

Manure Data in the CBP Partnership's Watershed Model

Chesapeake Bay Commission

Gary Shenk

USGS – CBPO

11/15/2024

Total Maximum Daily Load (TMDL)

What management practices...

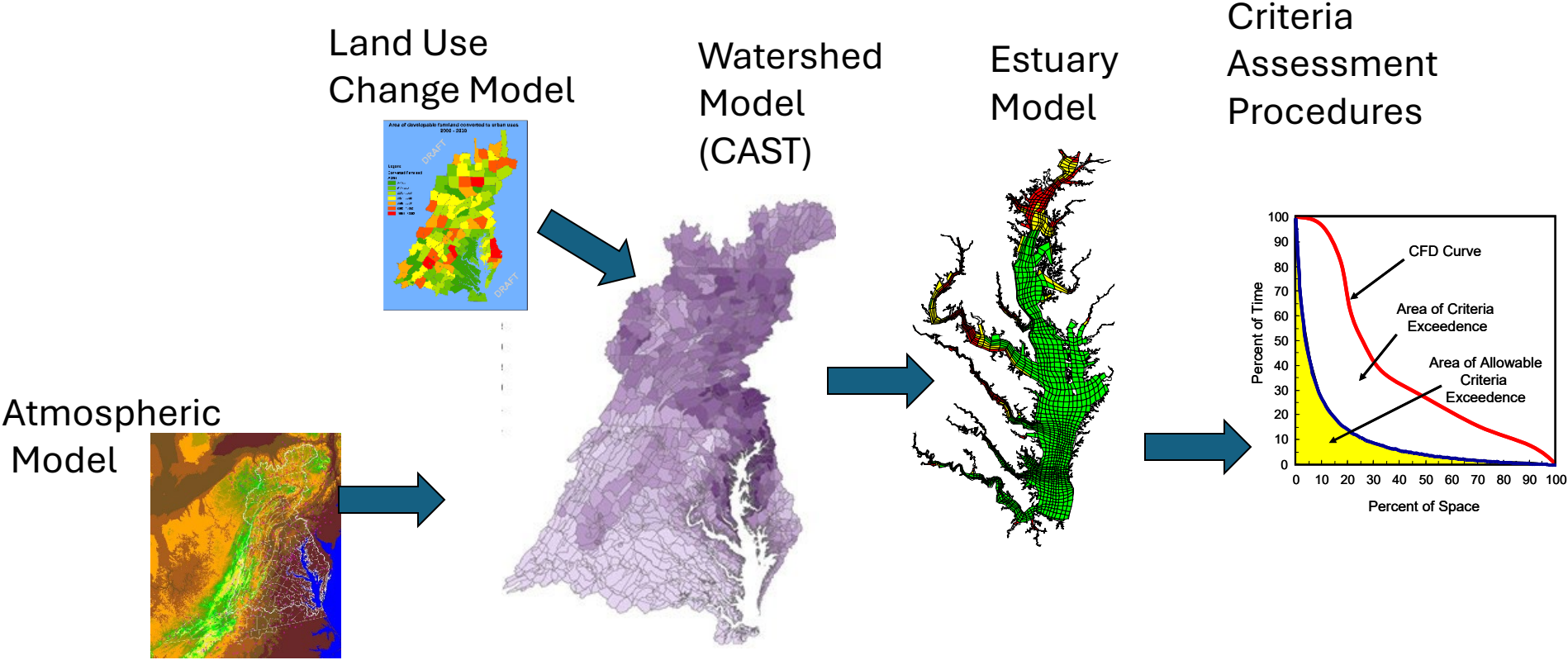
.... will reduce nitrogen, phosphorus, and sediment to levels ...

.... that will achieve levels of dissolved oxygen, clarity, and chlorophyll in the Bay...

... that are supportive of living resources?



CBP Decision Support System



What management practices...

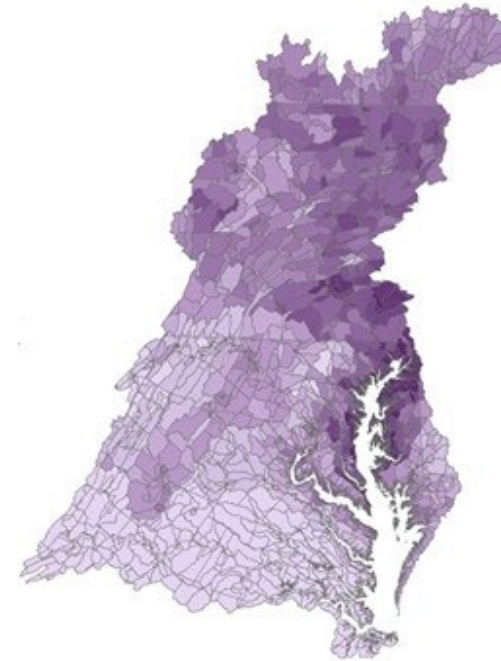
.... will reduce nitrogen and phosphorus to levels

.... that will achieve appropriate dissolved oxygen, clarity, and chlorophyll in the Bay?

Nutrient Targets

Major	State	StateBasin	2018 Planning Targets approved by PSC	
			Nitrogen	Phosphorus
Potomac	DC	DC Potomac	2.42	0.130
Eastern Shore	DE	DE Eastern Shore	4.55	0.108
Eastern Shore	MD	MD Eastern Shore	15.21	1.286
Patuxent	MD	MD Patuxent	3.21	0.301
Potomac	MD	MD Potomac	15.30	1.092
Susquehanna	MD	MD Susquehanna	1.18	0.053
Western Shore	MD	MD Western Shore	10.89	0.948
Susquehanna	NY	NY Susquehanna	11.53	0.587
Eastern Shore	PA	PA Eastern Shore	0.45	0.025
Potomac	PA	PA Potomac	6.11	0.357
Susquehanna	PA	PA Susquehanna	66.59	2.661
Western Shore	PA	PA Western Shore	0.02	0.001
Eastern Shore	VA	VA Eastern Shore	1.43	0.164
James	VA	VA James	25.92	2.731
Potomac	VA	VA Potomac	16.00	1.892
Rappahannock	VA	VA Rappahannock	6.85	0.849
York	VA	VA York	5.52	0.556
James	WV	WV James	0.04	0.005
Potomac	WV	WV Potomac	8.18	0.427

- Nutrient loads in million lbs/year
 - Watershed model (CAST) used to assess progress toward these goals



Calculating Manure Amounts

USDA - NASS

Animal population by county



Animals

Calculating Manure Amounts

USDA - NASS

Animal population by county

Manure produced per animal
Depending on animal size



Nitrogen and Phosphorus content
Dependent on Feed

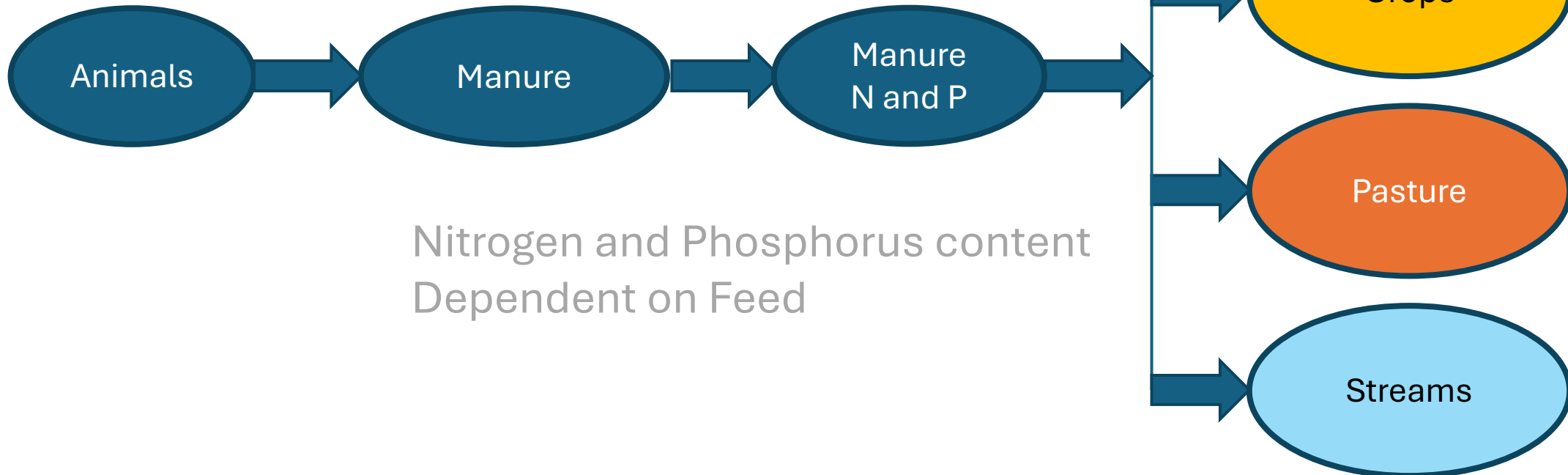
Calculating Manure Amounts

USDA - NASS

Animal population by county

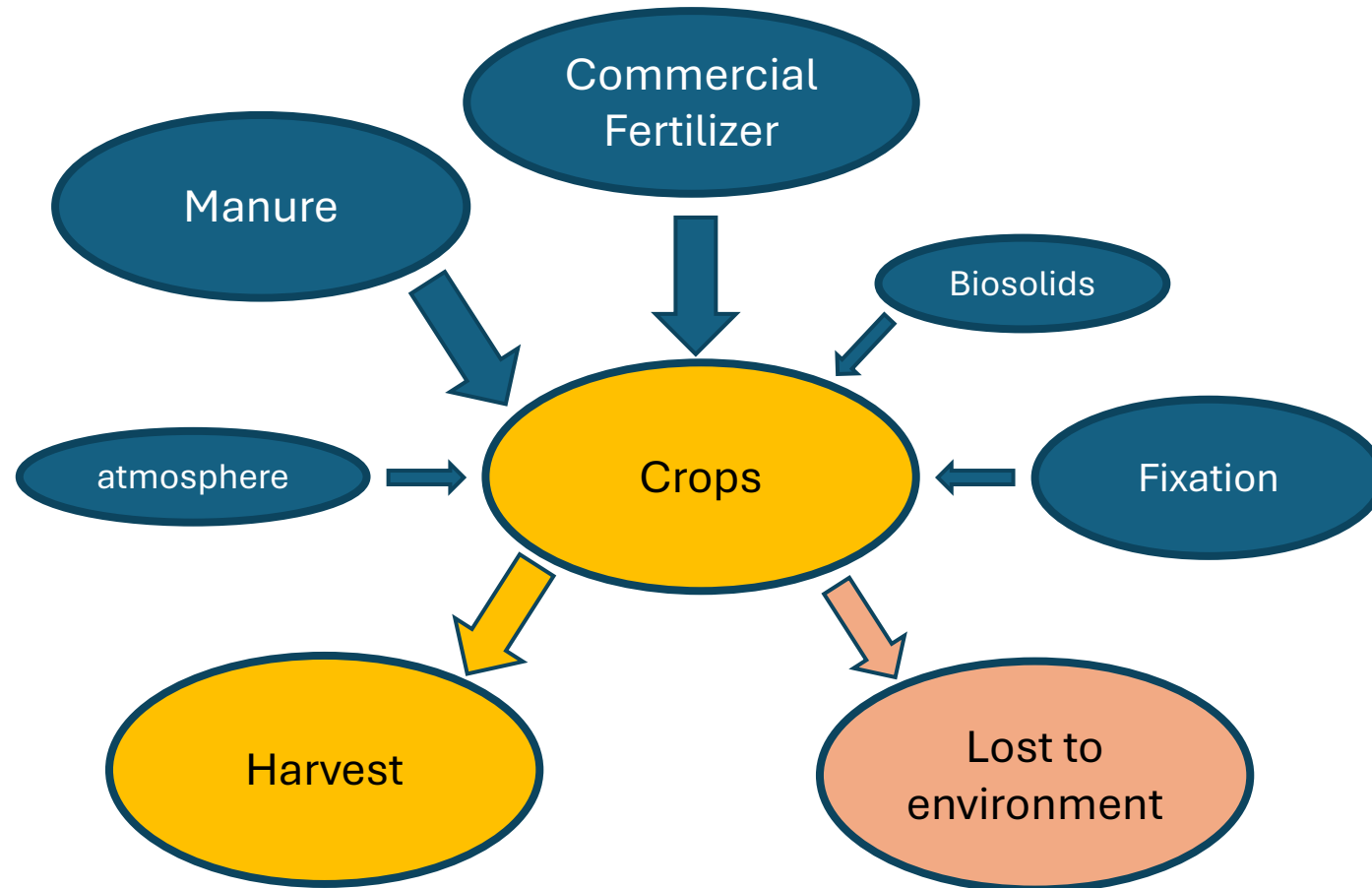
Manure produced per animal

Depending on animal size



Nitrogen and Phosphorus content
Dependent on Feed

Crop Nutrient Sources



Who Decides?

Agriculture Modeling Team

– Voting Members and Alternates



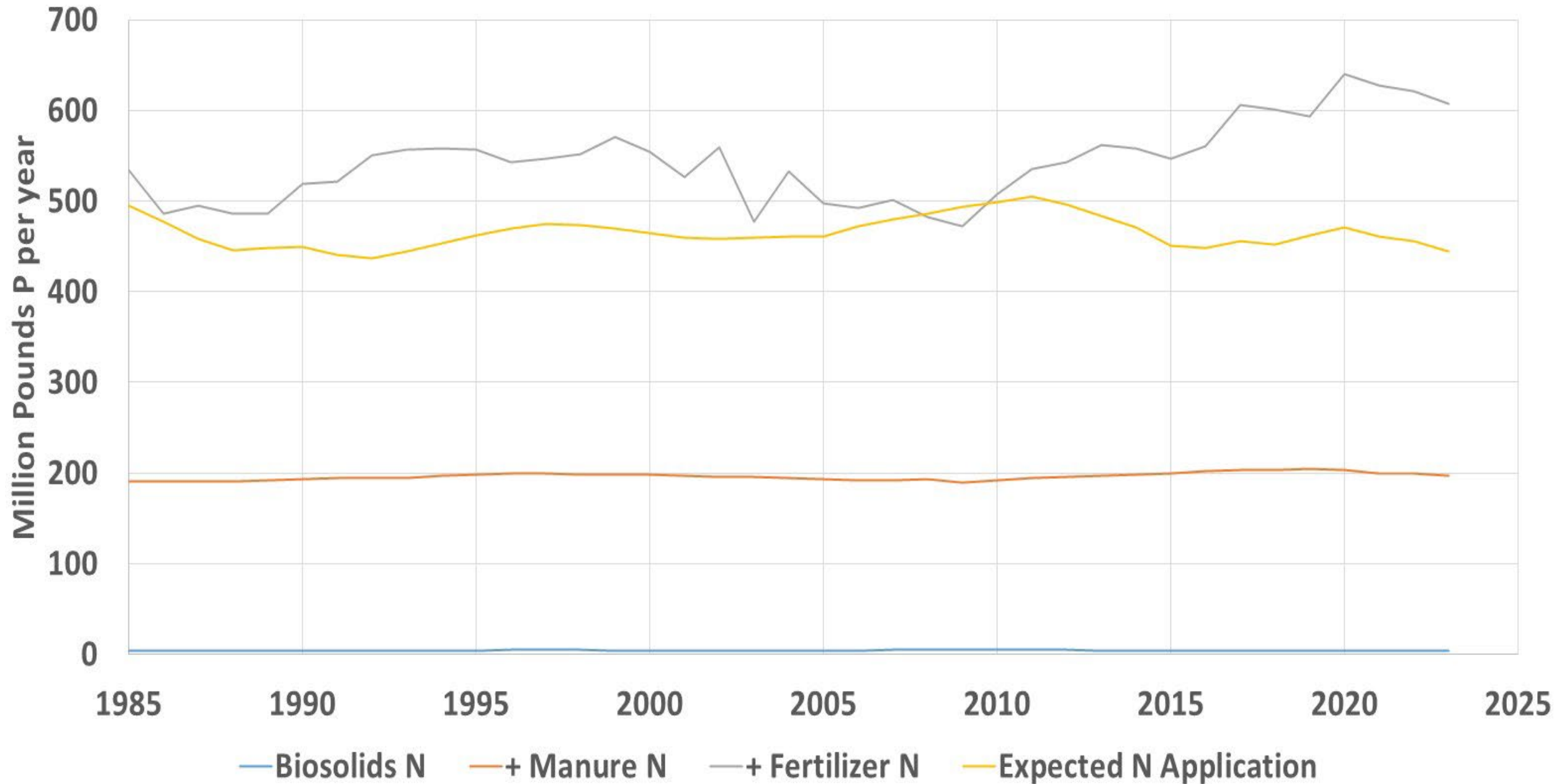
Agriculture Research Service



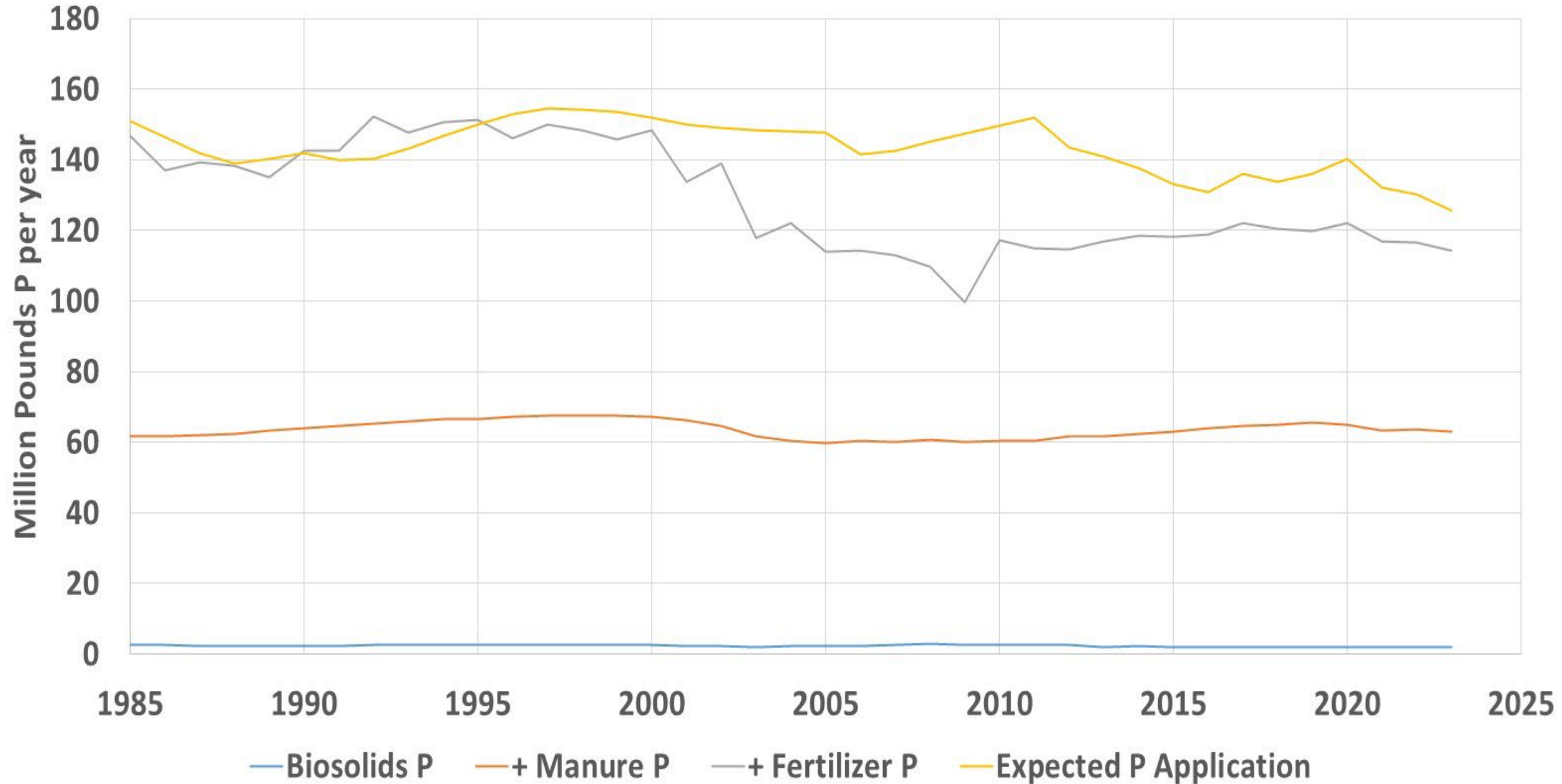
West Virginia
Conservation Agency



Crop Nitrogen Applications

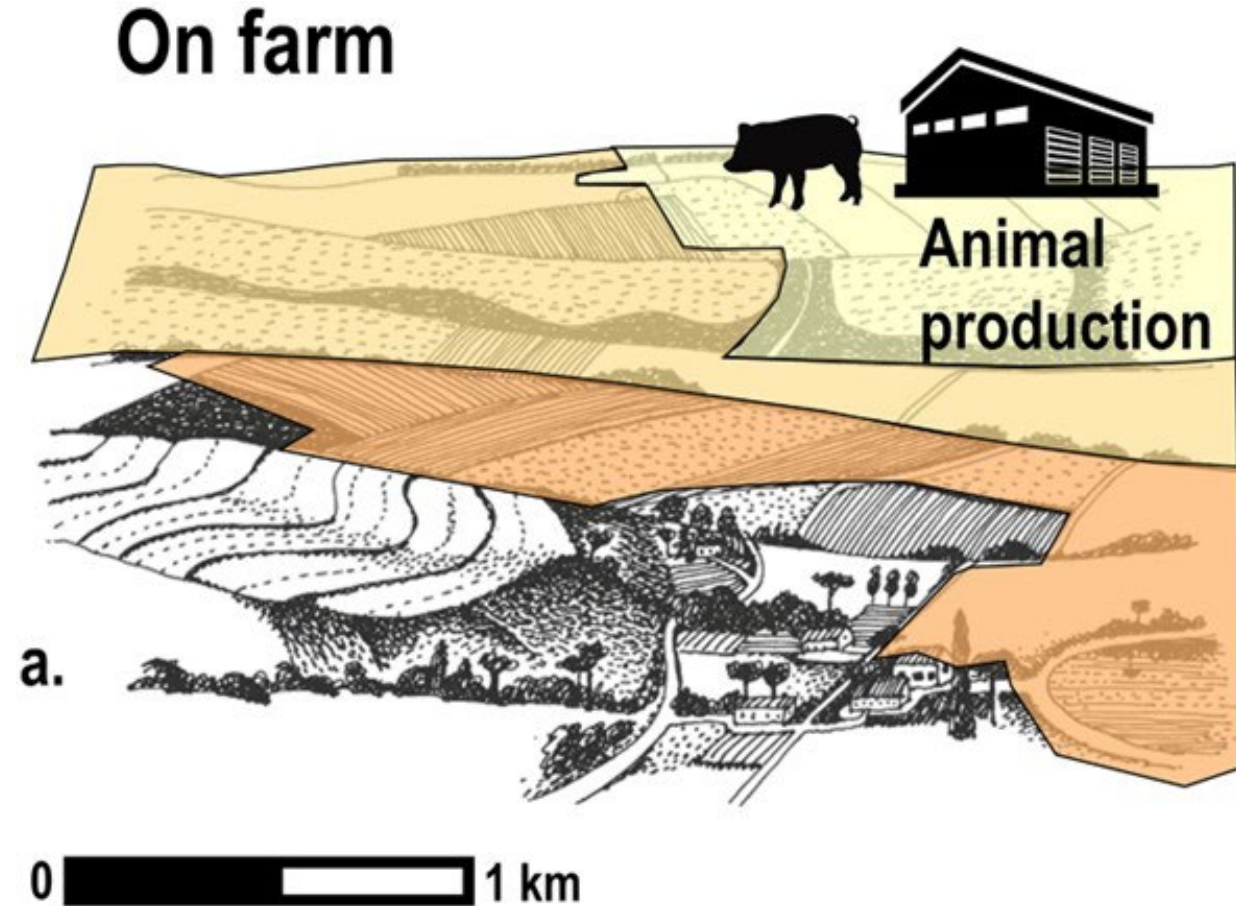


Crop Phosphorus Applications



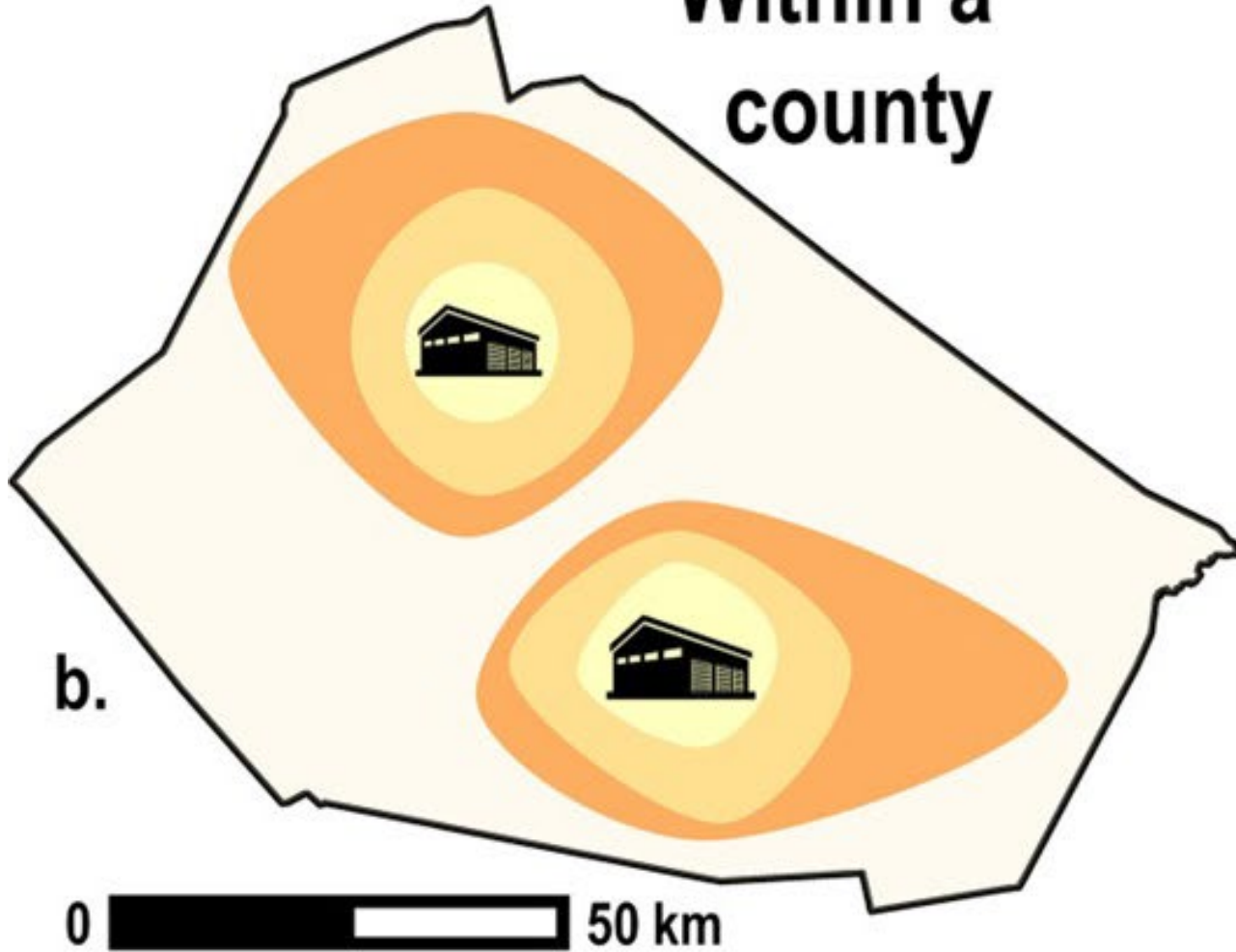
Manuresheds

A "manureshed" encompasses the lands surrounding animal feeding operations onto which manure nutrients can be redistributed to meet environmental, production, and economic goals.

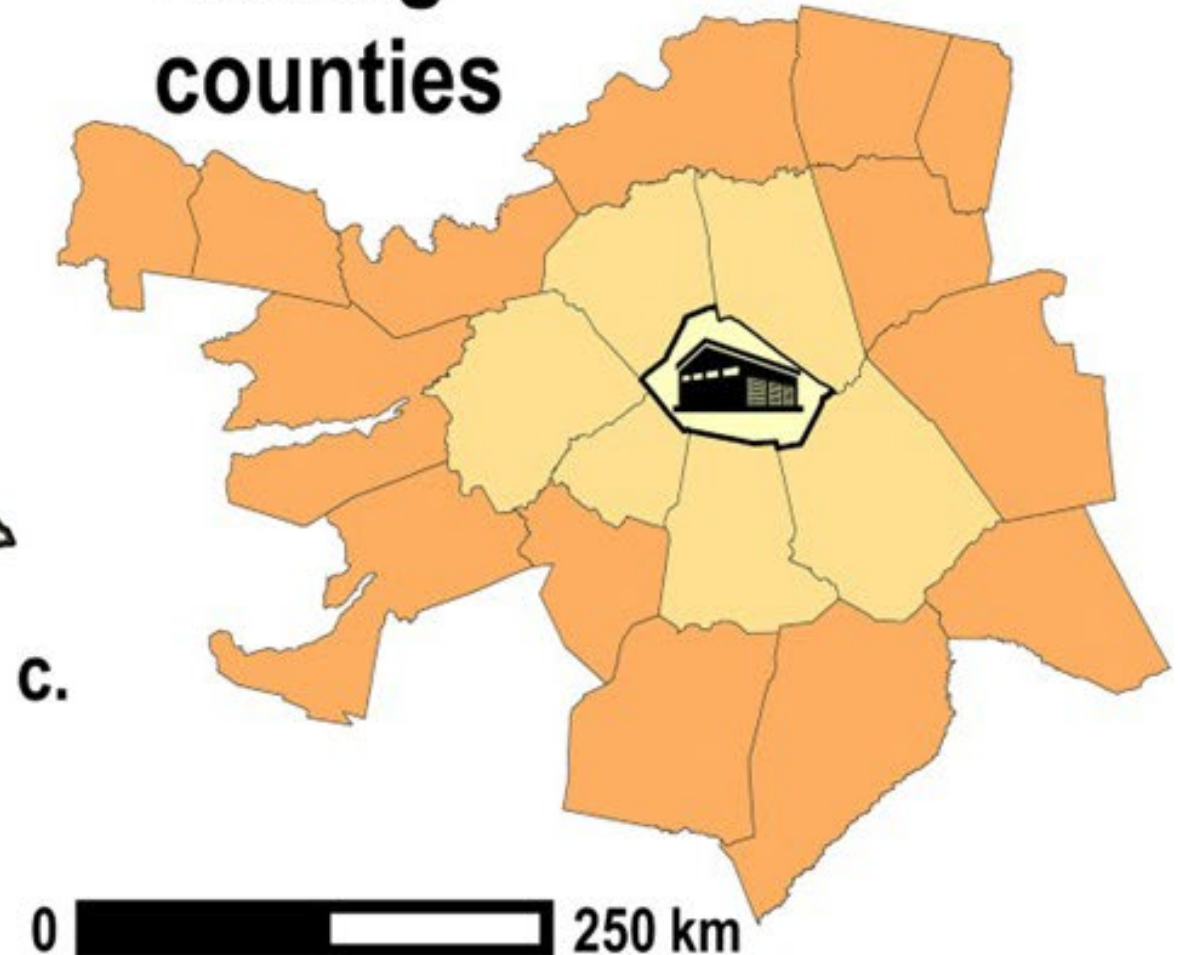


Manuresheds

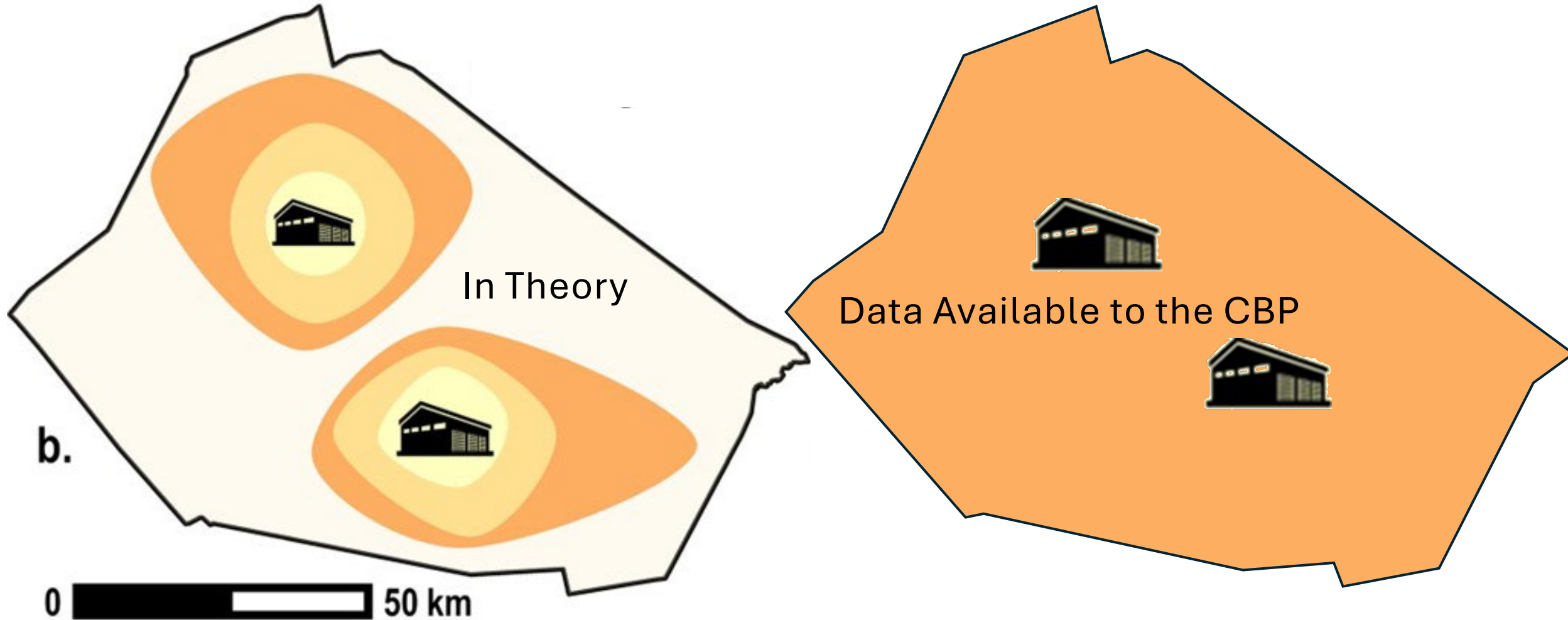
**Within a
county**



**Among
counties**



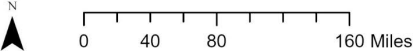
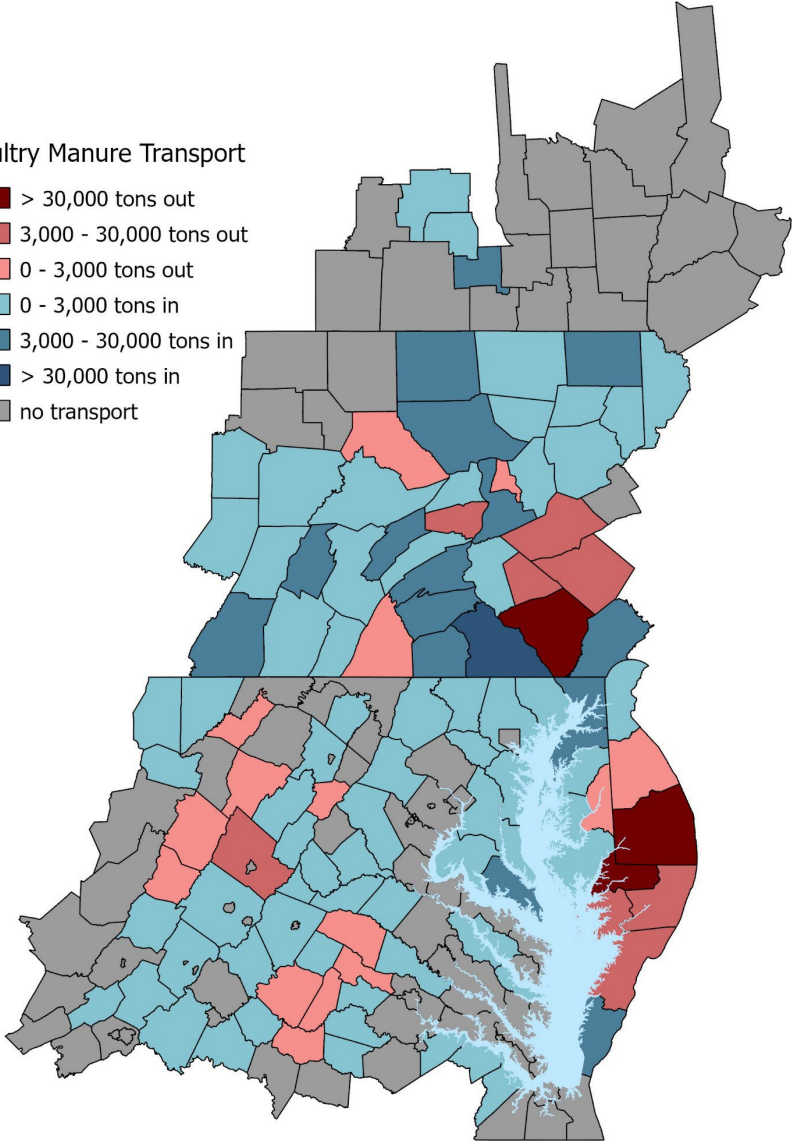
Manuresheds



Poultry Manure Transport Balance by County

Poultry Manure Transport

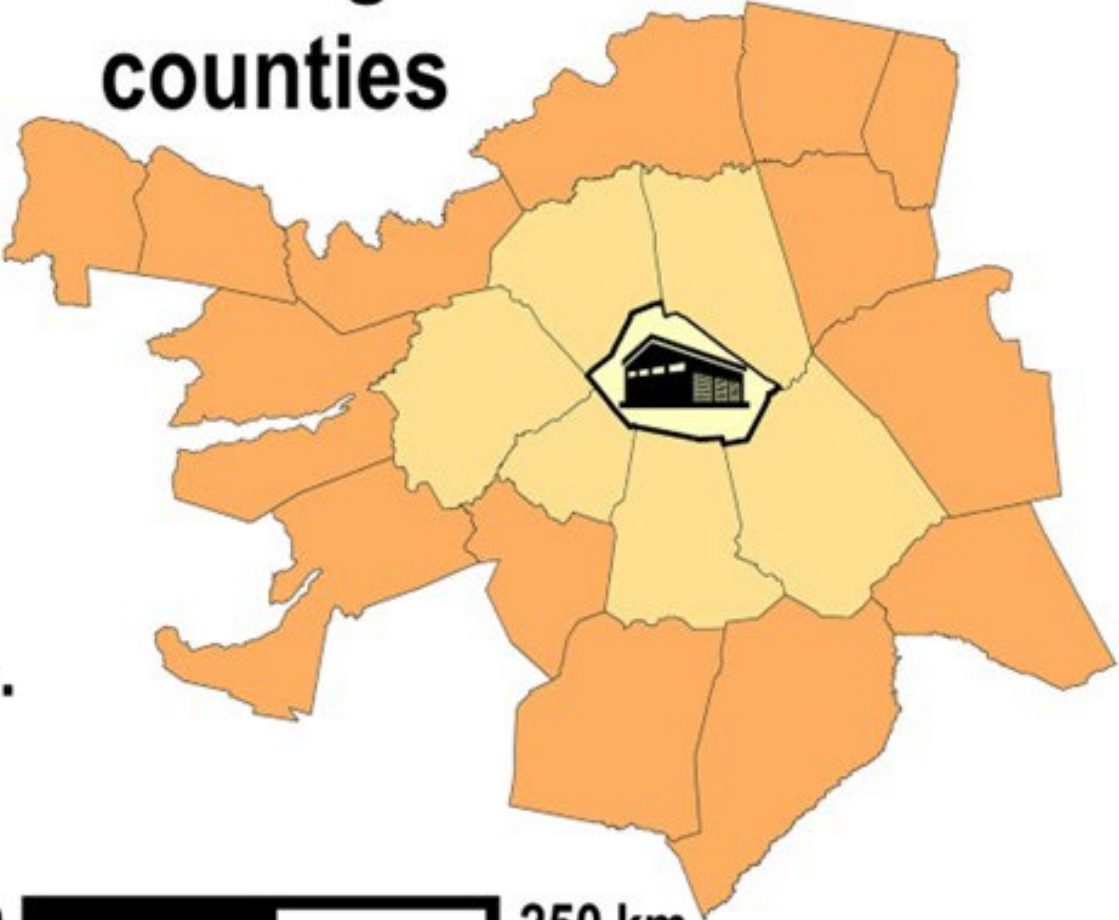
- > 30,000 tons out
- 3,000 - 30,000 tons out
- 0 - 3,000 tons out
- 0 - 3,000 tons in
- 3,000 - 30,000 tons in
- > 30,000 tons in
- no transport



Bailey Bosley
 USGS - Chesapeake Bay Program
 Data: CAST 2023 Progress
 10/2024

Source: Phase 6 CAST-23

Among counties



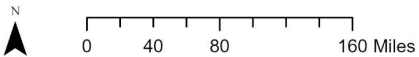
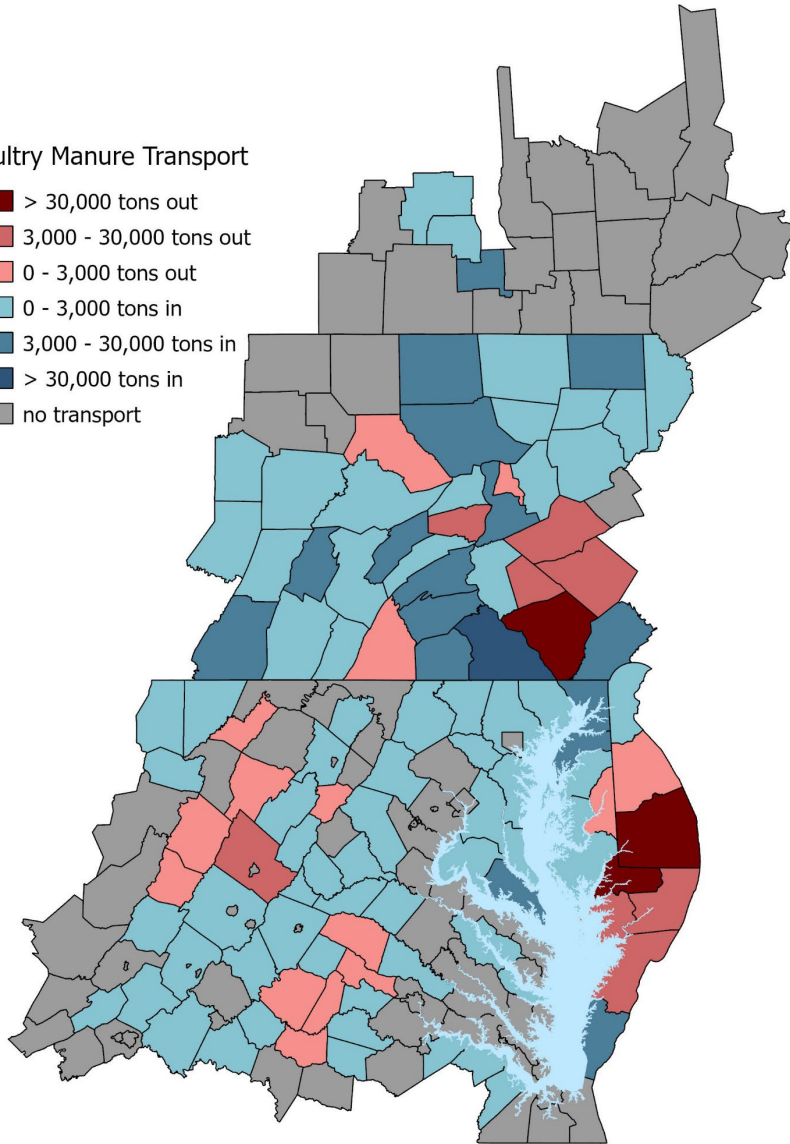
C.



Poultry Manure Transport Balance by County

Poultry Manure Transport

- > 30,000 tons out
- 3,000 - 30,000 tons out
- 0 - 3,000 tons out
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- 3,000 - 30,000 tons in
- > 30,000 tons in
- no transport

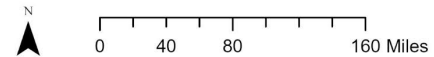
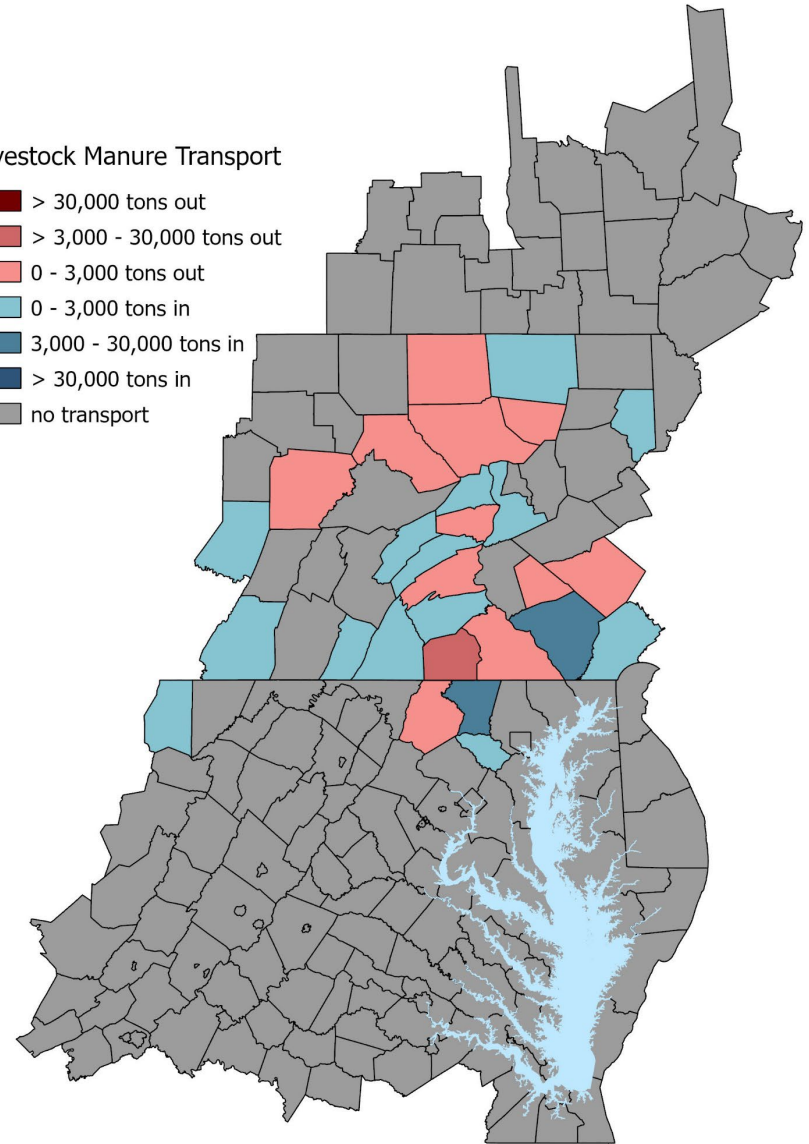


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Data: CAST 2023 Progress
10/2024

Livestock Manure Transport Balance by County

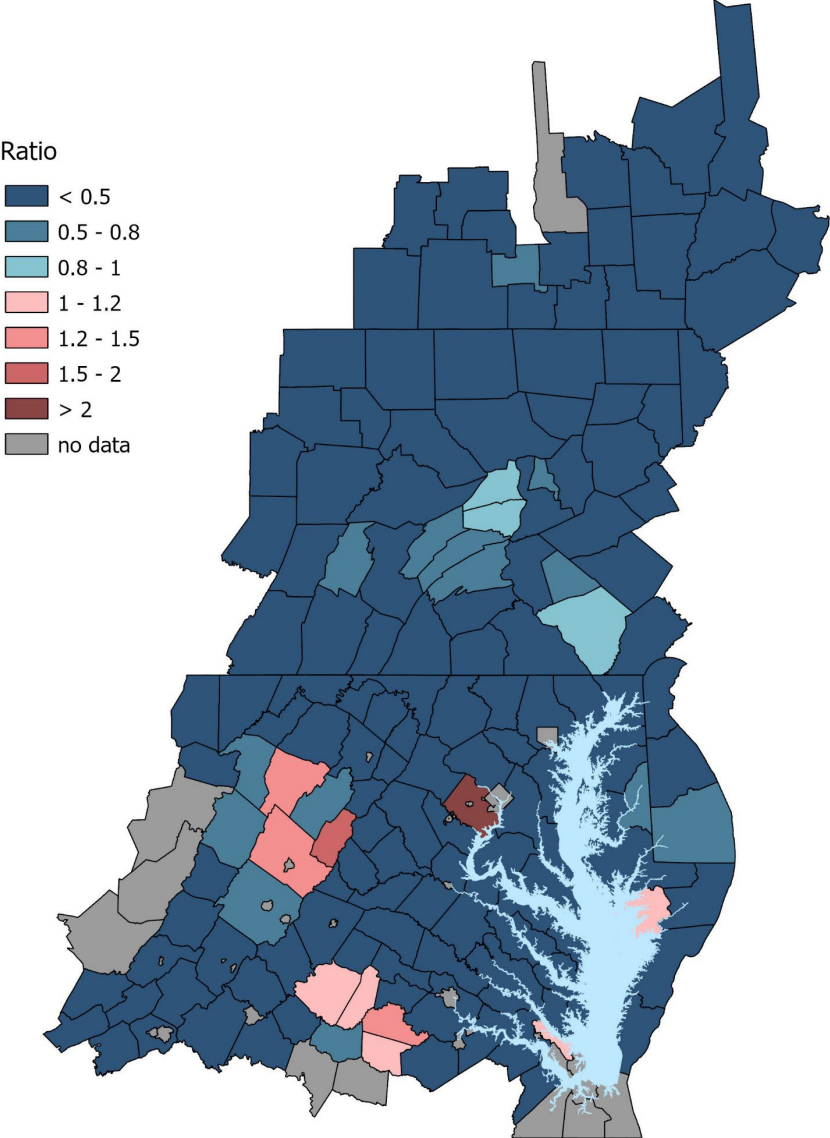
Livestock Manure Transport

- > 30,000 tons out
- > 3,000 - 30,000 tons out
- 0 - 3,000 tons out
- 0 - 3,000 tons in
- 3,000 - 30,000 tons in
- > 30,000 tons in
- no transport



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10/2024

Ratio of Nitrogen Applied that are Plant Available to Crop Need that is Manure Eligible by County



Are there still counties with excess manure?

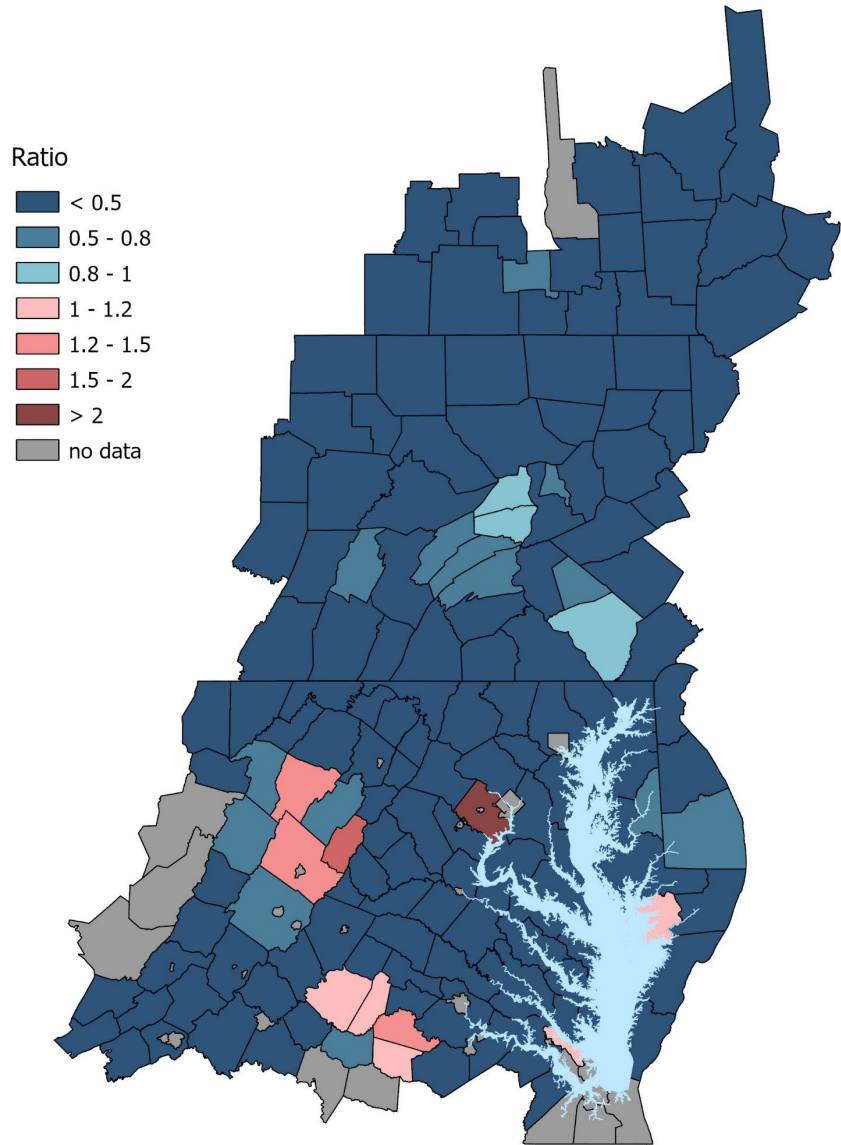
- Most high-transport counties are in balance for nitrogen

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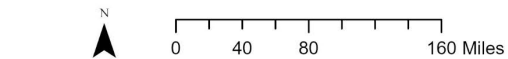
0 40 80 160 Miles

Source: Phase 6 CAST-23

Ratio of Nitrogen Applied that are Plant Available to Crop Need that is Manure Eligible by County

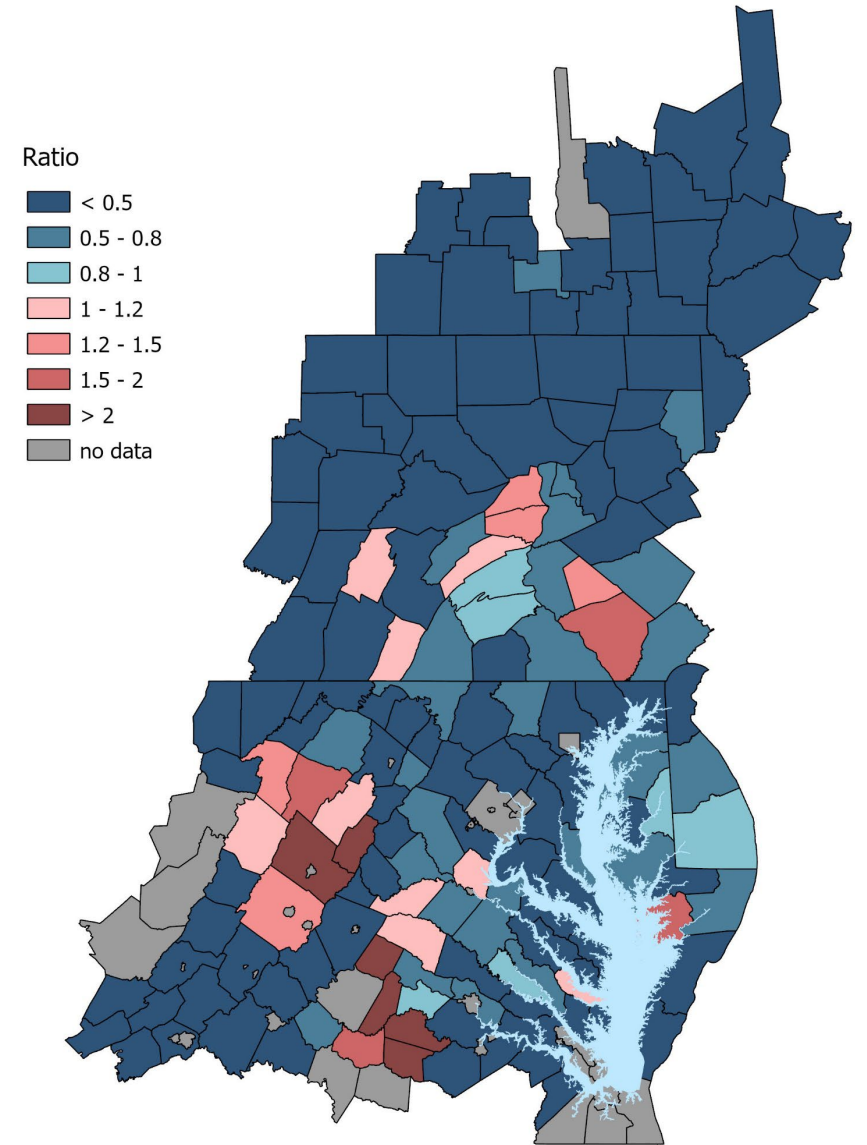


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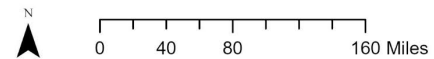


Source: Phase 6 CAST-23

Ratio of Phosphorus Applied that are Plant Available to Crop Need that is Manure Eligible by County



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 Data: CAST 2023 Progress
 10/2024



Source: Phase 6 CAST-23

Summary

- Not too much manure for the Chesapeake Bay Watershed
- Distribution is a solution
- The CBP has no visibility below the county level

