD	1.59
NY	0.20
PA	1.74
VA	1.50
WV	0.10
Total	5.40

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