

# Phase 6 Climate Change Assessment Model

Gary Shenk and the CBPO modeling team

12/05/19

Modeling Workgroup

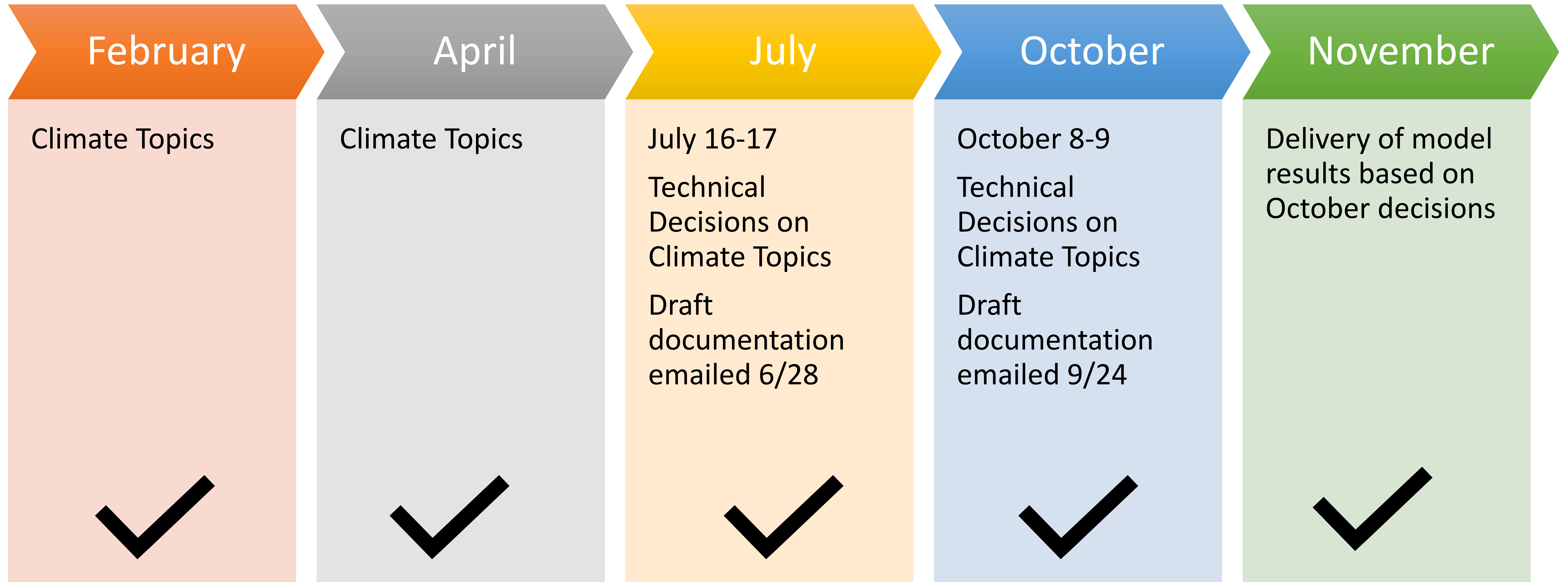
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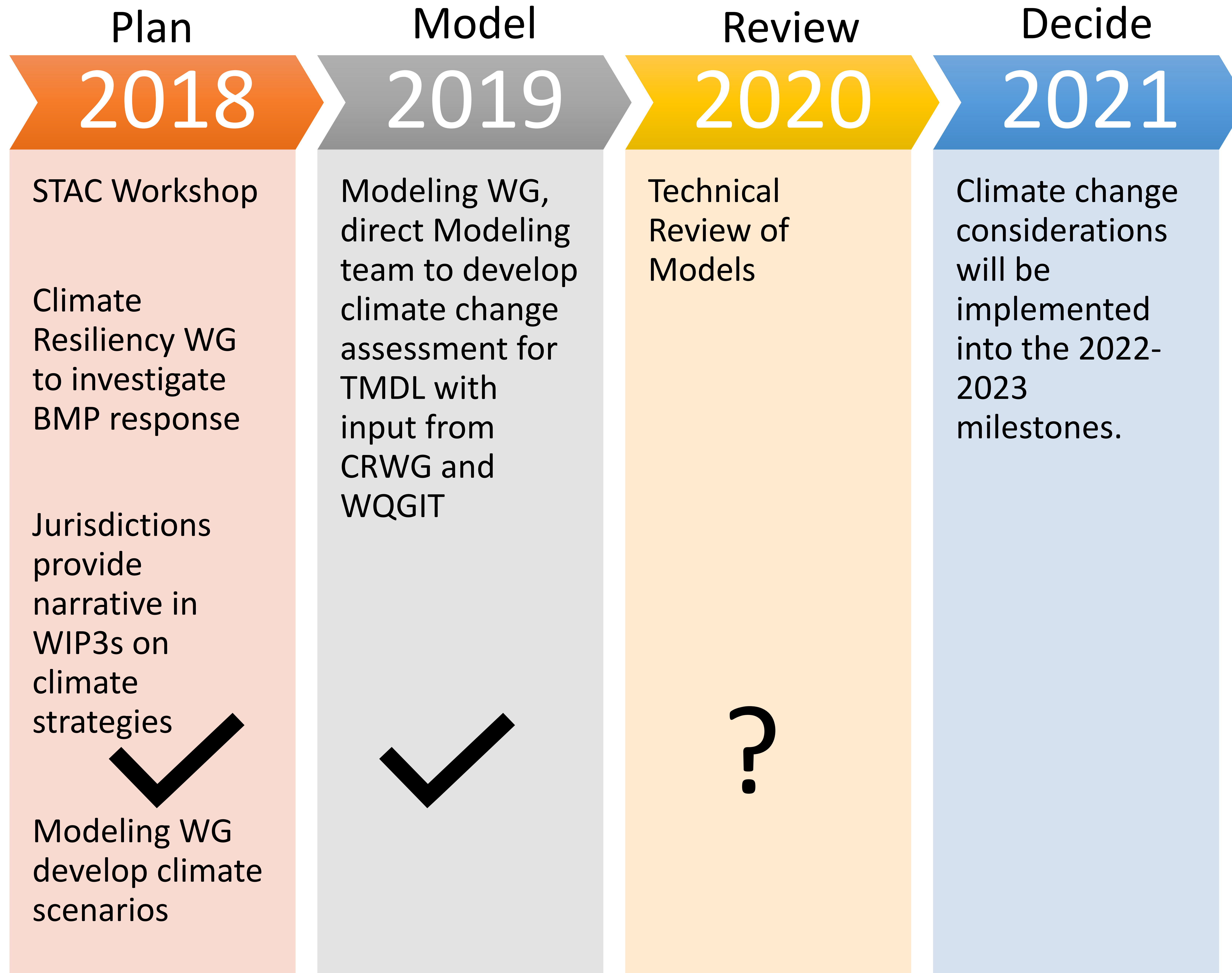
# PSC Direction

- PSC voted in July 2018 to not change planning targets until 2025
  - Must maintain model integrity
  - Use CAST-2017 and CAST-2019 for TMDL accounting
- PSC asked to re-evaluate climate change

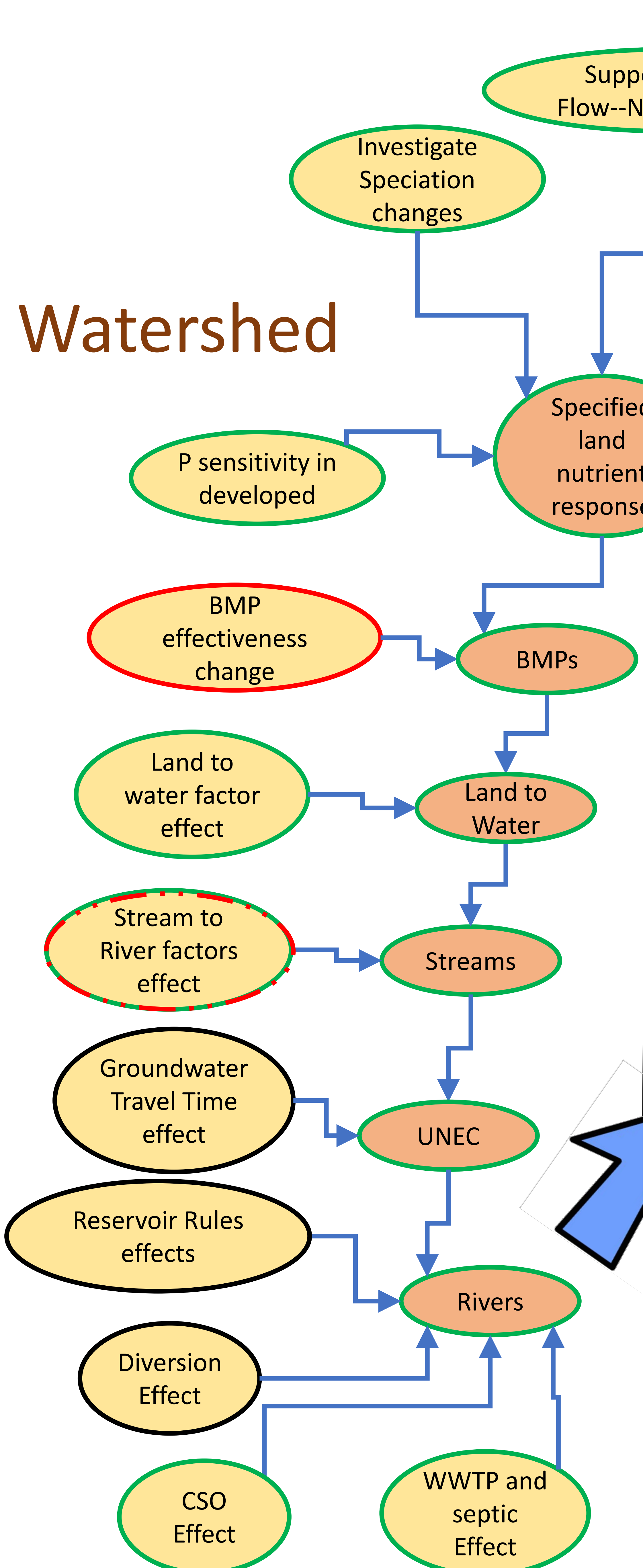
# CBP 2019 MWG Climate Work Plan



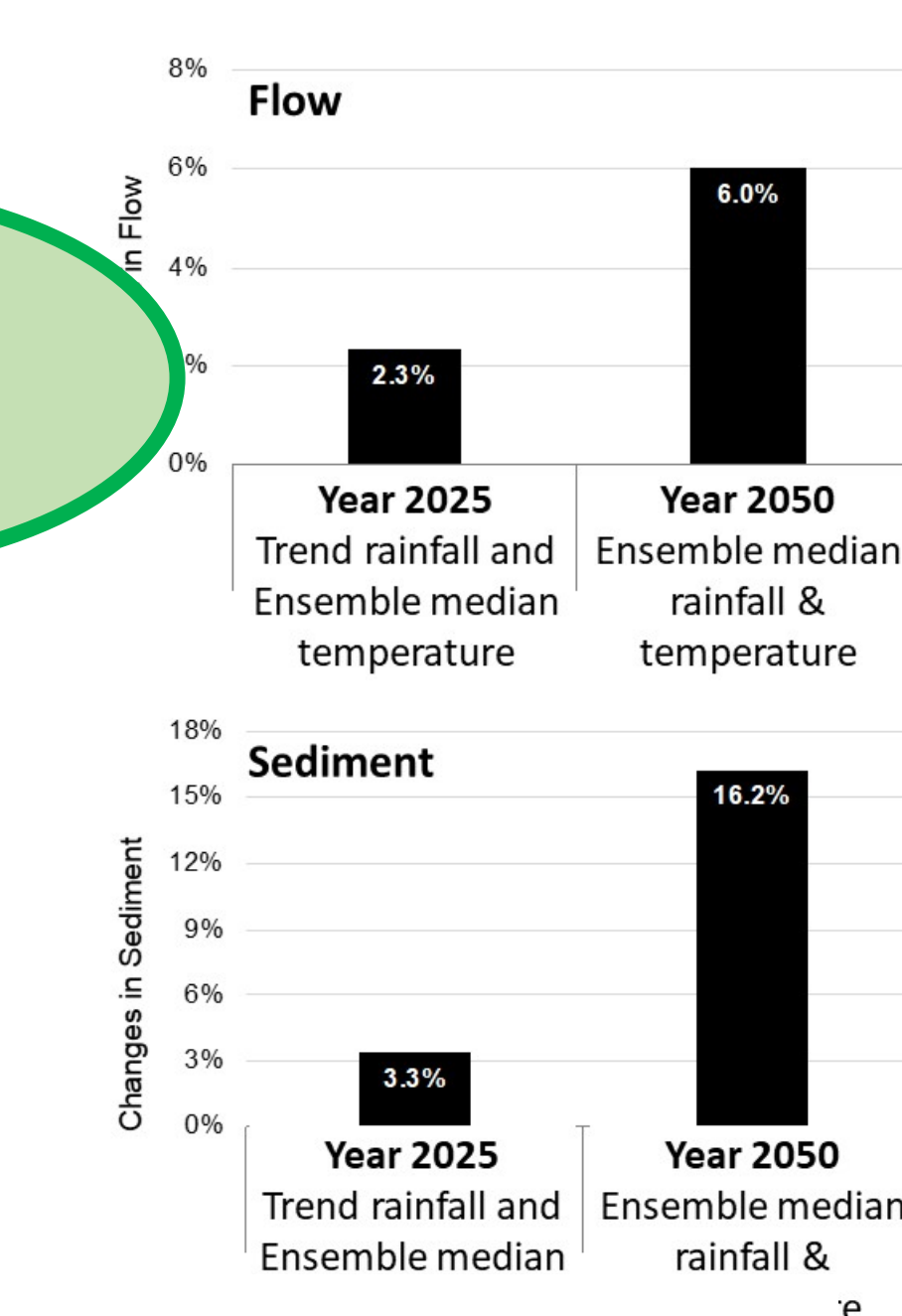
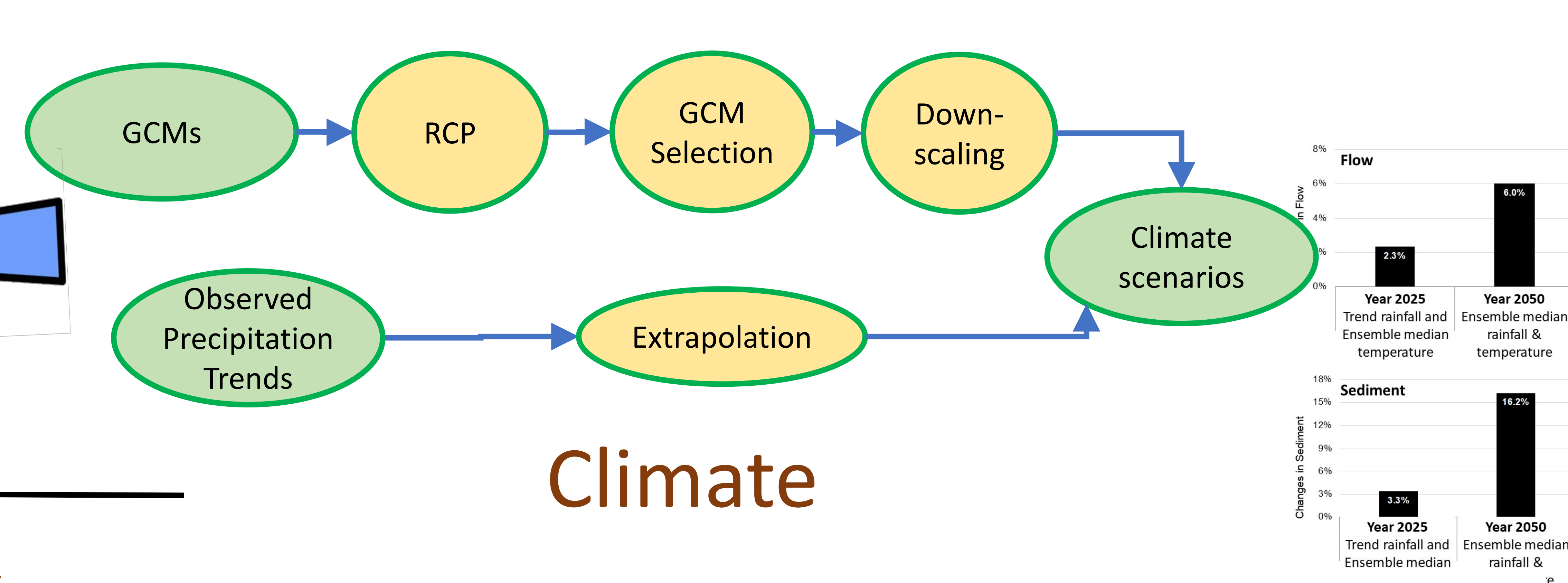
# CBP Climate Work Plan



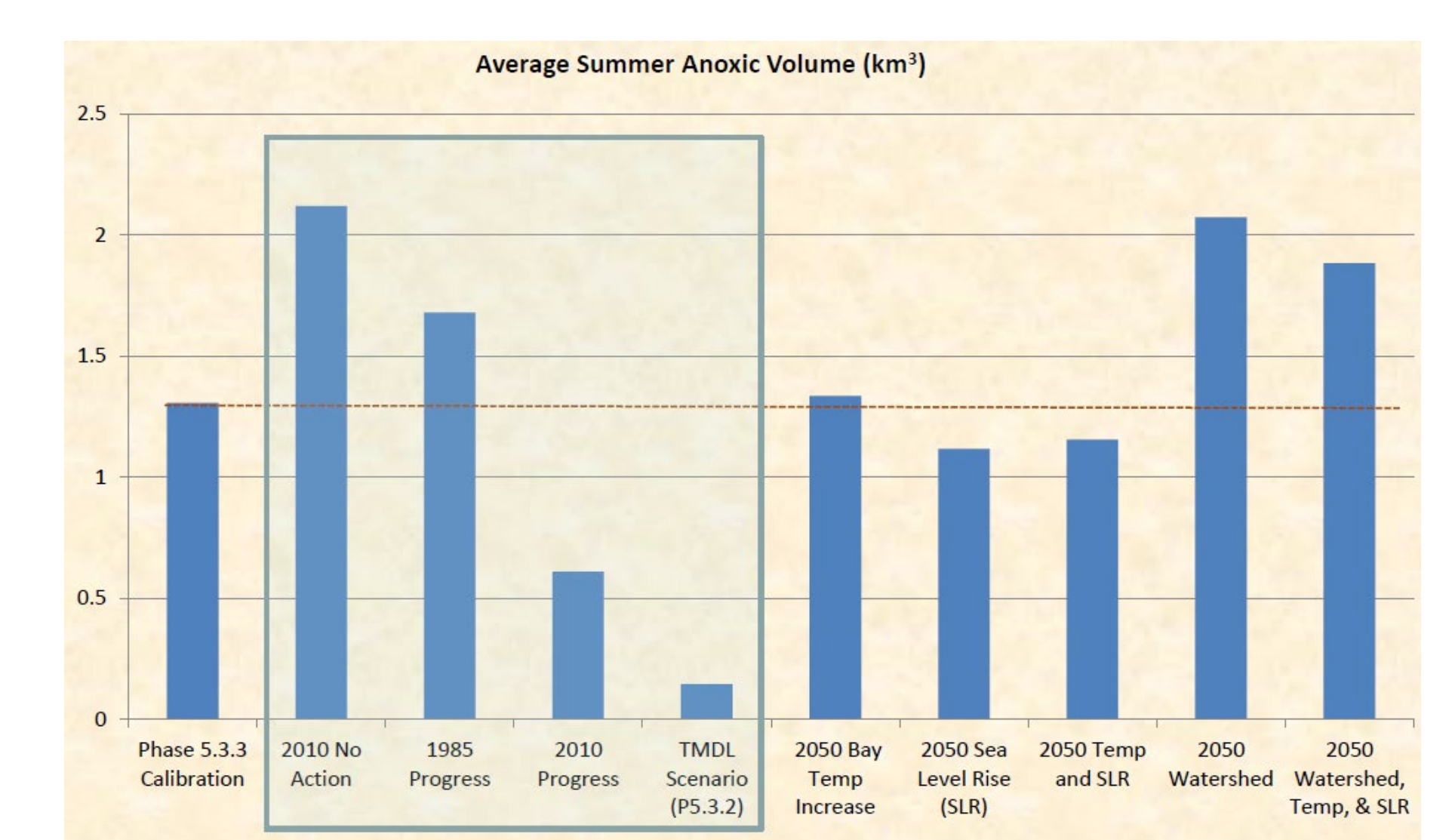
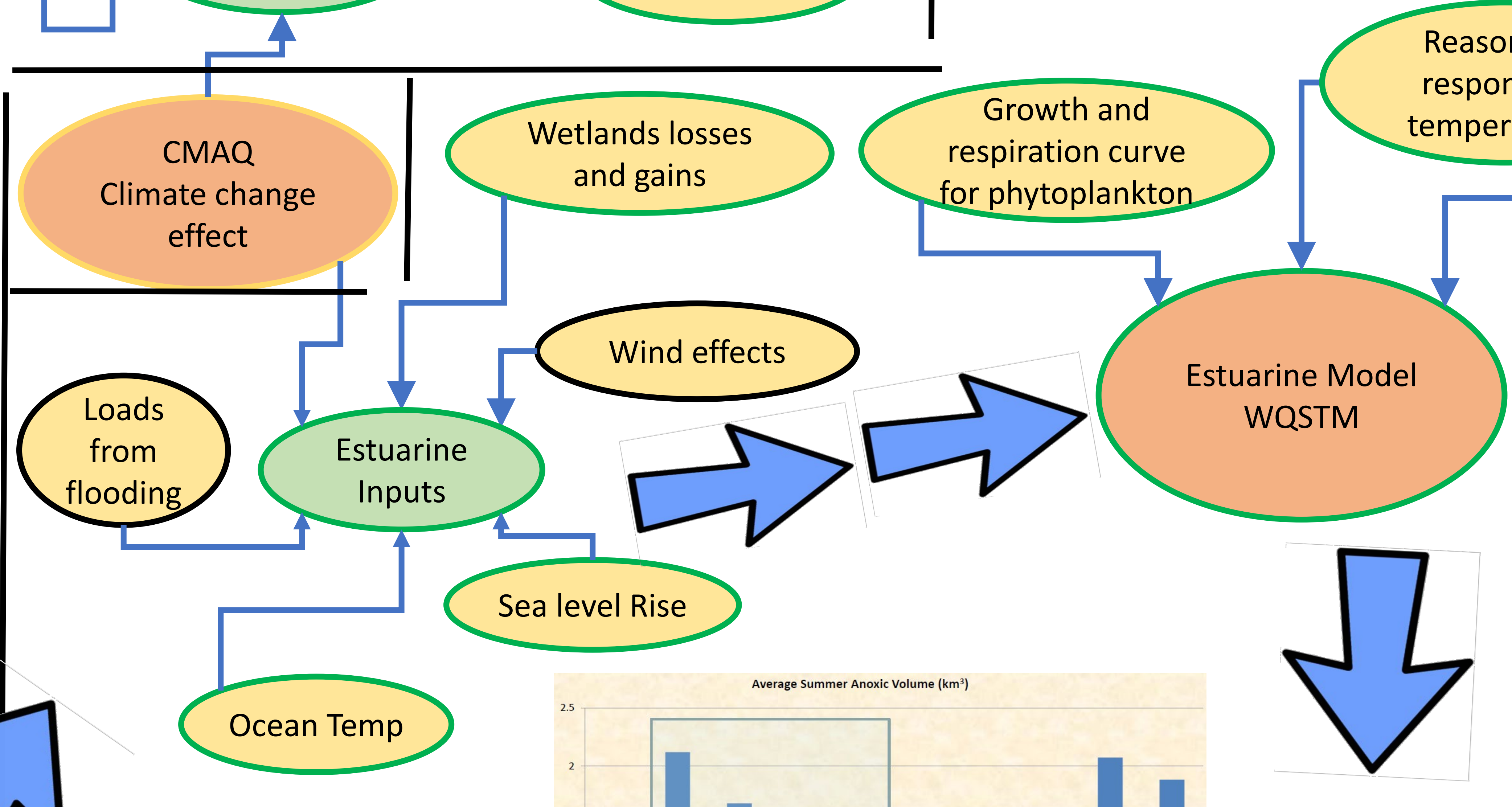
# Watershed



# Climate

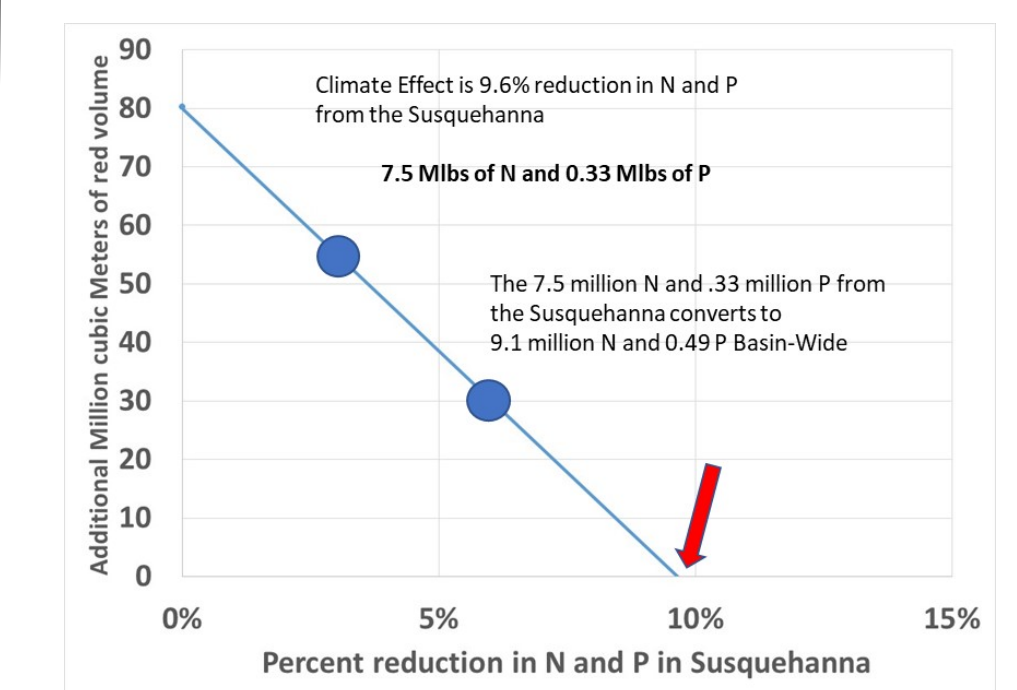


# Estuary

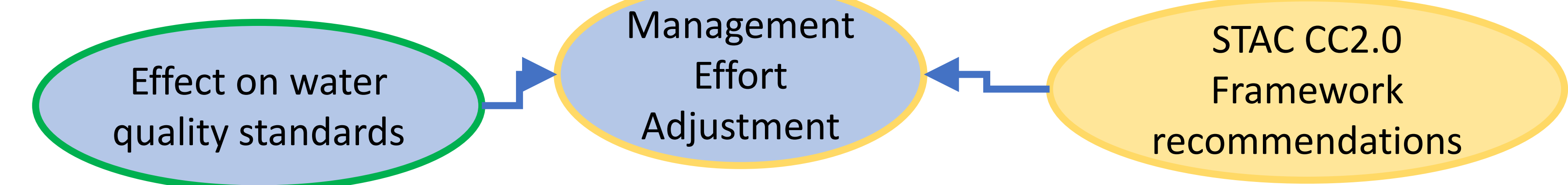
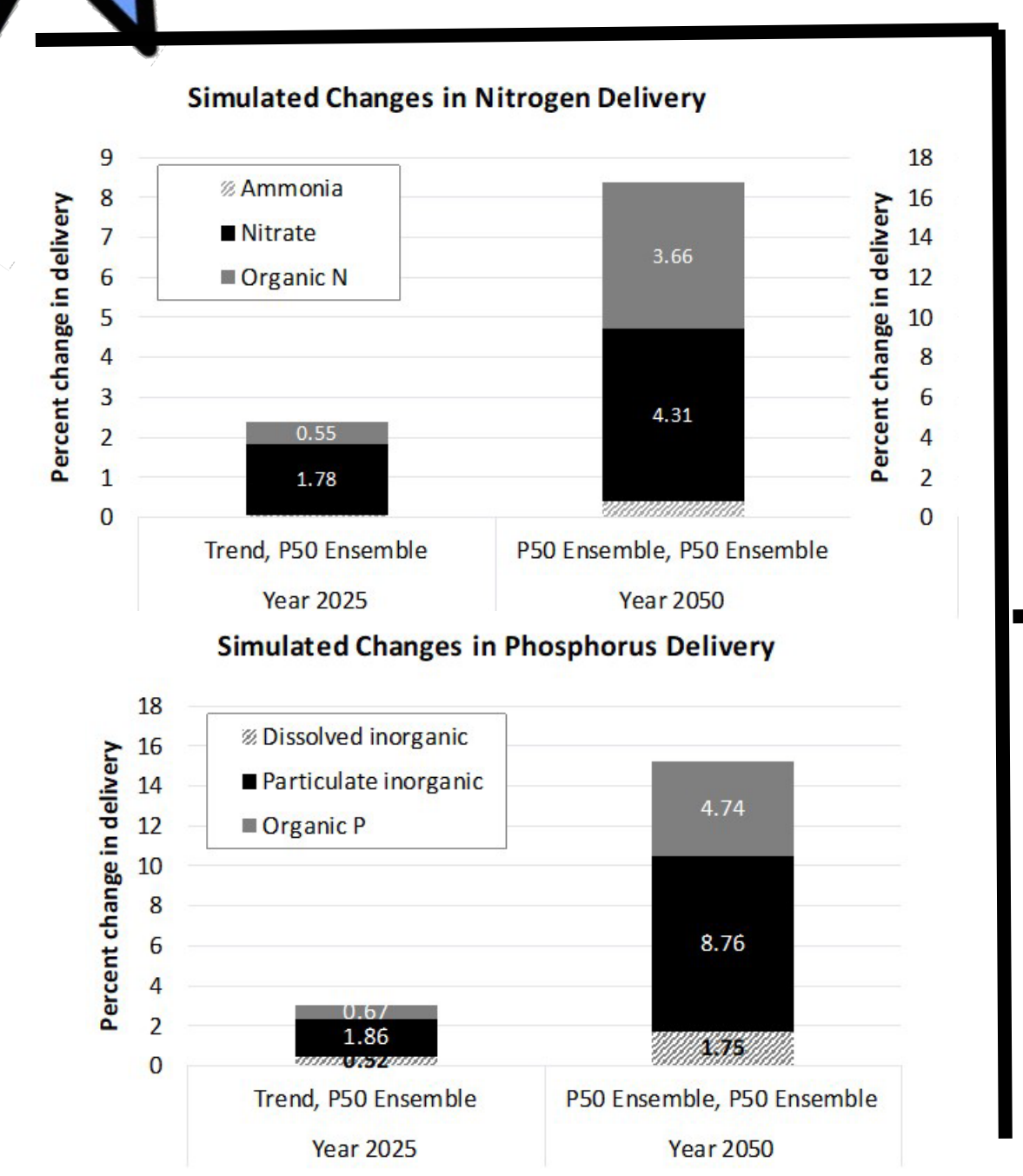
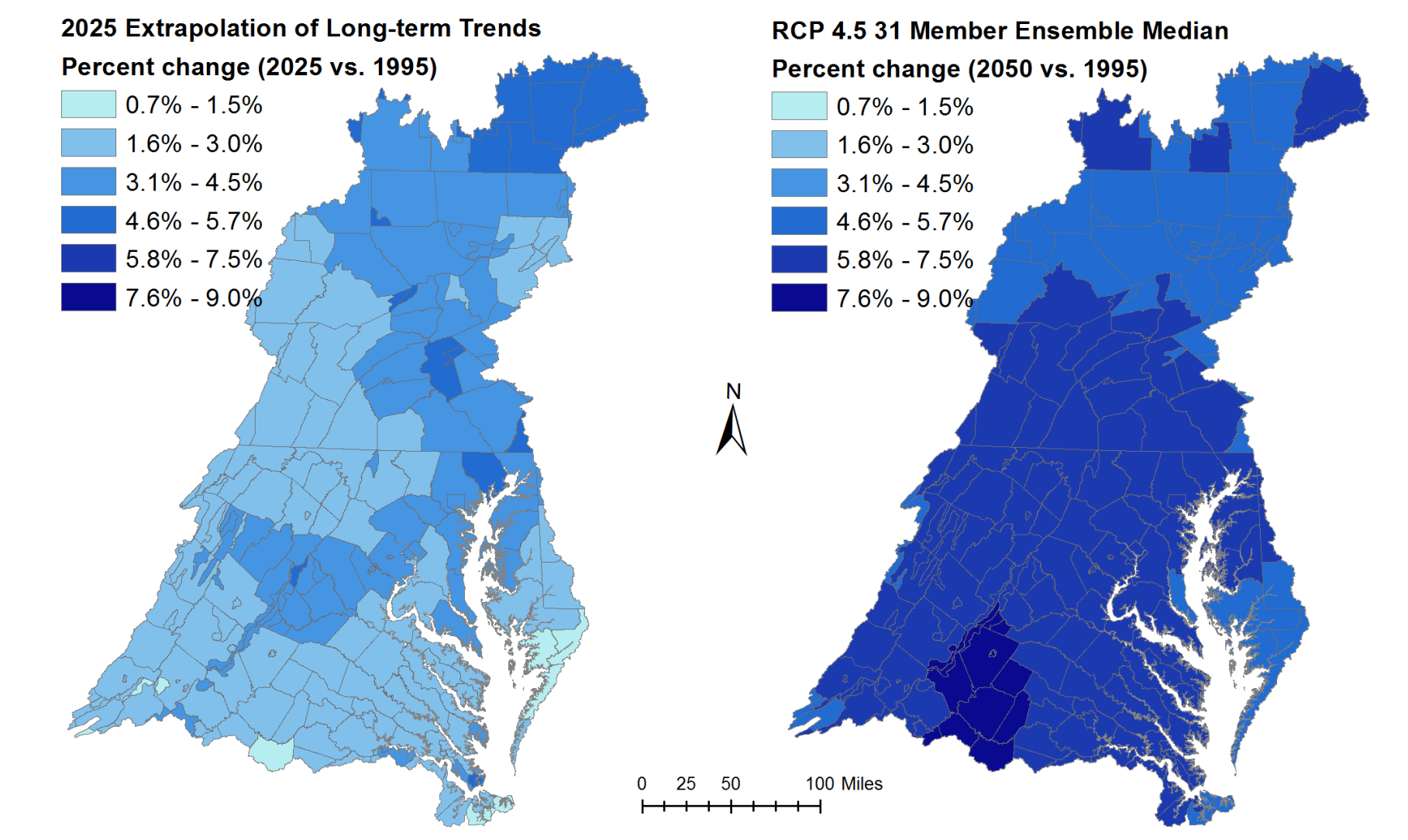
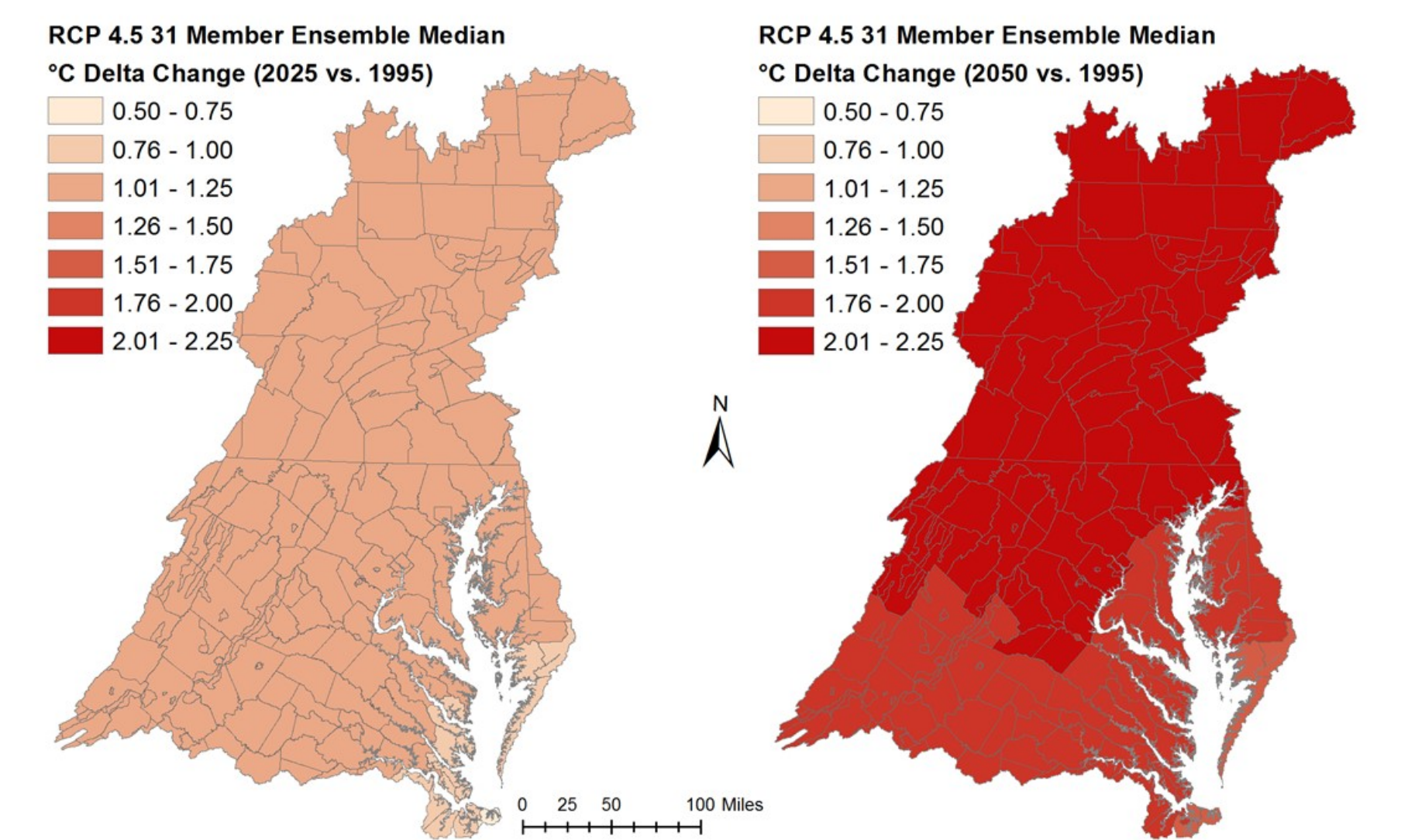


# Management

CB Seg	Designated Use	Designated Use Total Volume	Red Percent		Red Volume		Red Percent		Red Volume	
			WIP + Conov	CC	WIP + Conov	CC	WIP + Conov	CC		
CB3MH	DW	864	0.05%	0	0	0.05%	0	0	0	
CB4WH	DW	2854	5.52%	158	0	6.50%	186	0	0	
MDSMH	DW	2097	1.09%	23	0	1.51%	32	0	0	
VASMH	DW	1605	0.00%	0	0	0.00%	0	0	0	
POMMH	DW	1839	0.00%	0	0	0.00%	0	0	0	
CB3MH	DC	390	0.00%	0	0	0.00%	0	0	0	
CB4WH	DC	2126	8.04%	171	0	10.09%	215	0	0	
MDSMH	DC	2875	0.00%	0	0	0.00%	0	0	0	
VASMH	DC	1848	0.00%	0	0	0.00%	0	0	0	
							352	0	432	
							CC Difference	80		



Jurisdiction	1985 Baseline	2013 Progress	Climate Change
NY	18.71	15.44	0.400
PA	122.41	99.28	4.135
MD	83.56	55.89	2.194
WV	8.73	8.06	0.236
DC	6.48	1.75	0.006
DE	6.97	6.59	0.397
VA	84.29	61.53	1.722
BasinWide	331.15	248.54	9.09



Included

Not included But important

Not included minor

Model Project/Decision

Data Set Endpoint

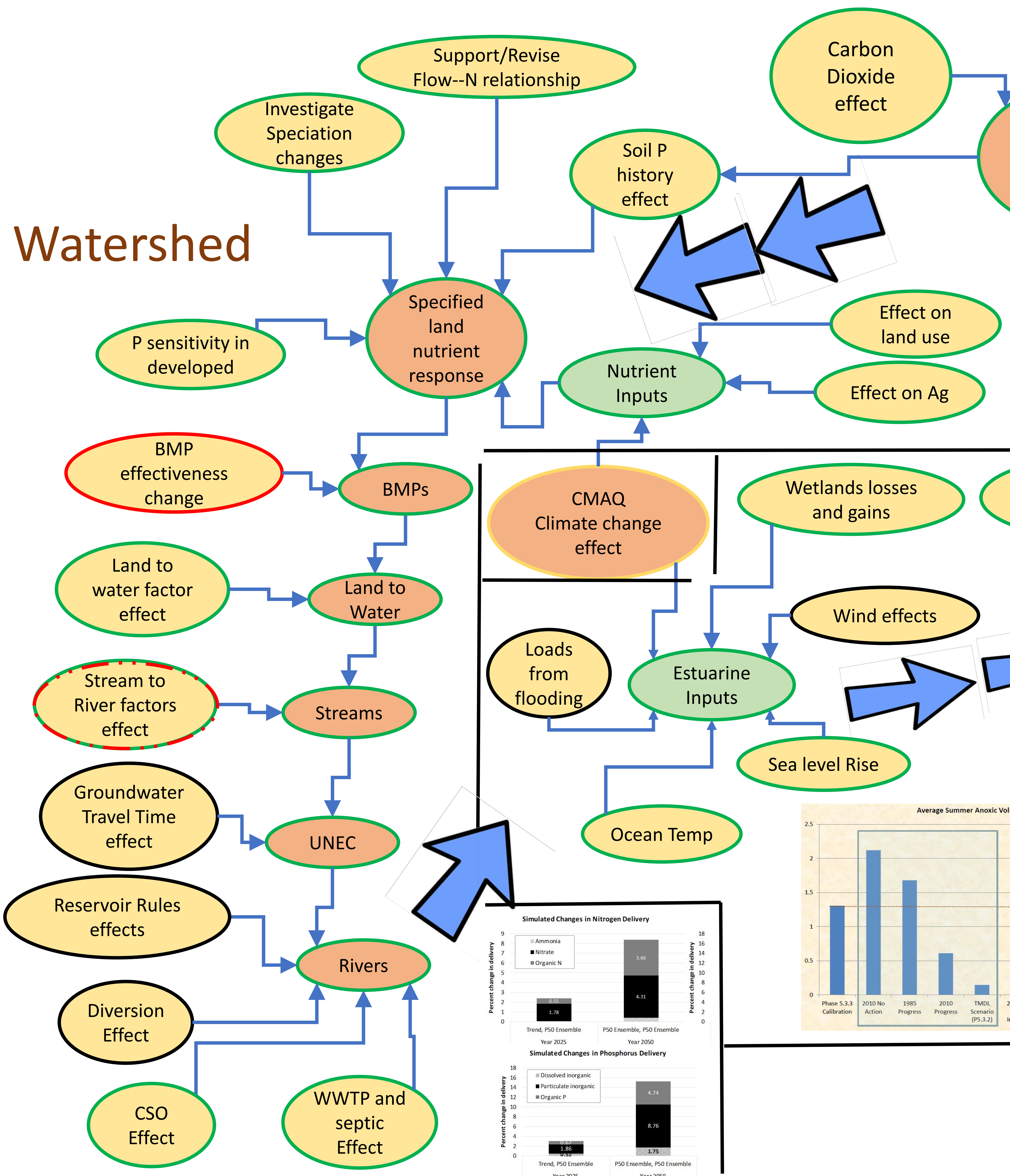
# Modeling workgroup – integrity of the models

- TMDL modeling question:
  - How would *changes* in watershed management and loads between 1995 and a given scenario effect water quality?
- Management question:
  - Are we on track to reach our 2025 goals?

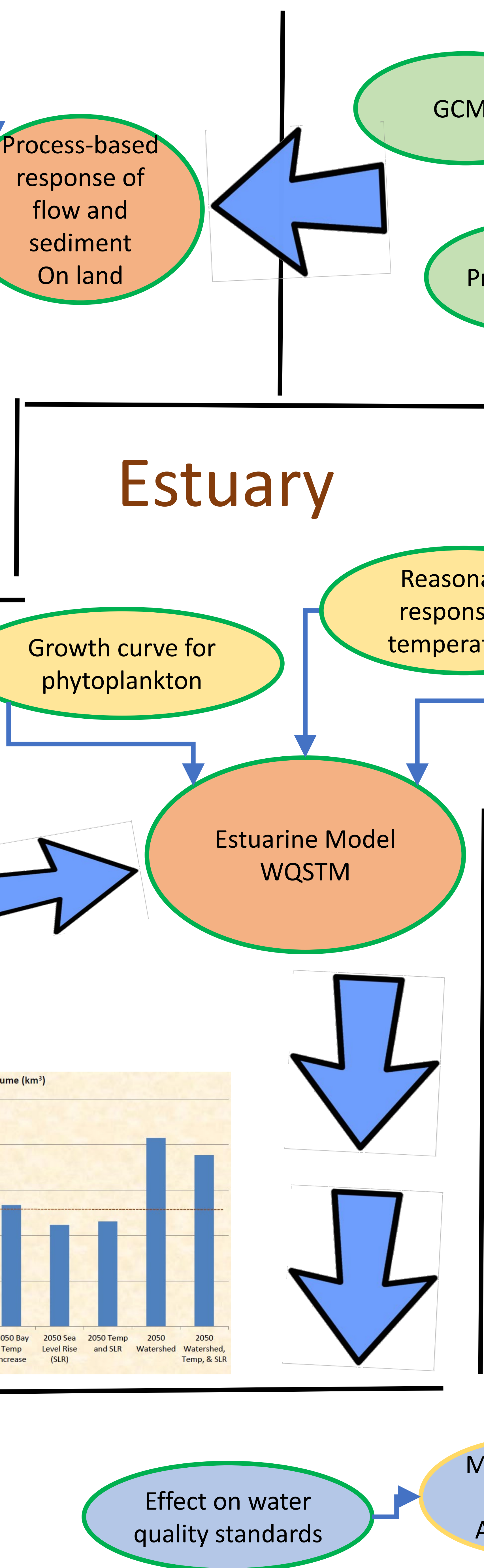
## Maintaining integrity and providing flexibility

- ***No changes may be made to the model that, if applied fairly to all years, would change the loads prior to 1995.***

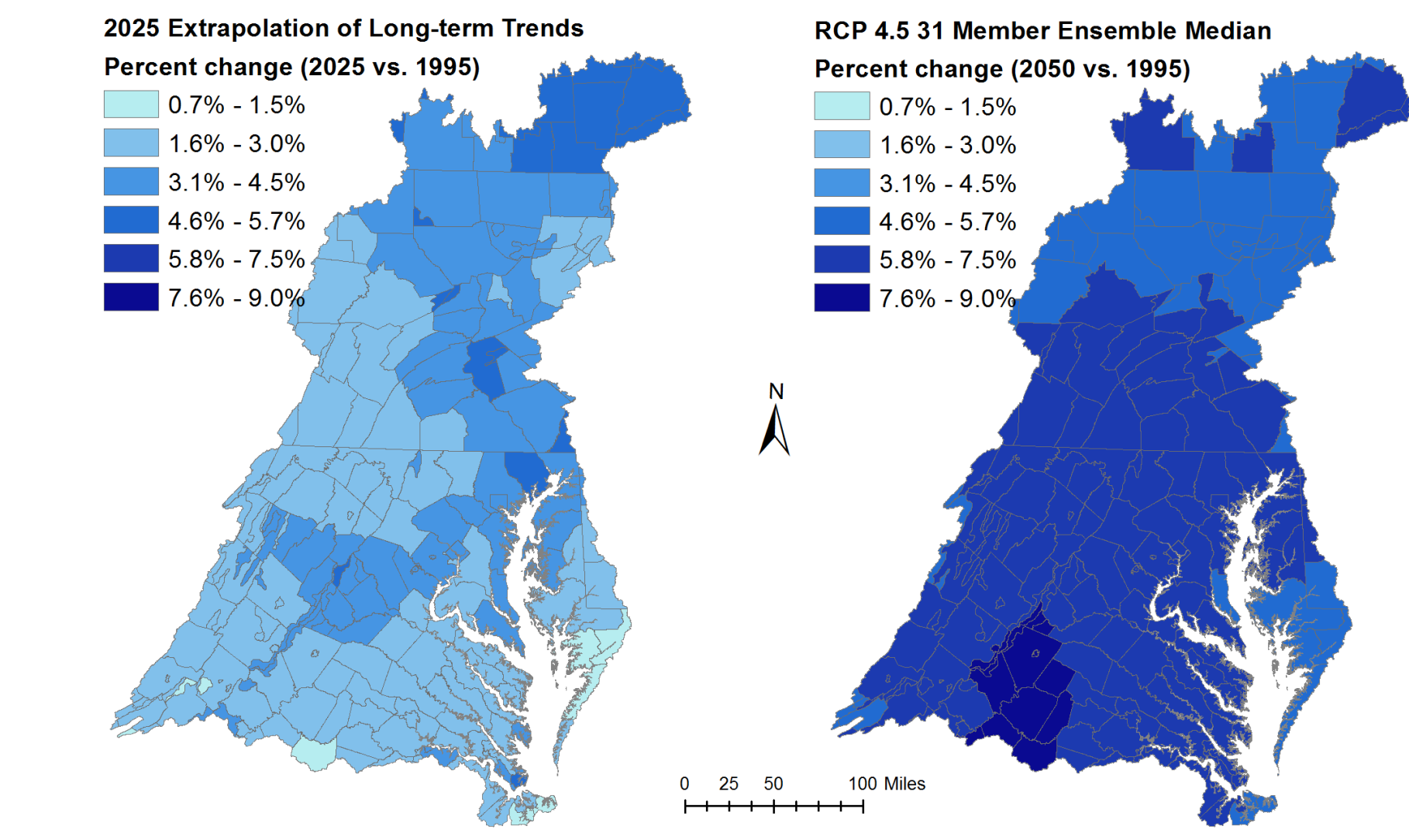
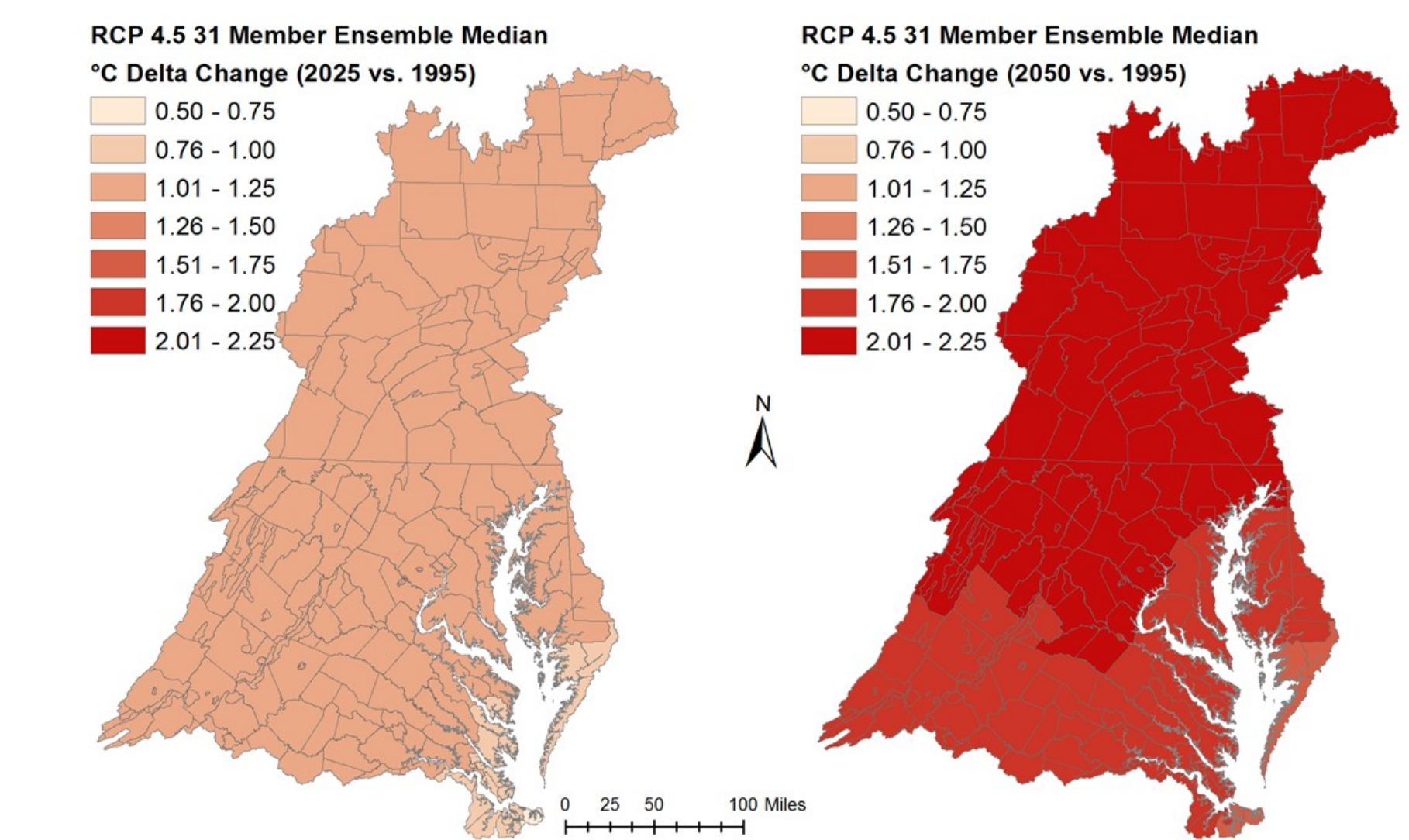
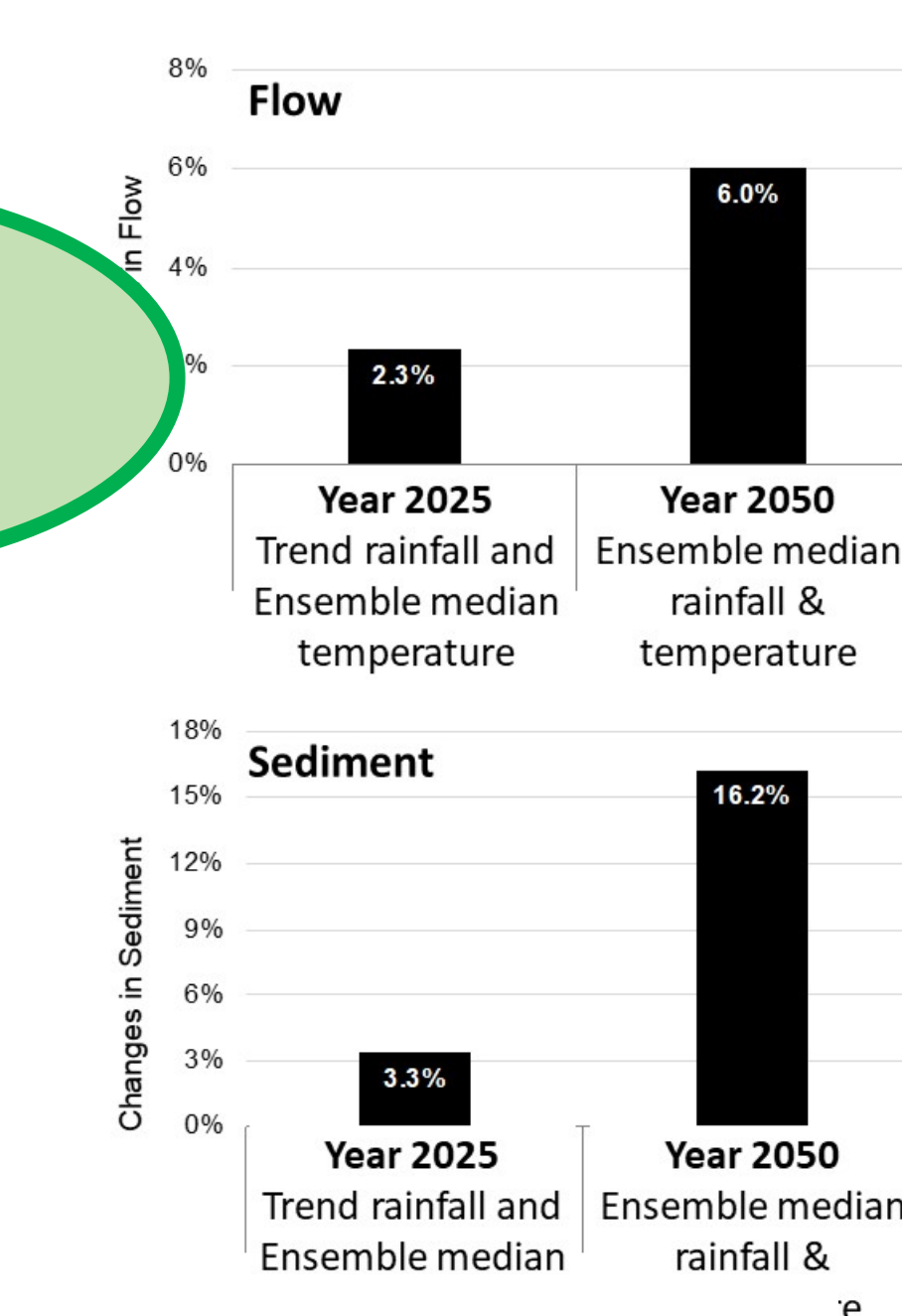
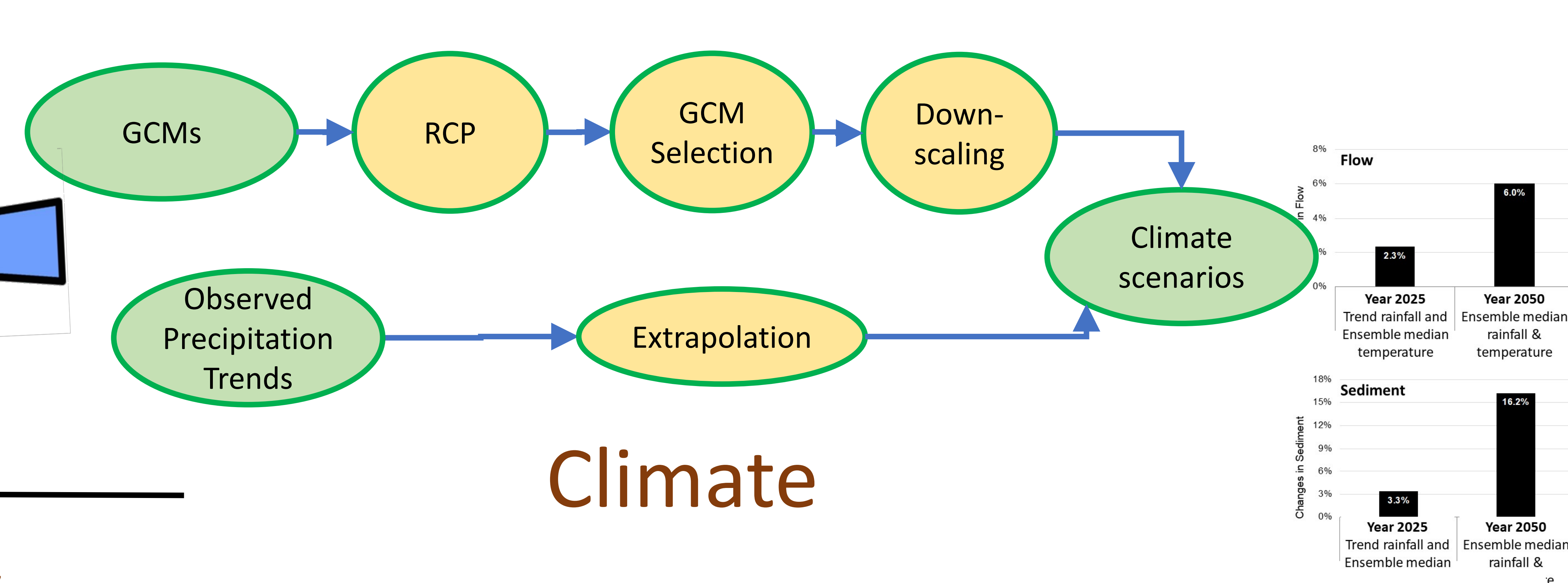
# Watershed



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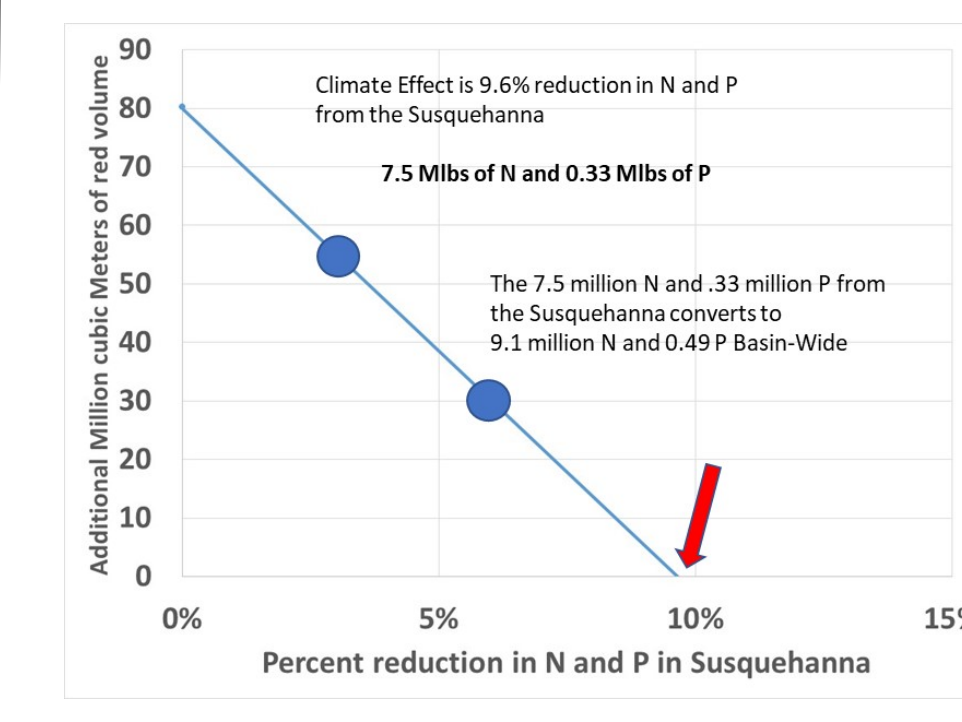


# Climate

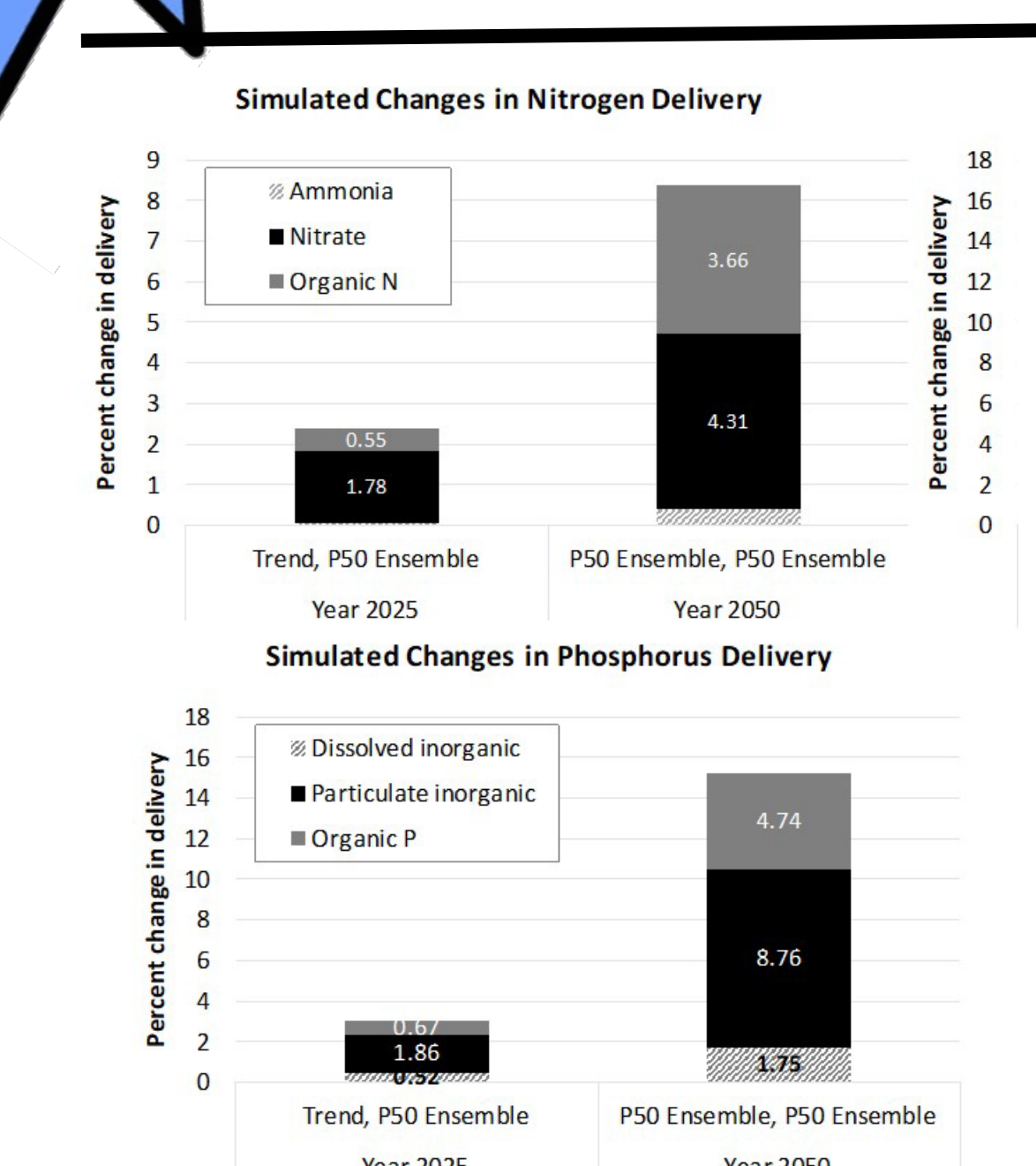
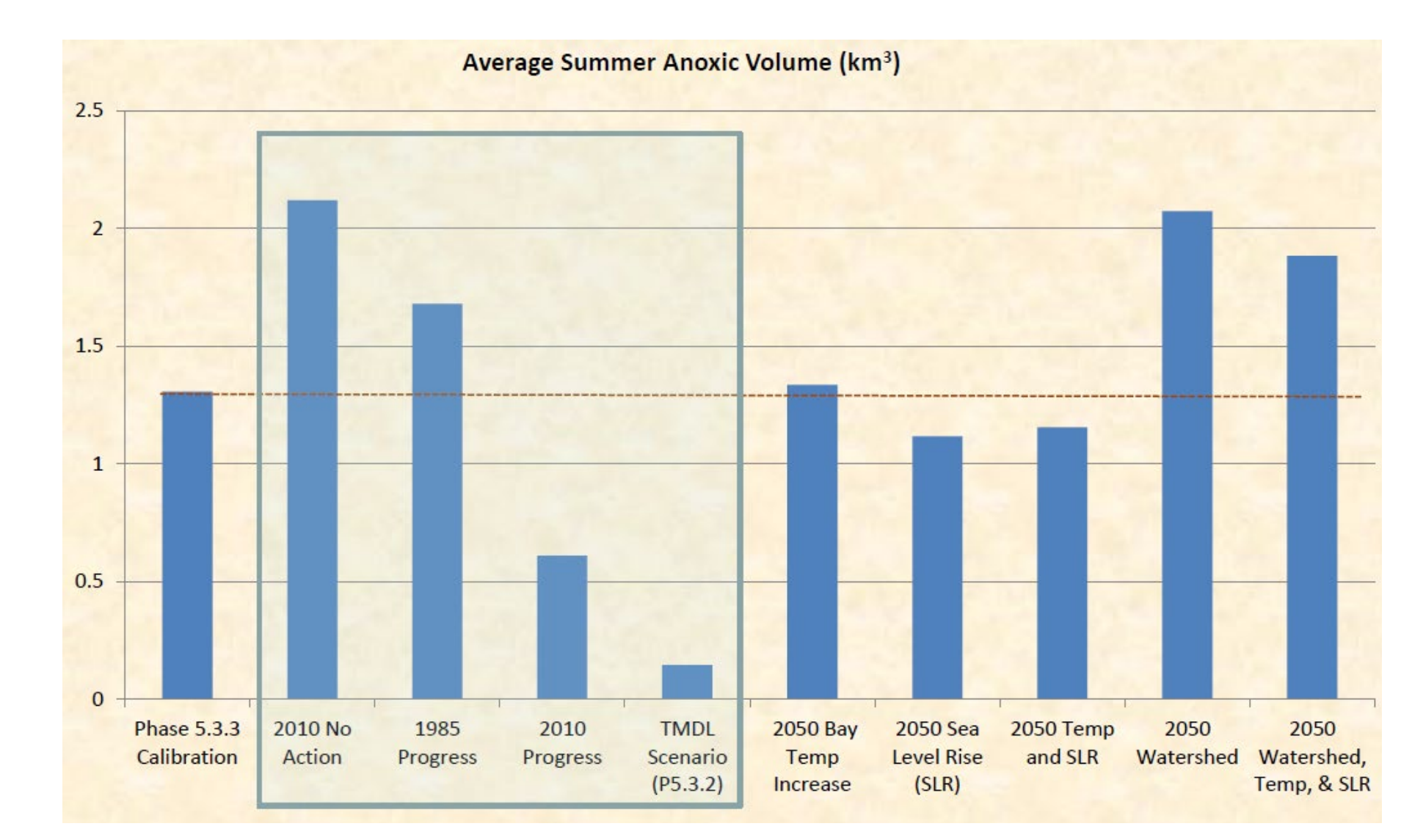


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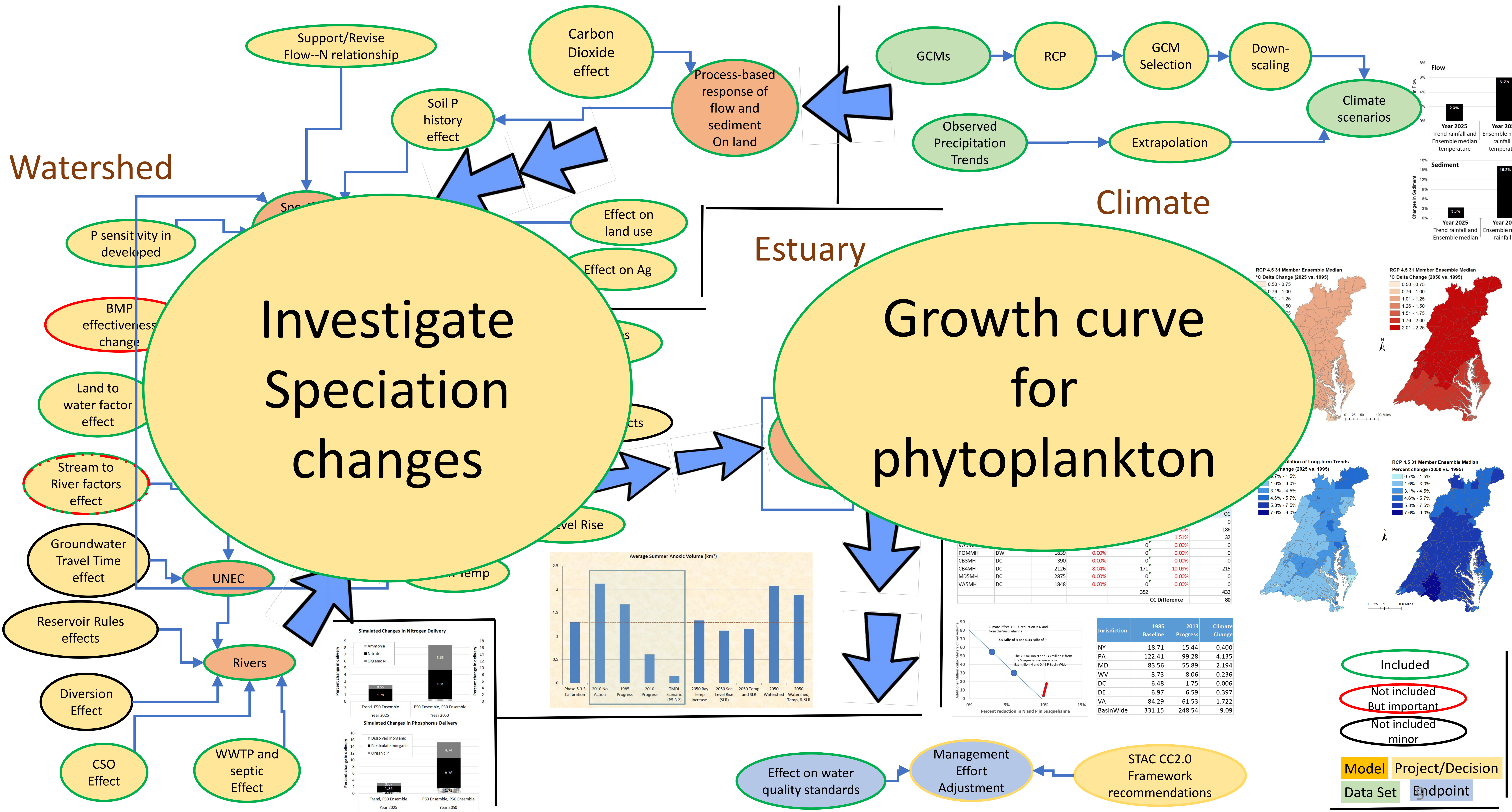
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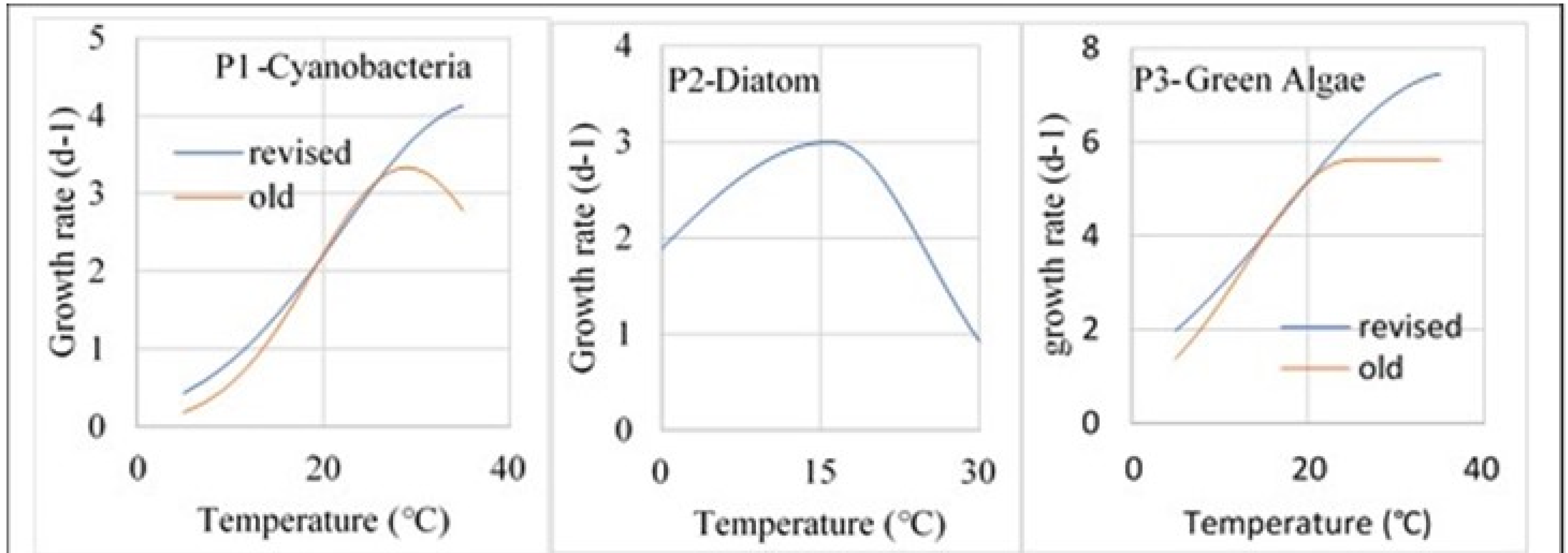
**Included** (green oval)  
**Not included But important** (red oval)  
**Not included minor** (black oval)

**Model** (yellow box) | **Project/Decision** (yellow box)  
**Data Set** (green box) | **Endpoint** (green box)

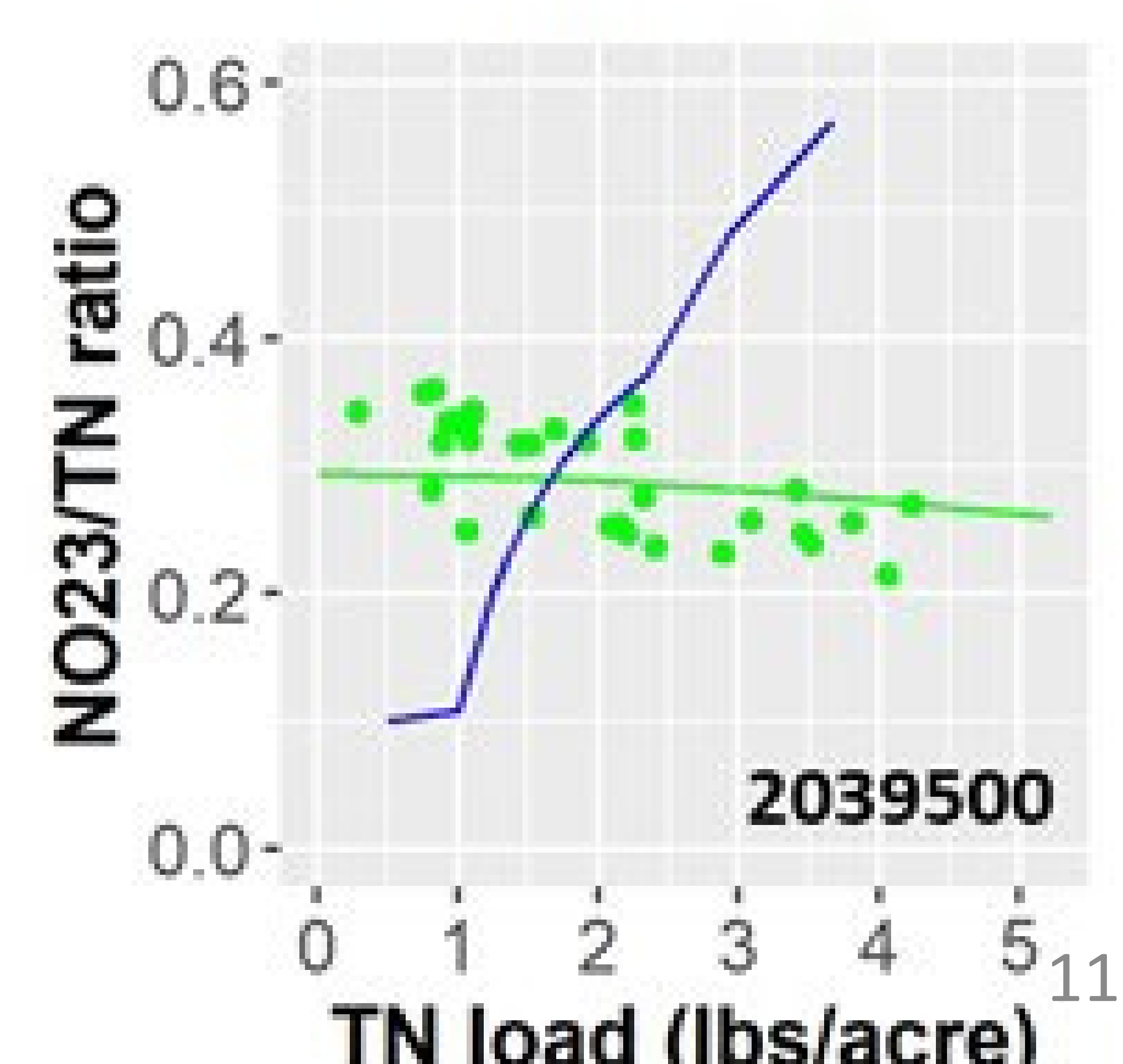
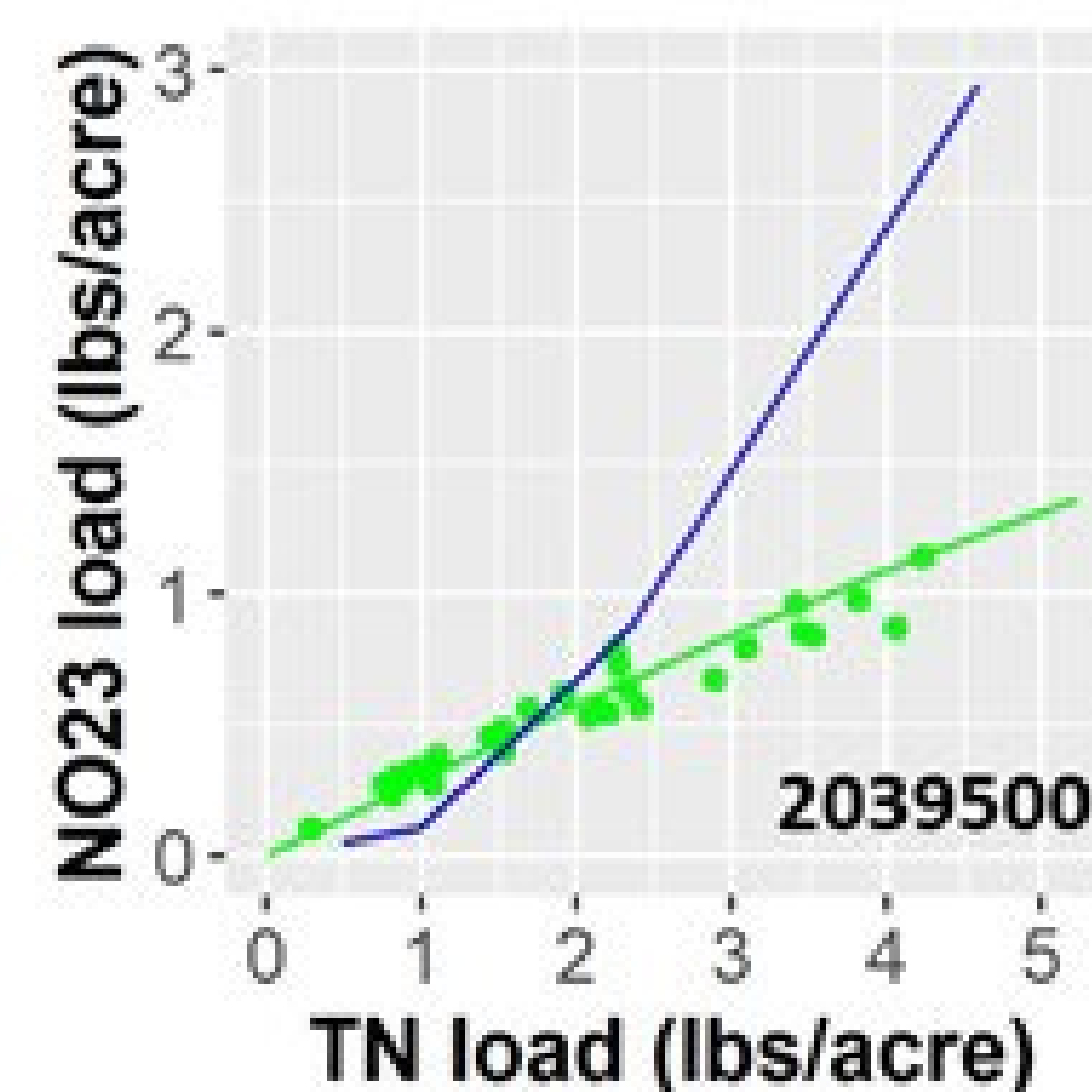
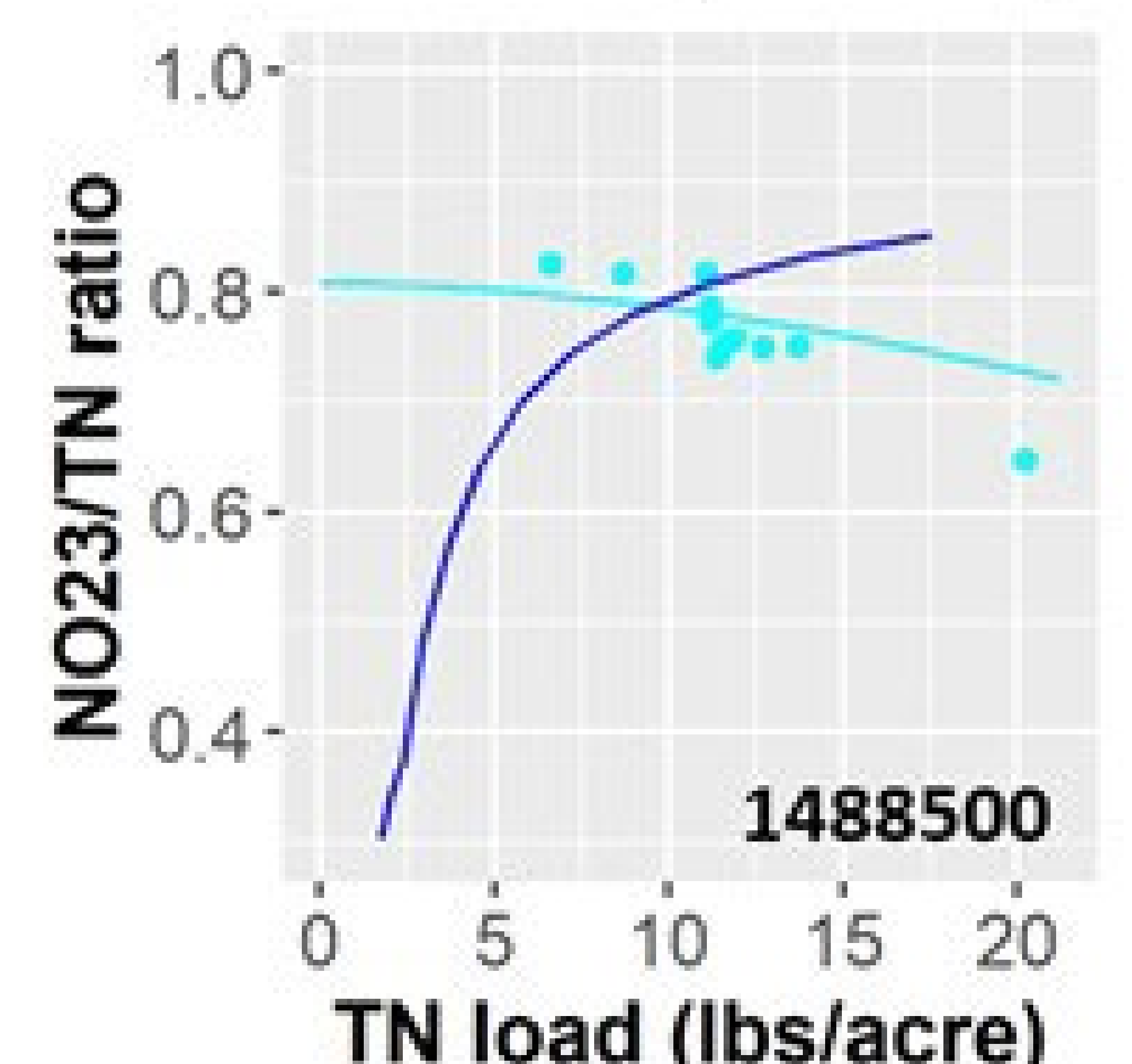
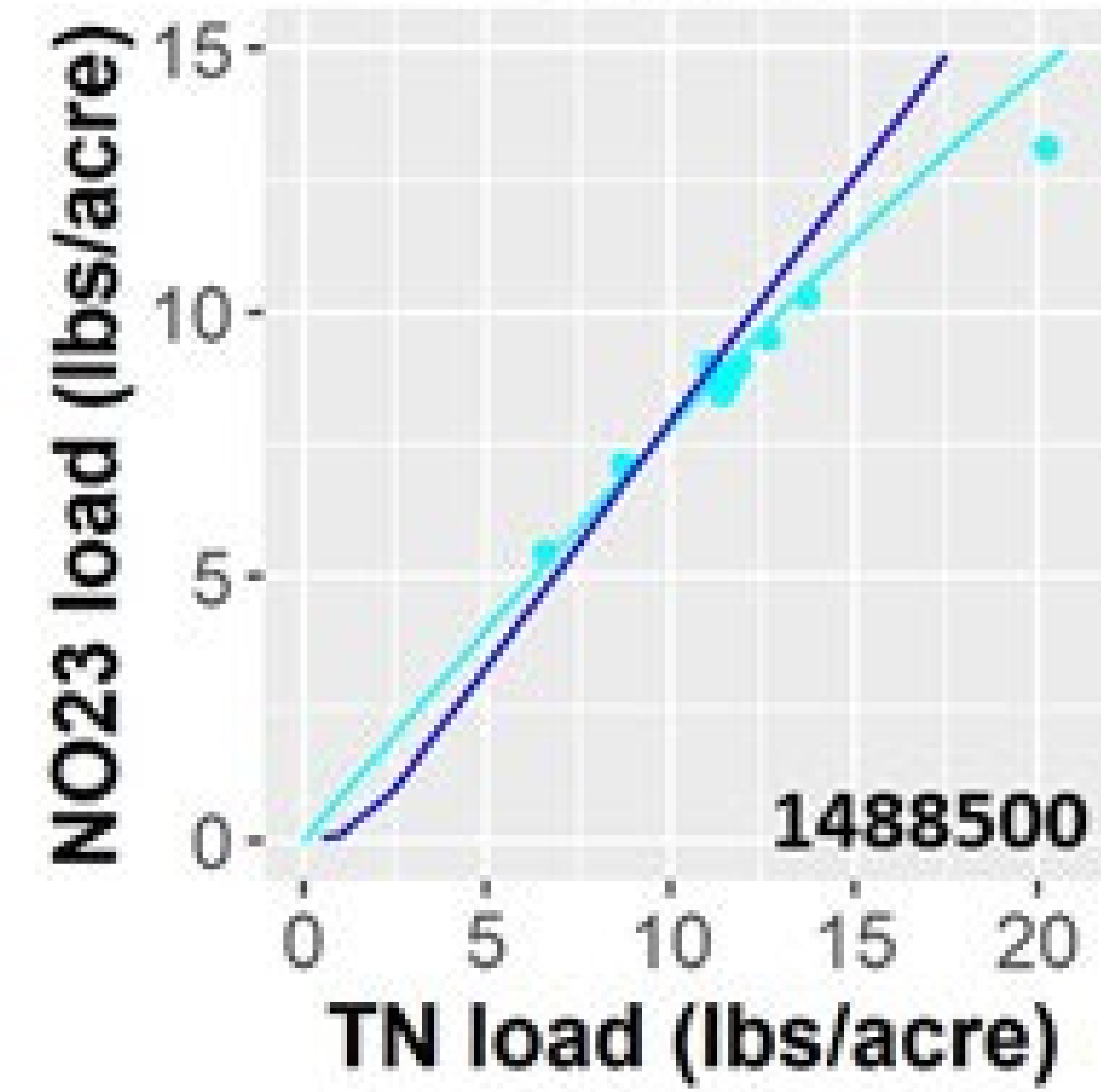
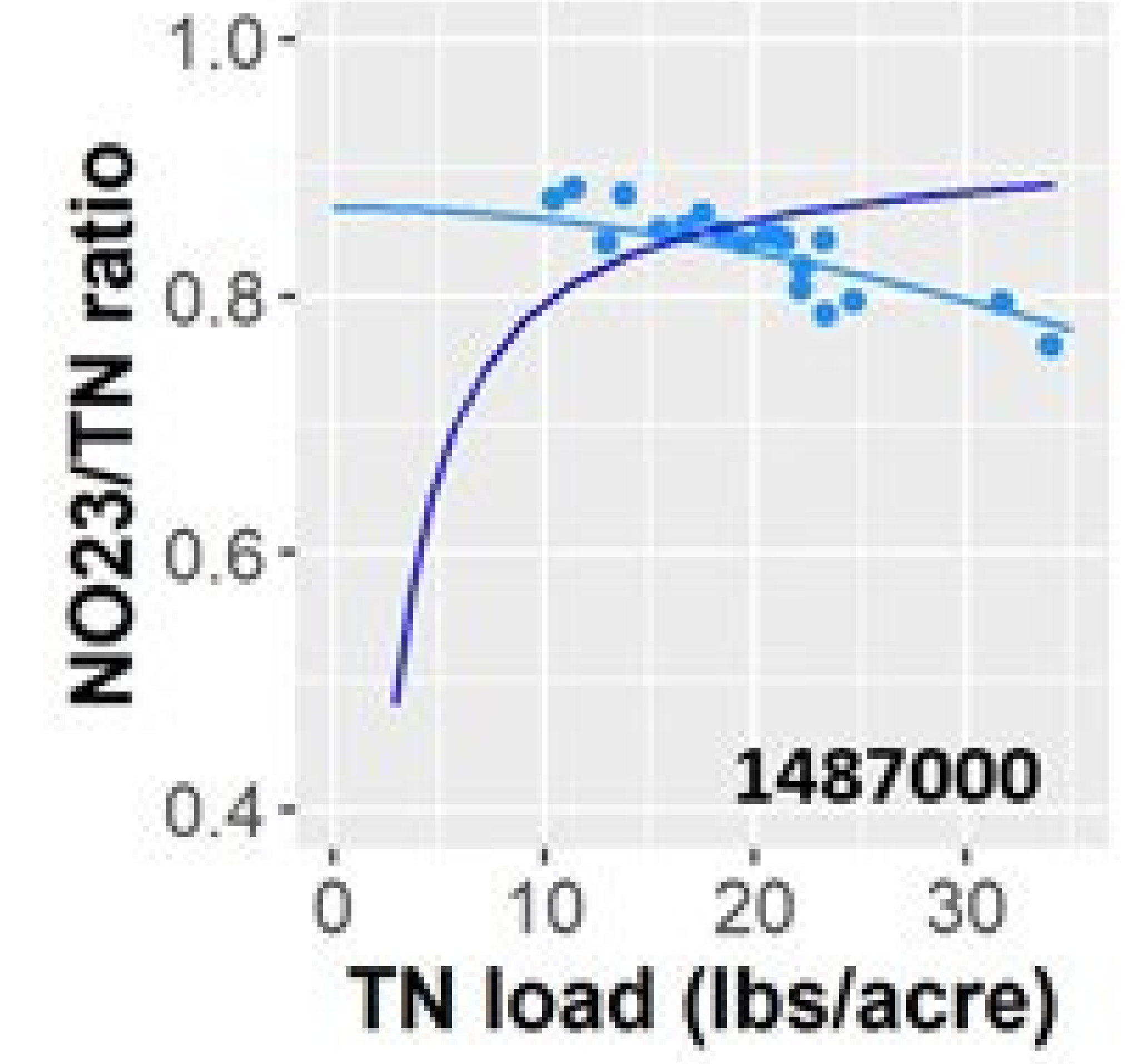
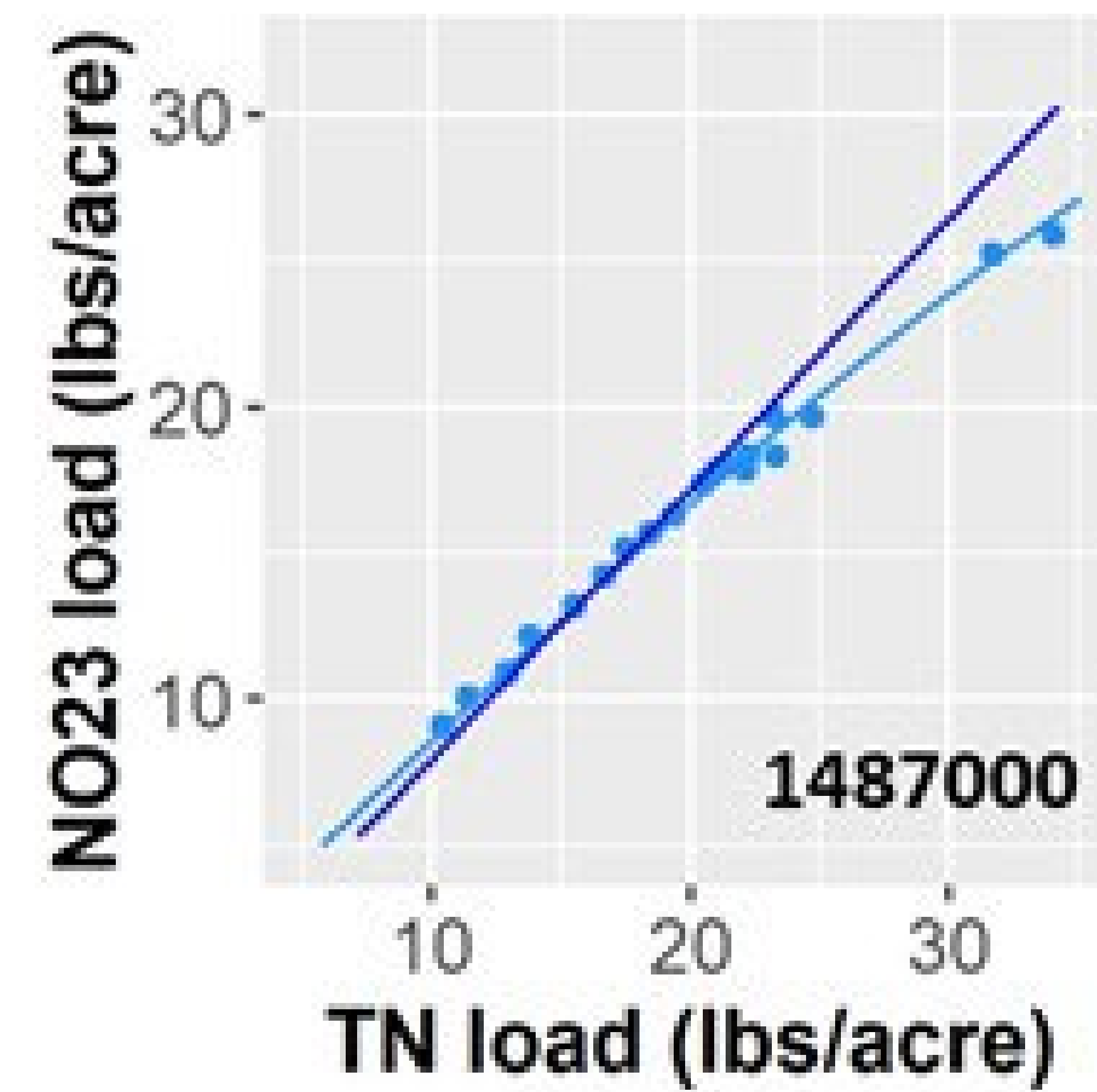
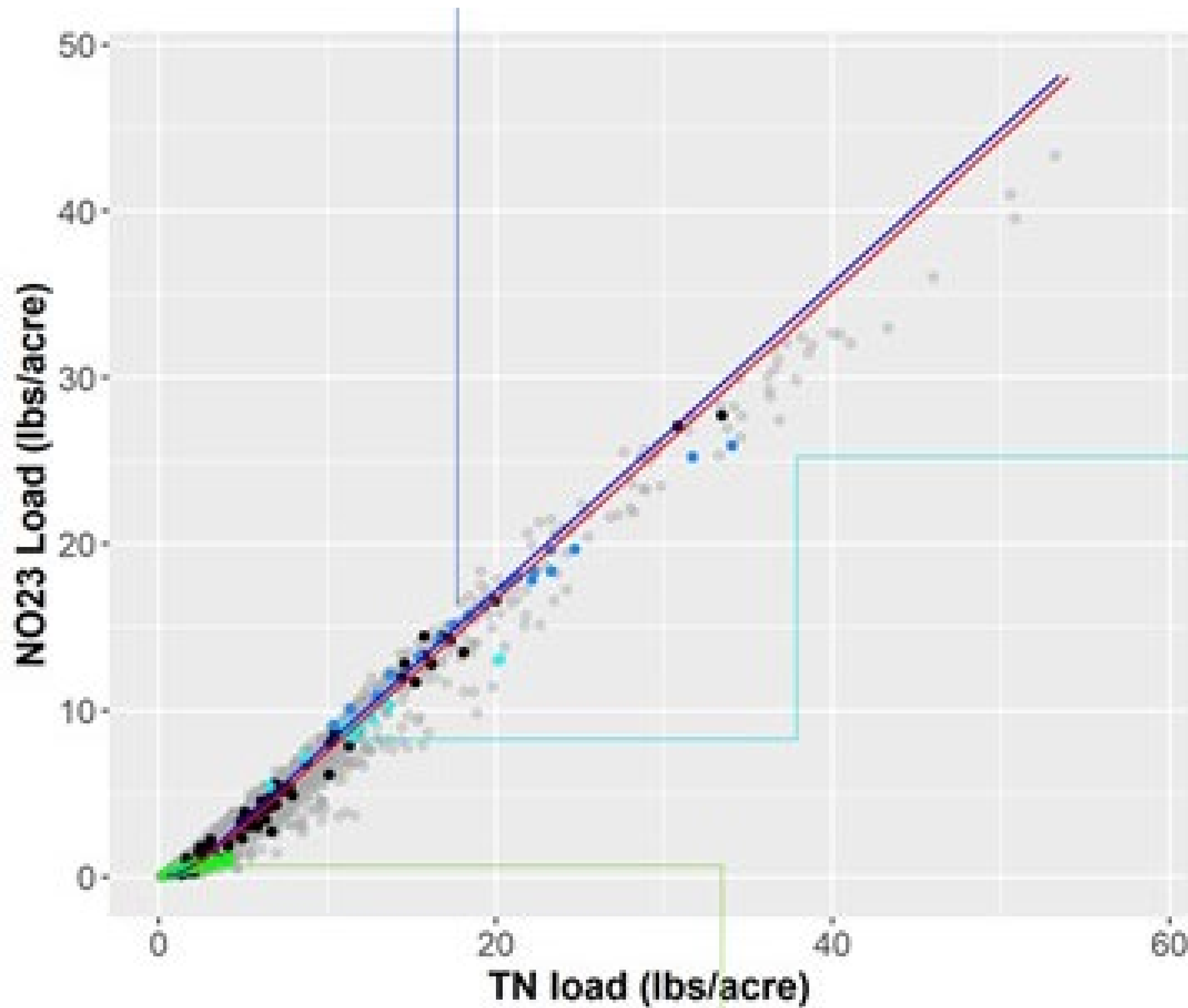




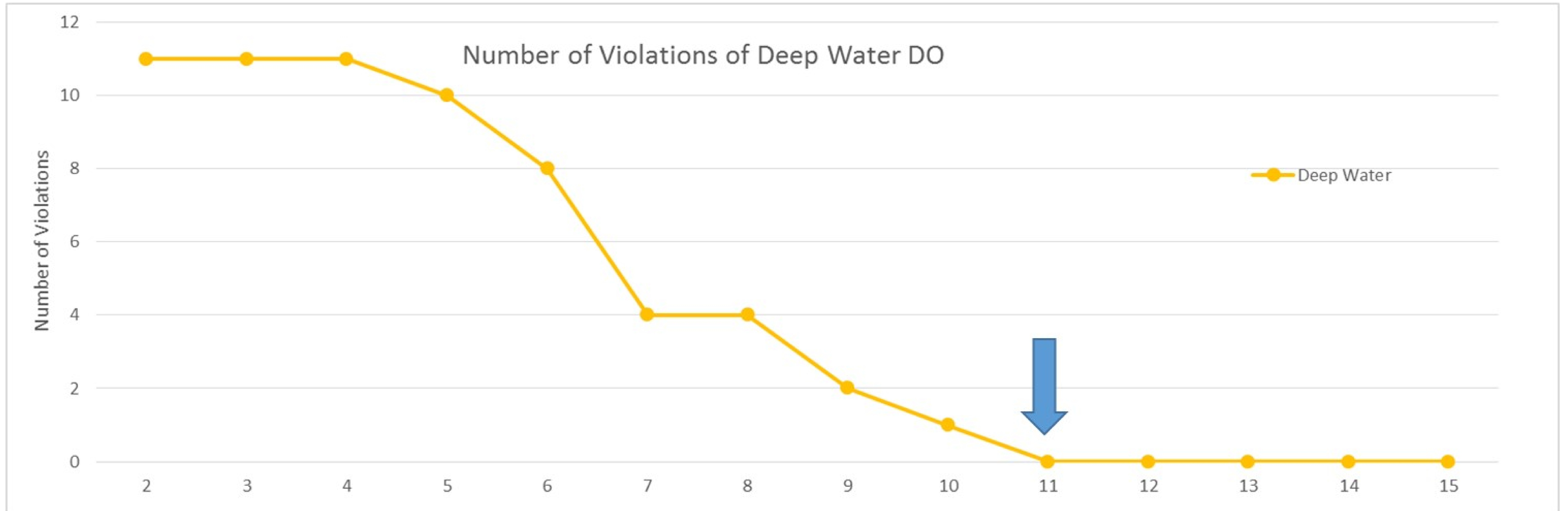
# New Growth Curves in WQSTM



# STAC recommendation New Speciation in WSM



# New Model – would change assimilative capacity



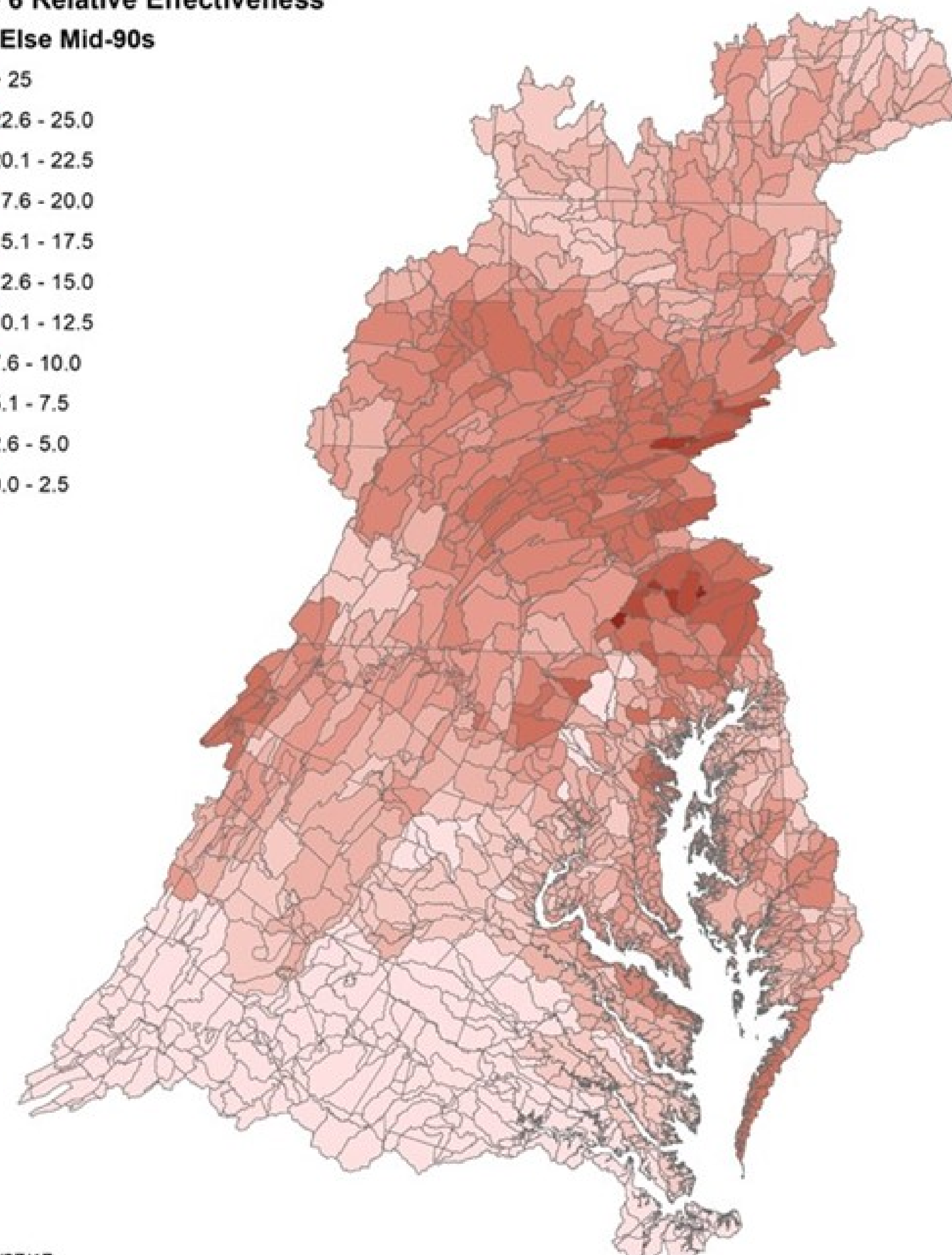
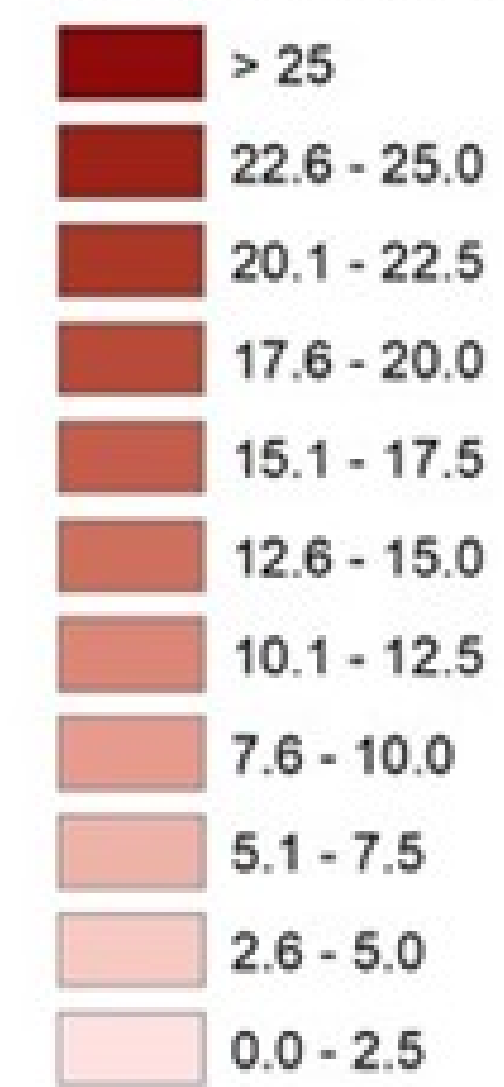
	1985	1990	1993	2000	2010	2013	WIP+18%TN & +12%TP	WIP+6%TN & +4%TP	WIP2	WIP-6%TN & -8%TP	WIP-11%TN & -16%TP	E3	All Forest
No Action	Progress	Progress	Progress	Progress	Progress	Progress							
404TN	347TN	338TN	337TN	317TN	266TN	253TN	224TN	205TN	195TN	185TN	174TN	133TN	40TN
41.7TP	30.4TP	27.7TP	23.7	21.9TP	16.9TP	15.9TP	14.8TP	14.4	13.7TP	13.0TP	11.9TP	8.6TP	3.9TP

# New Model – would change watershed and estuarine delivery

## Nitrogen

### Phase 6 Relative Effectiveness

#### TN All Else Mid-90s

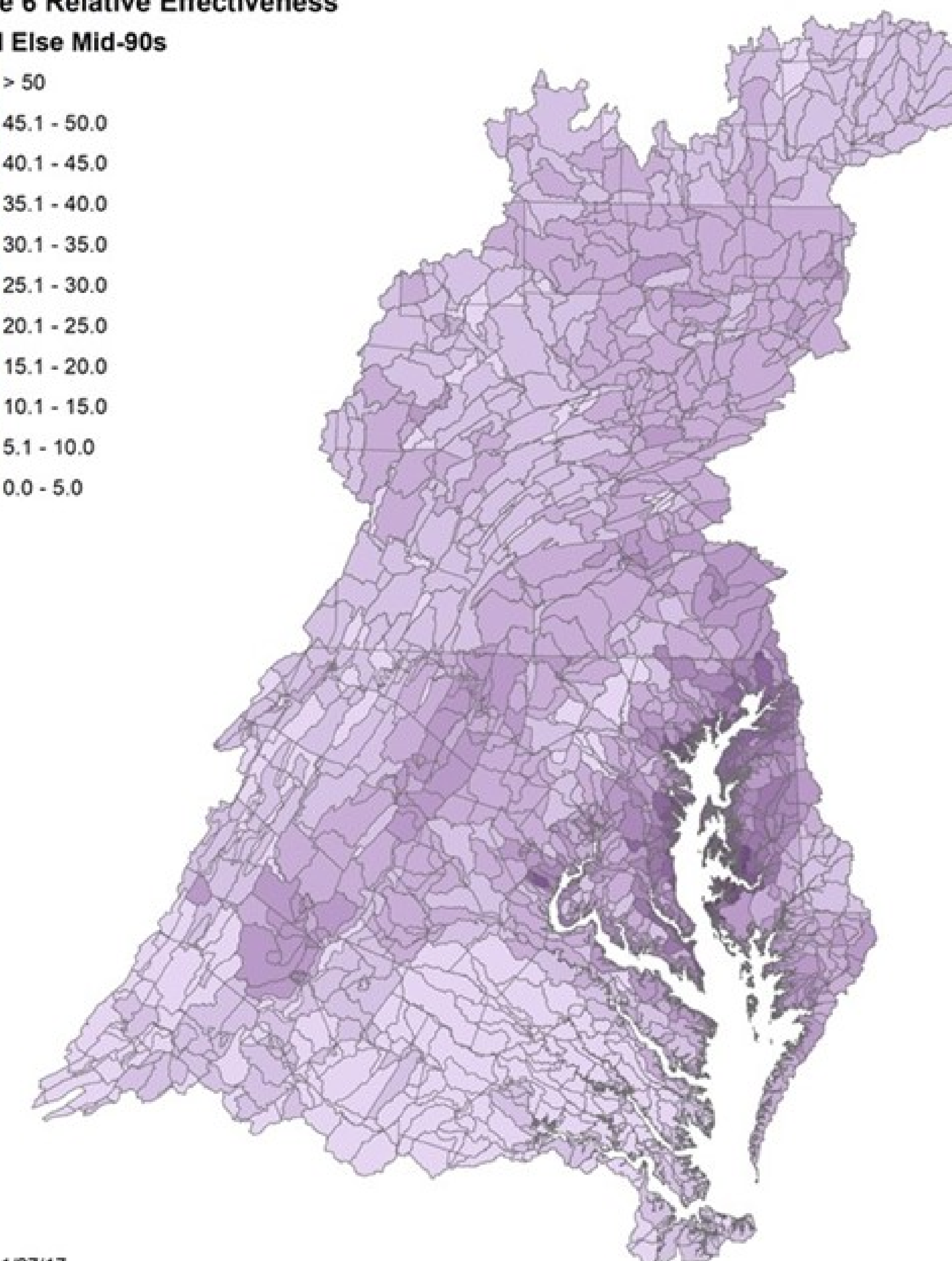
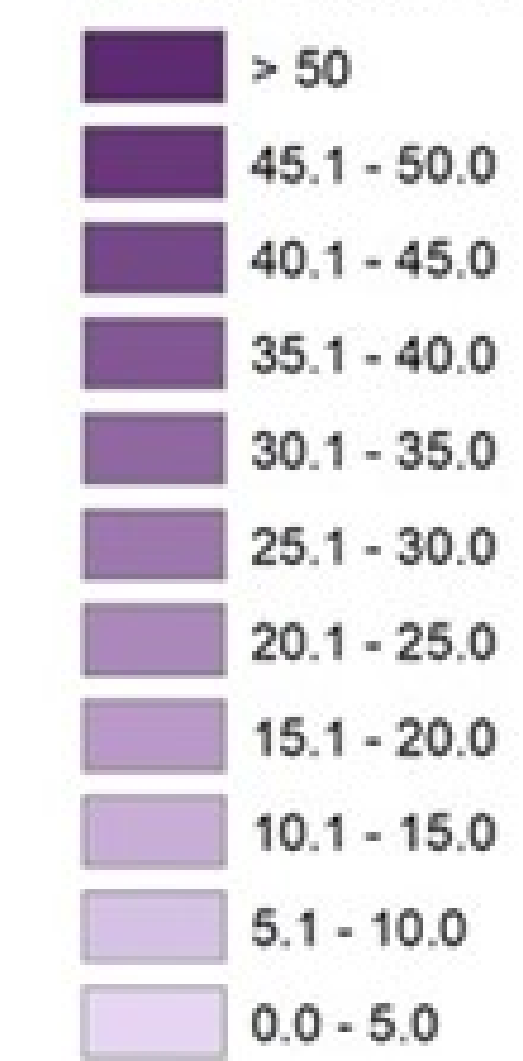


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## Phosphorus

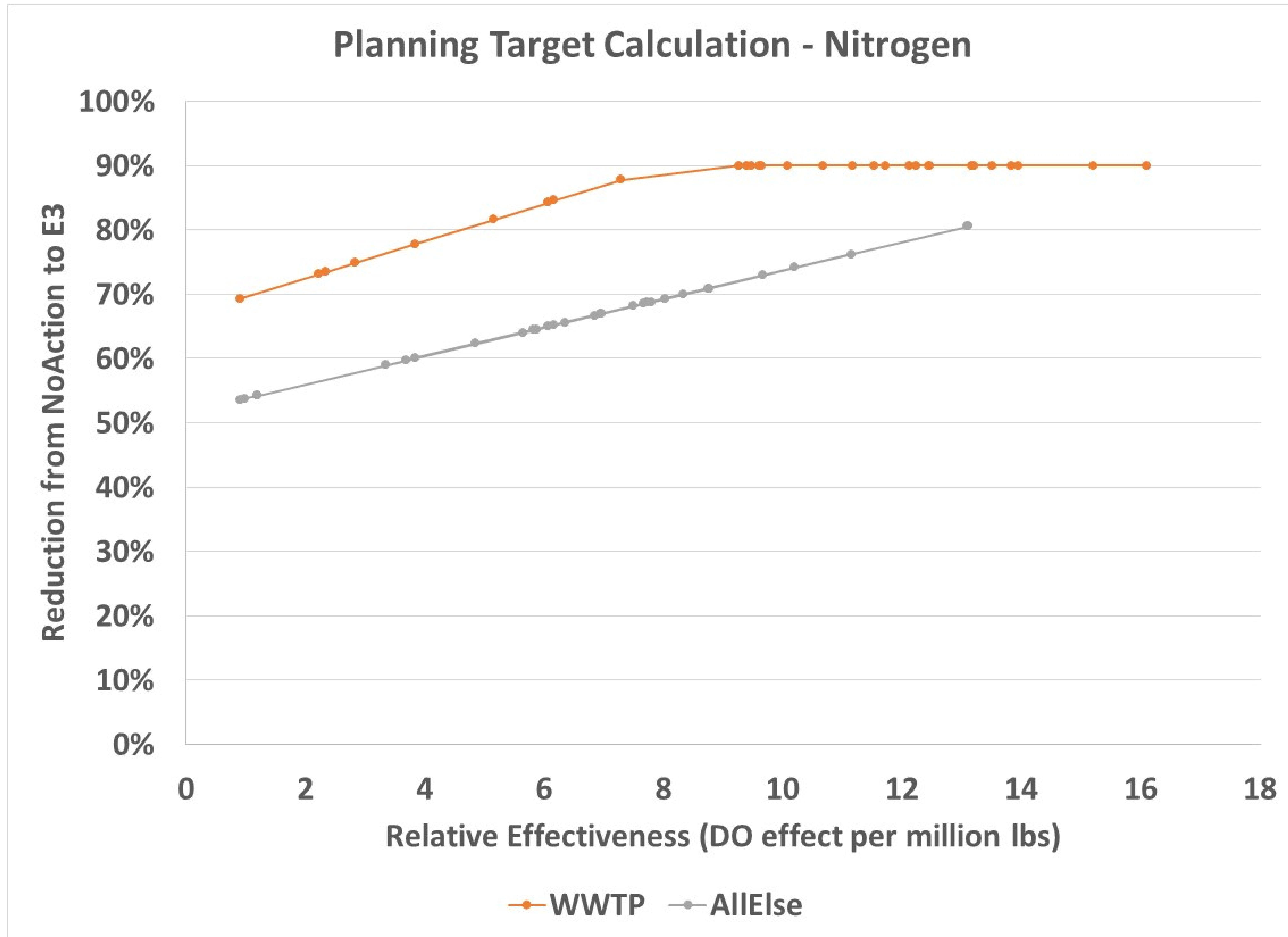
### Phase 6 Relative Effectiveness

#### TP All Else Mid-90s



11/27/17

# New Model – would change planning targets



# Climate Model System – relative change only

- PSC voted to not change planning targets until 2025
  - Still need to use CAST-2017 and CAST-2019
- PSC asked to evaluate climate change
- Climate change assessment models will be used to evaluate the ***change*** in attainability of standards due to climate change effects