

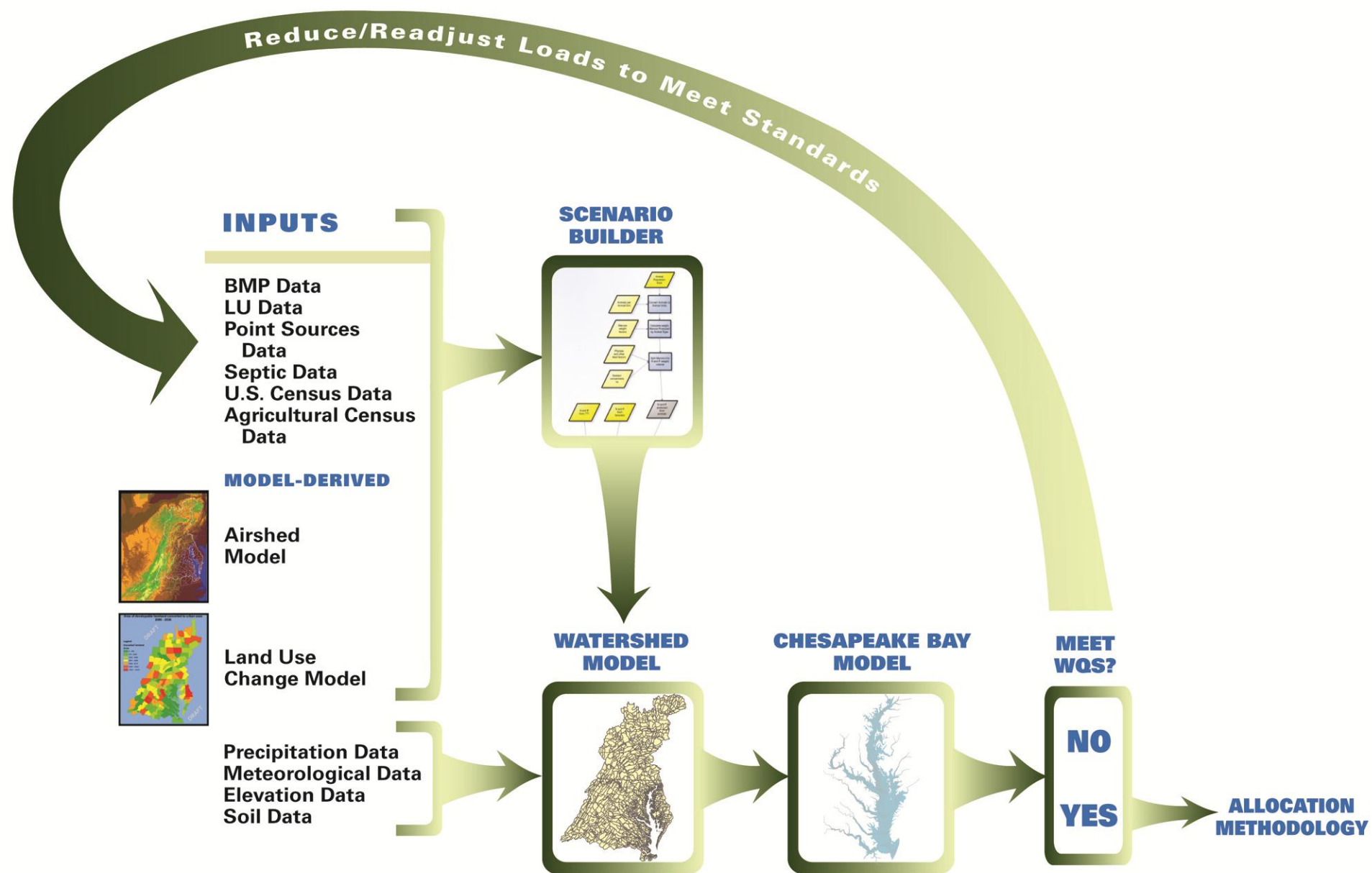
# Crediting Conservation and Finer Scale Modeling

Gary Shenk

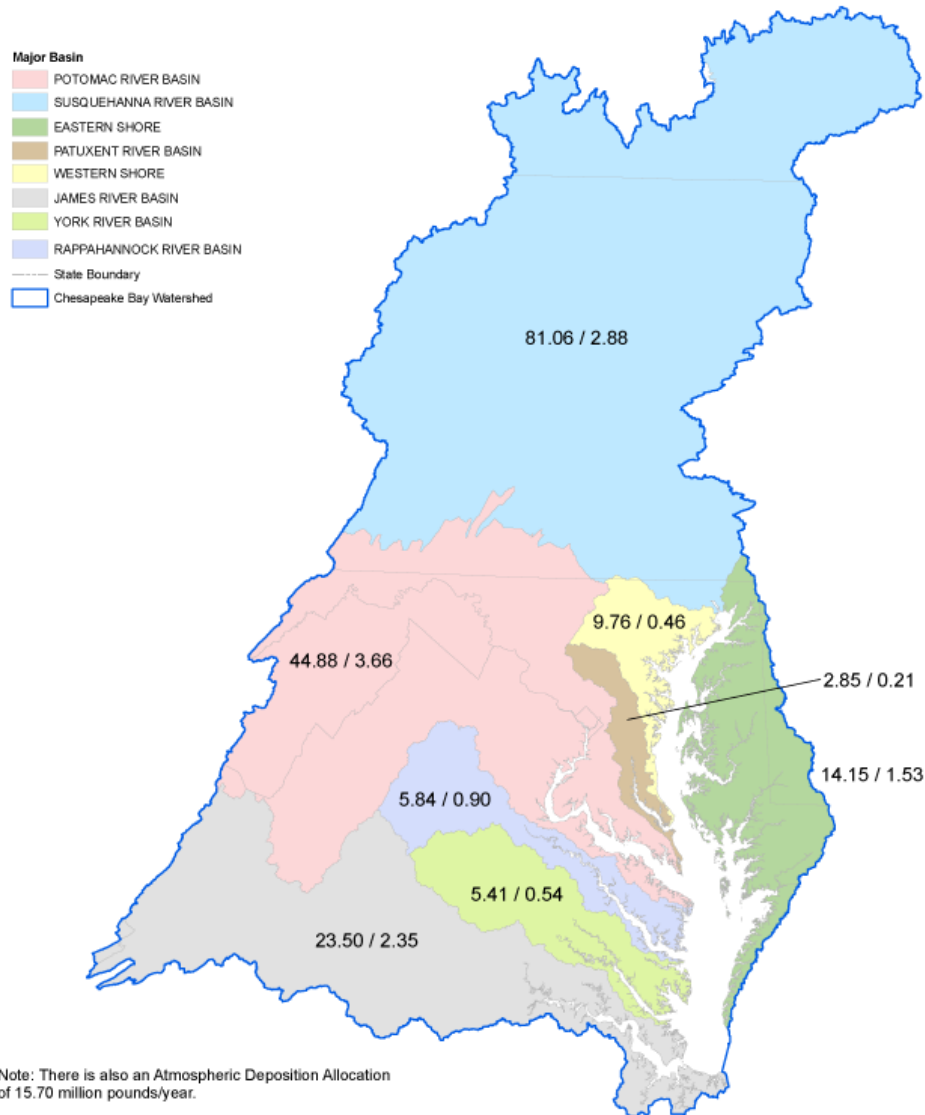
Maintain Healthy Watersheds GIT

9/11/13

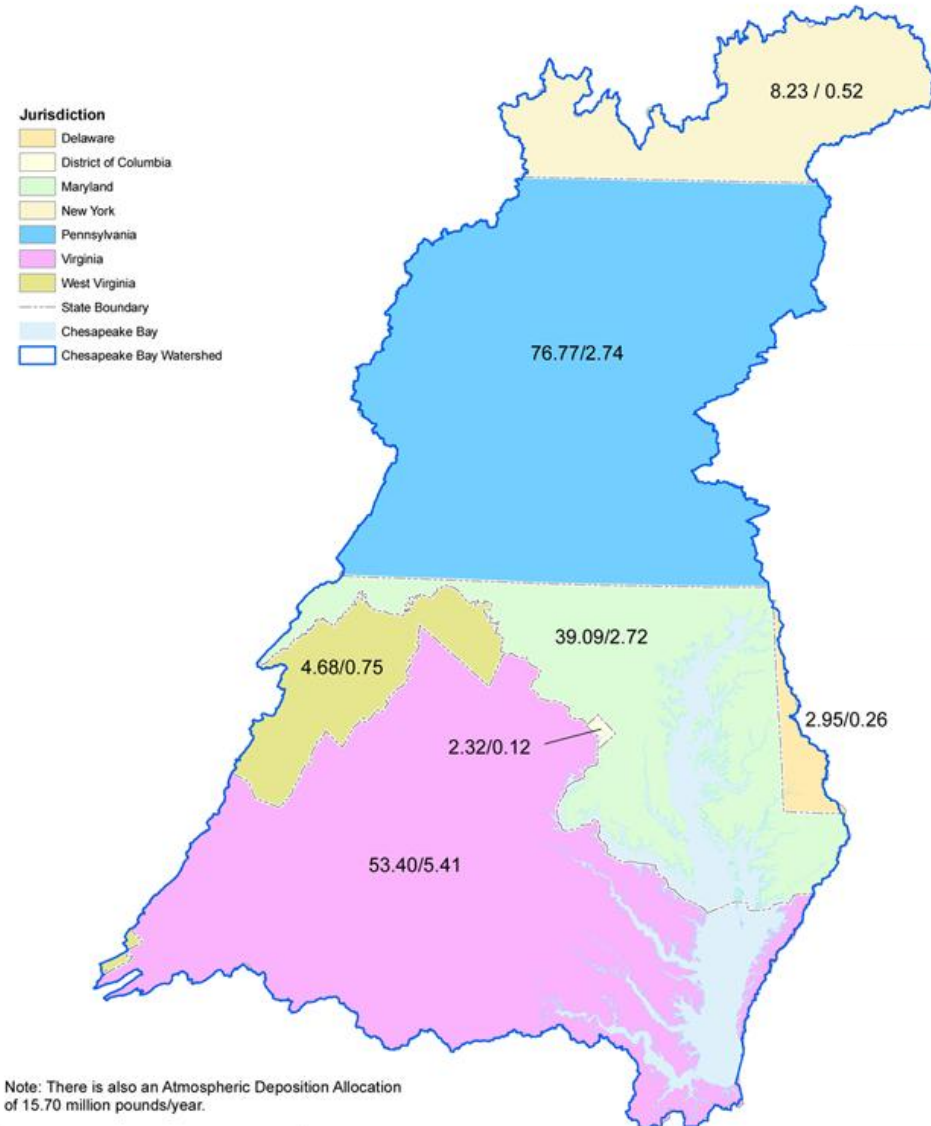
# Chesapeake Bay Partnership Models



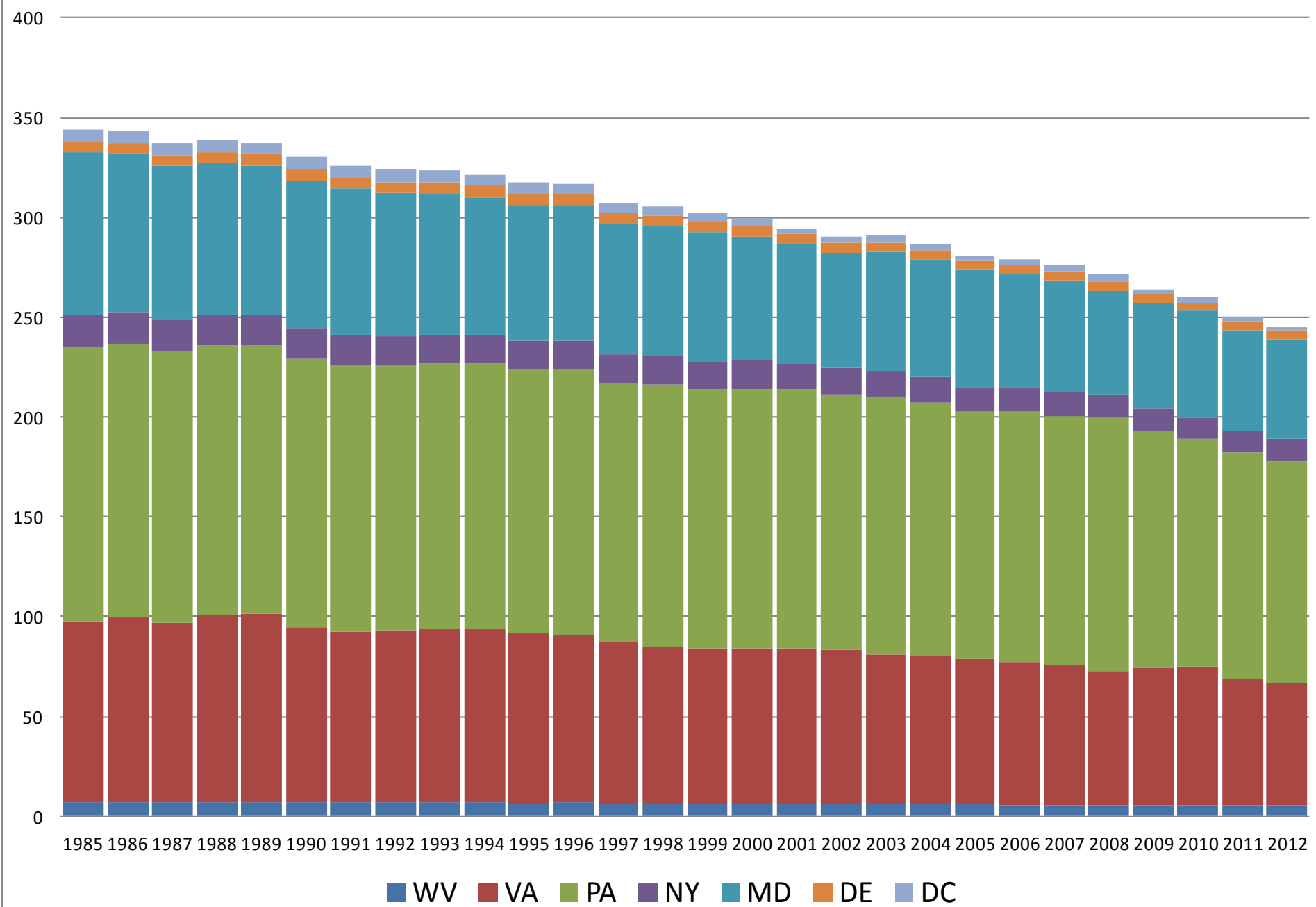
# Pollution Diet by River



# Pollution Diet by State



## Phase 5.3.2 CBP Watershed Model Nitrogen Loads by State





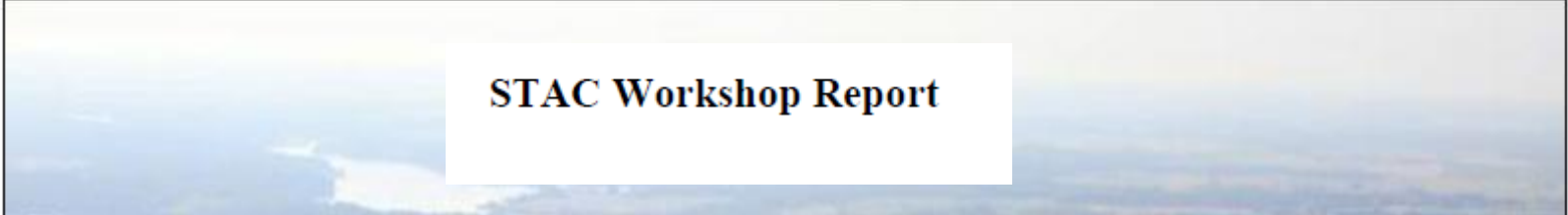
## **CREDITING CONSERVATION**

Accounting for the Water Quality Value  
of Conserved Lands Under the Chesapeake Bay TMDL

CHESAPEAKE BAY COMMISSION - JUNE 2013

- Modeling Requests
  - Refine “Granularity”
  - Develop land uses that differentiate in land quality
  - Develop BMP effectiveness values that vary based on BMP quality

# The Role of Natural Landscape Features in the Fate and Transport of Nutrients and Sediment



STAC Workshop Report

- Upgrade WSM to deal with small-scale effects in natural landscapes
  - Add riparian forest, forested floodplains, and wetlands
  - Take fine-scale hydrologic and physical characteristics into account

# Lots of agreement

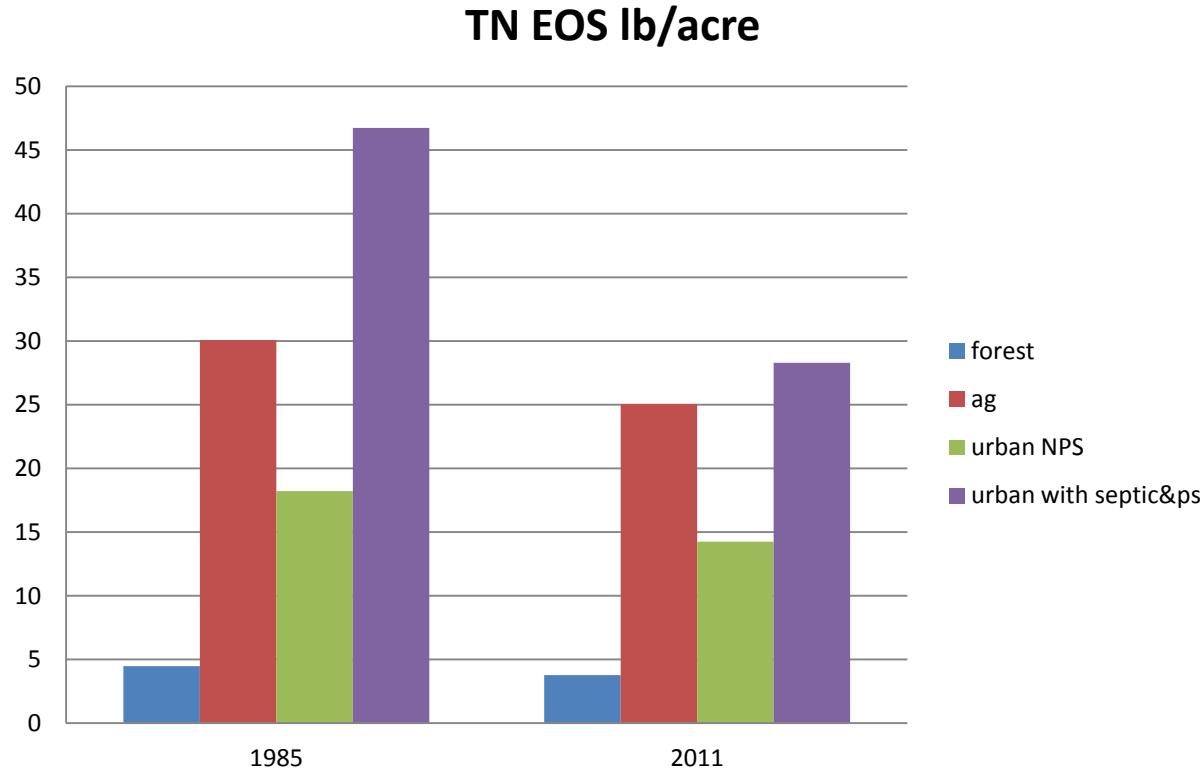
1. Credit Conservation
2. Define Natural Land Uses
3. Incorporate small scale effects

# Crediting Conservation Currently

- The offset programs alter the competitive balance between development and conservation by internalizing a cost for development that was previously externalized
- Maryland uses a 'forest conservation act' BMP that alters projected growth
  - This strategy works to the extent that we use a projected future land use for planning.



# Land use Loads - Nitrogen



Source: Phase 5.3.2 Watershed model

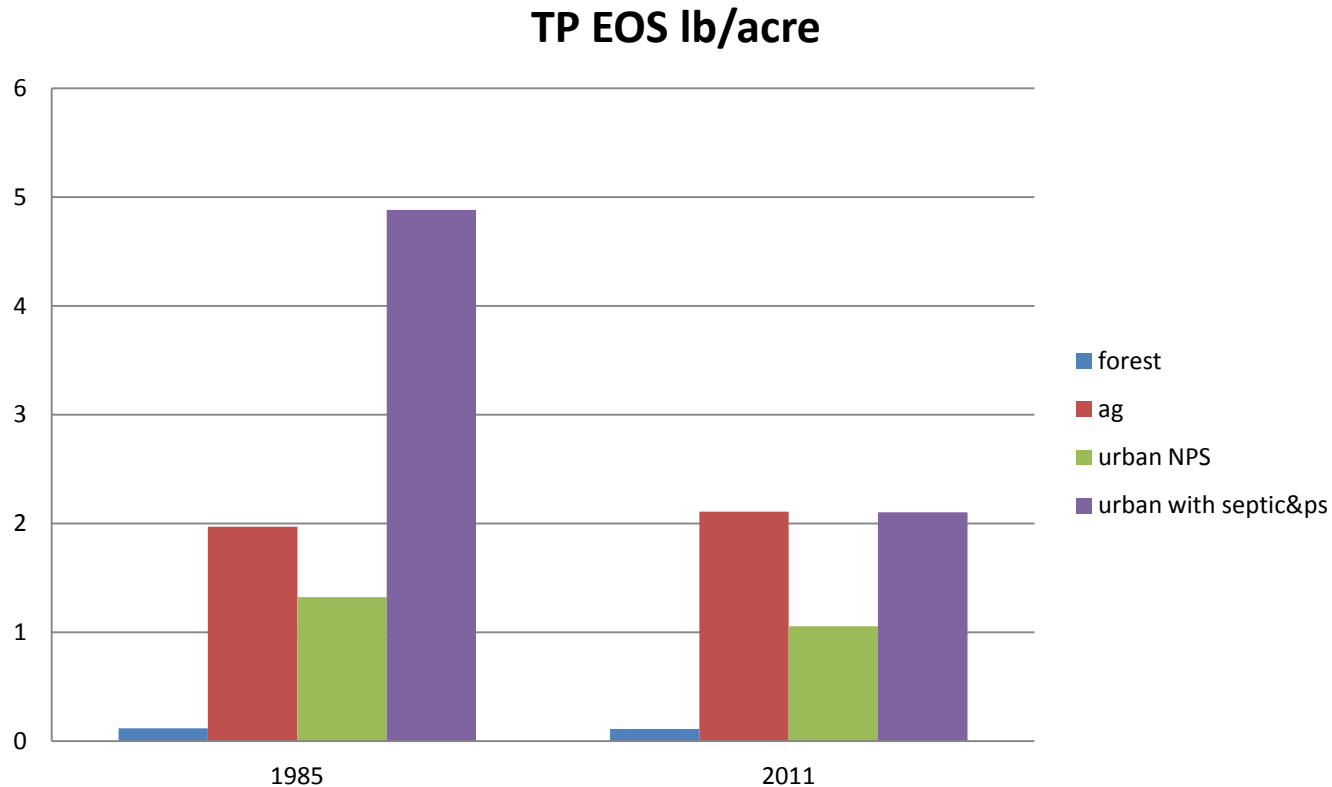
Originally based on:

Literature Surveys

Additional Primary Literature

USGS Statistical Model (Sparrow)

# Land use Loads - Phosphorus



Source: Phase 5.3.2 Watershed model

Originally based on:

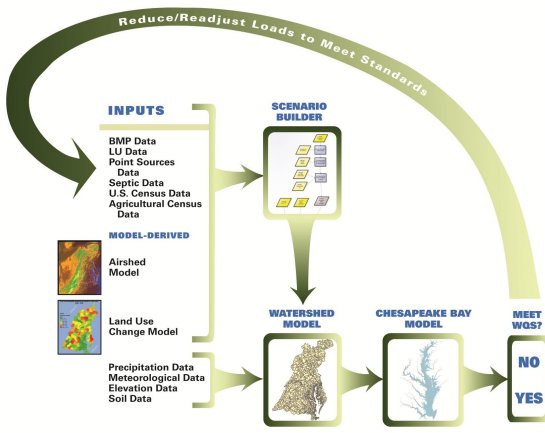
Literature Surveys

Additional Primary Literature

USGS Statistical Model (Sparrow)

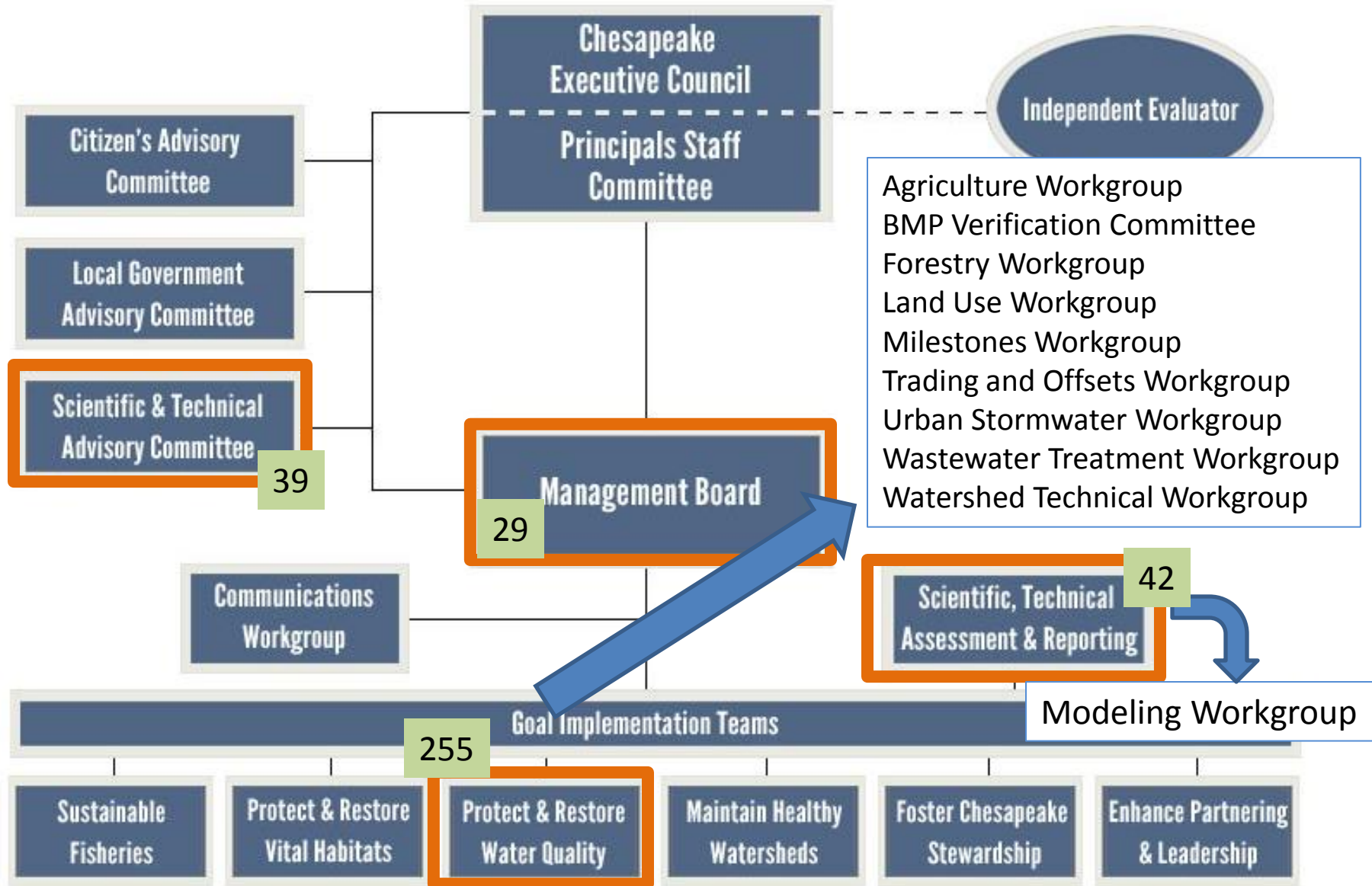
# What's on the table for Phase 6?

Define natural land uses  
Incorporate small-scale effects



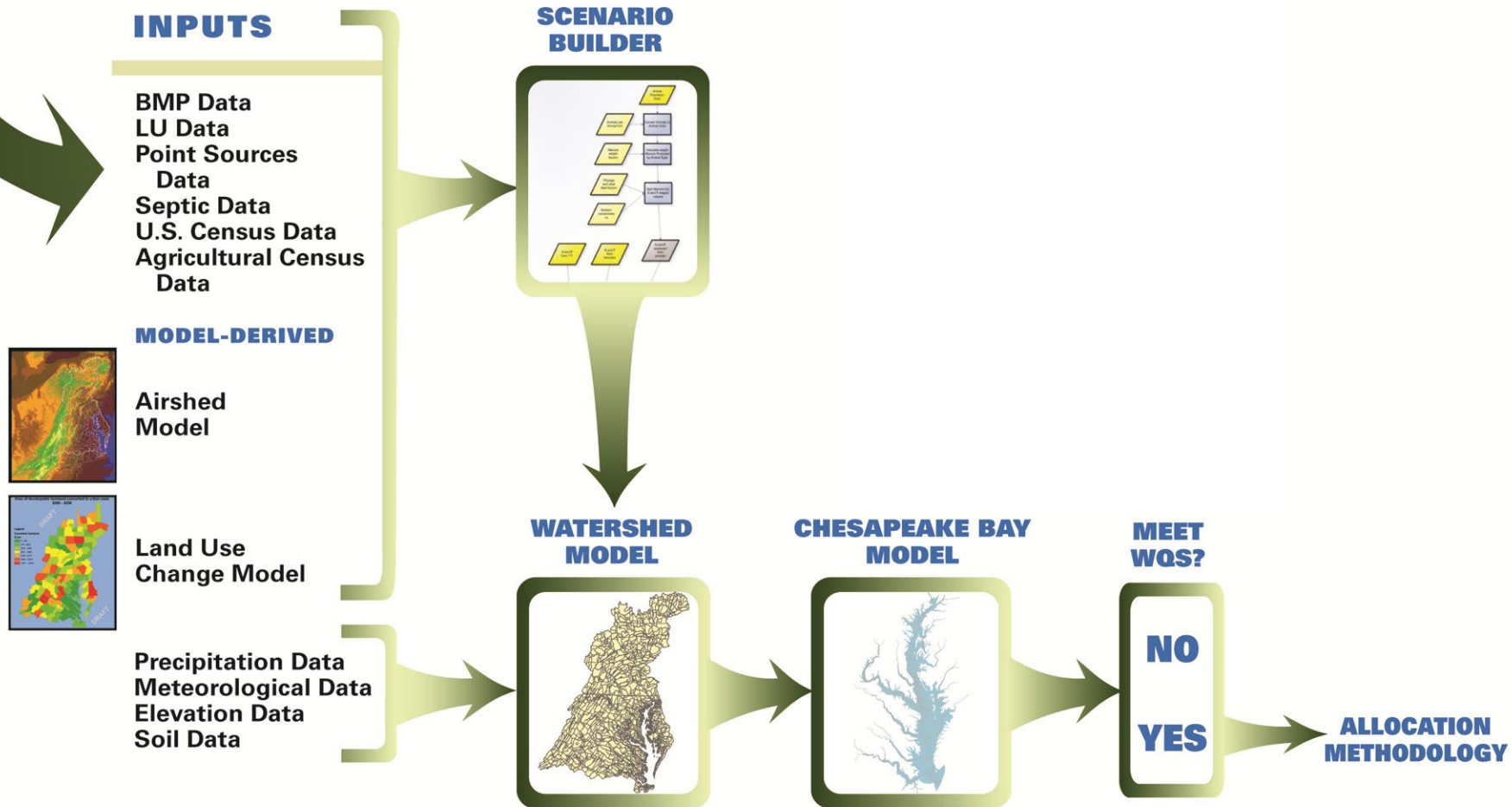
Model related Membership as of 7/2013 – 365 individuals

# Chesapeake Bay Program Partnership



# Chesapeake Bay Partnership Models

## Priorities



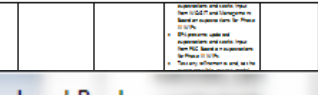
# WQGIT Priorities for phase 6

Chesapeake Bay Program Partnership						
Midpoint Assessment and Milestones Schedule – High and Lower Port Harbors						
Assessment/Activity	Task/Assessment/Project	Lead/Responsible Party/Task	Deliverables	Start Date	End Date	Completion Date
Phase 1	Initial data gathering	NOAA/USACE/Chesapeake Bay Program	NOAA/USACE/Chesapeake Bay Program Initial data gathering Development of a technical report about the current status	April 2012	April 2012	Phase 1 completed
Phase 2	Initial data gathering	NOAA/USACE/Chesapeake Bay Program	NOAA/USACE/Chesapeake Bay Program Initial data gathering Development of a technical report about the current status	April 2012	April 2012	Phase 2 completed
Phase 3	Initial data gathering	NOAA/USACE/Chesapeake Bay Program	NOAA/USACE/Chesapeake Bay Program Initial data gathering Development of a technical report about the current status	April 2012	April 2012	Phase 3 completed

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Topic		Activities/ Deliverables		Start Date	End Date
Topic 1	Topic 1 description Phase 1 (1/1/2023-31/12/2023)	1. Identify the scope of the project	2. Develop a project plan	1/1/2023	31/12/2023
		3. Identify the scope of the project	4. Develop a project plan	1/1/2023	31/12/2023
		5. Identify the scope of the project	6. Develop a project plan	1/1/2023	31/12/2023
		7. Identify the scope of the project	8. Develop a project plan	1/1/2023	31/12/2023
		9. Identify the scope of the project	10. Develop a project plan	1/1/2023	31/12/2023
Topic 2	Topic 2 description Phase 2 (1/1/2023-31/12/2023)	1. Identify the scope of the project	2. Develop a project plan	1/1/2023	31/12/2023
		3. Identify the scope of the project	4. Develop a project plan	1/1/2023	31/12/2023
		5. Identify the scope of the project	6. Develop a project plan	1/1/2023	31/12/2023
		7. Identify the scope of the project	8. Develop a project plan	1/1/2023	31/12/2023
		9. Identify the scope of the project	10. Develop a project plan	1/1/2023	31/12/2023

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Version 0.2.0.0.2  
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			• calculate total cost. This is GDP and compare to Marshall's response for Price (1/3) • If you increase price and quantities and costs. This has NO effect on quantities in Price (1/3) • Quantity adjustment and so on	• May 2007 • June 2007
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## Find and Replace

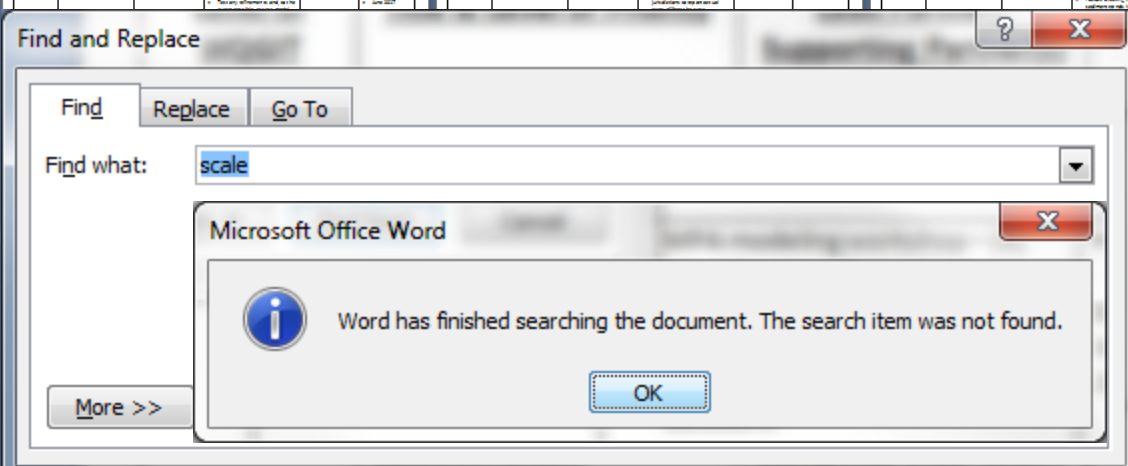
Find what: scale

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finished searching the document. The sea

OK

item was not found.





# Define Natural Land Uses

## - Current plan -

- A. Forests with unmanaged understory
  - A. Upland forest
  - B. Riparian/floodplain forest
  - C. Harvested, scrub/shrub (undergoing managed succession)
  - D. Disturbed forest (fire, insects, disease, or acid rain)
- B. Wetlands
  - A. Floodplain wetlands
  - B. Forested wetlands (outside the floodplain)
  - C. Tidal emergent wetlands
- C. Beaches

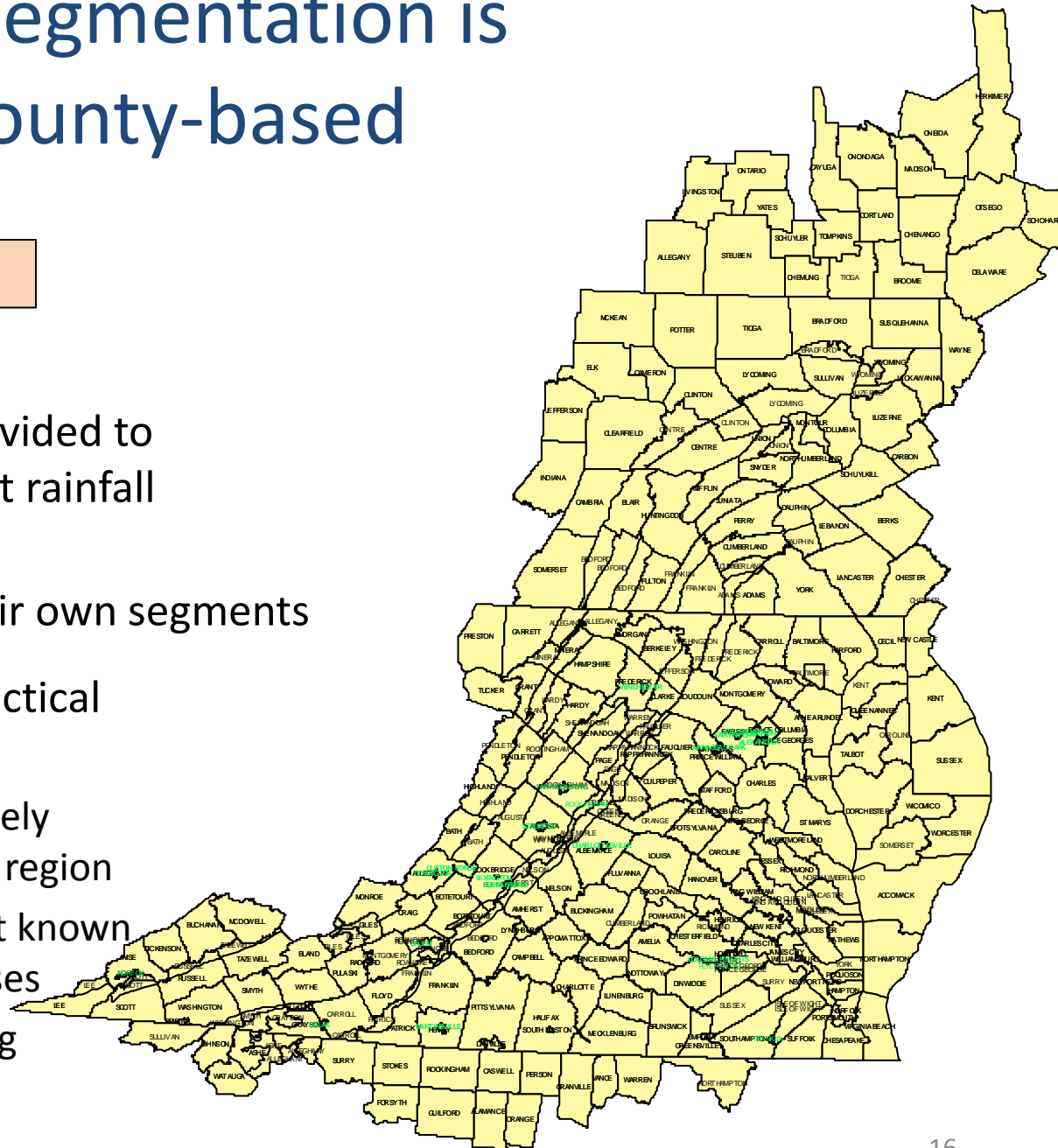
# Phase 5 land segmentation is primarily county-based

Incorporate small-scale effects

- Some counties were divided to accommodate different rainfall patterns.
- Federal areas have their own segments

Reasons why counties are a practical choice for segmentation:

- Most counties are completely within a hydrogeomorphic region
- BMP and Crop data are not known on a finer scale in most cases
- Near the limit of computing capacity

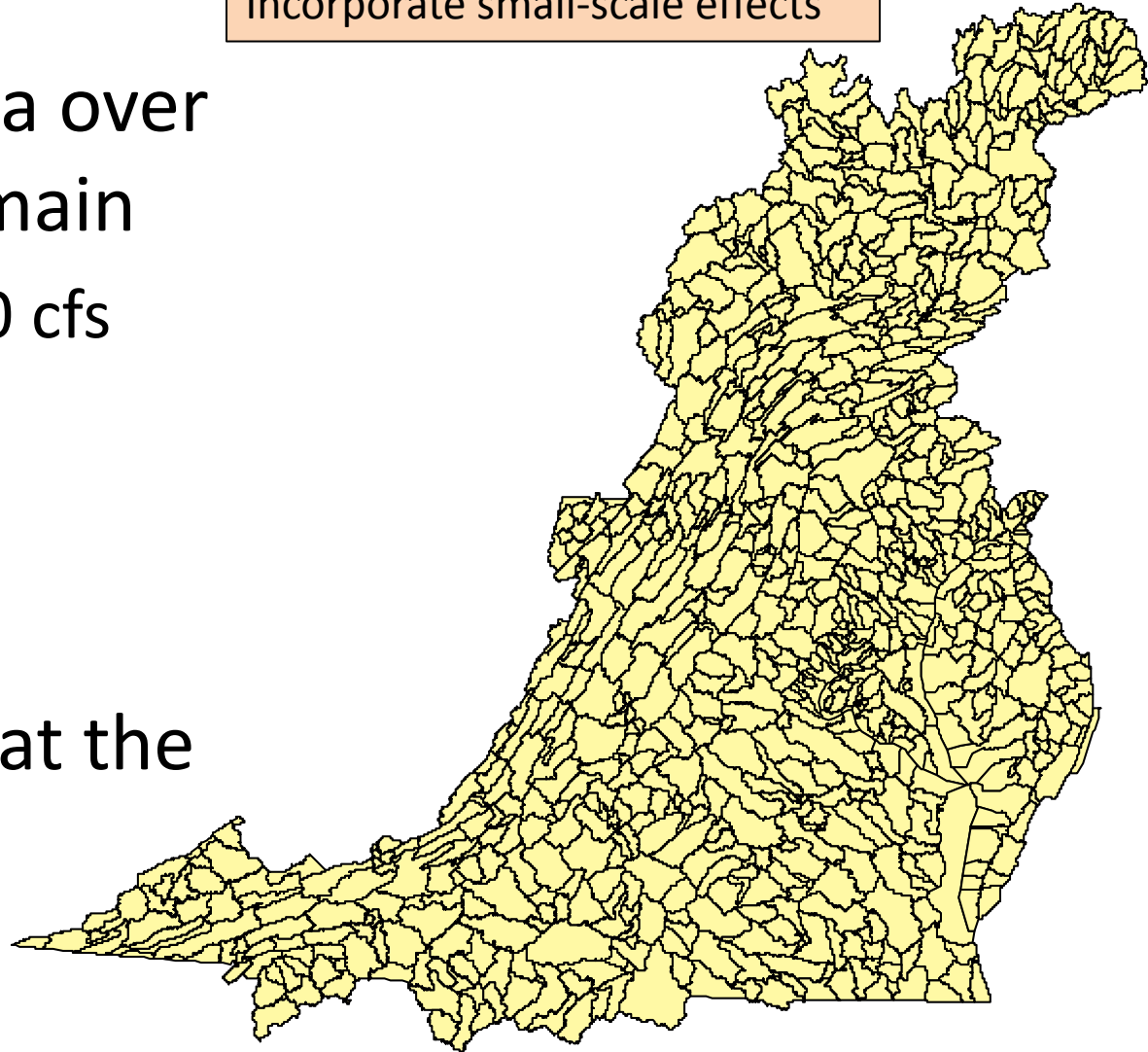


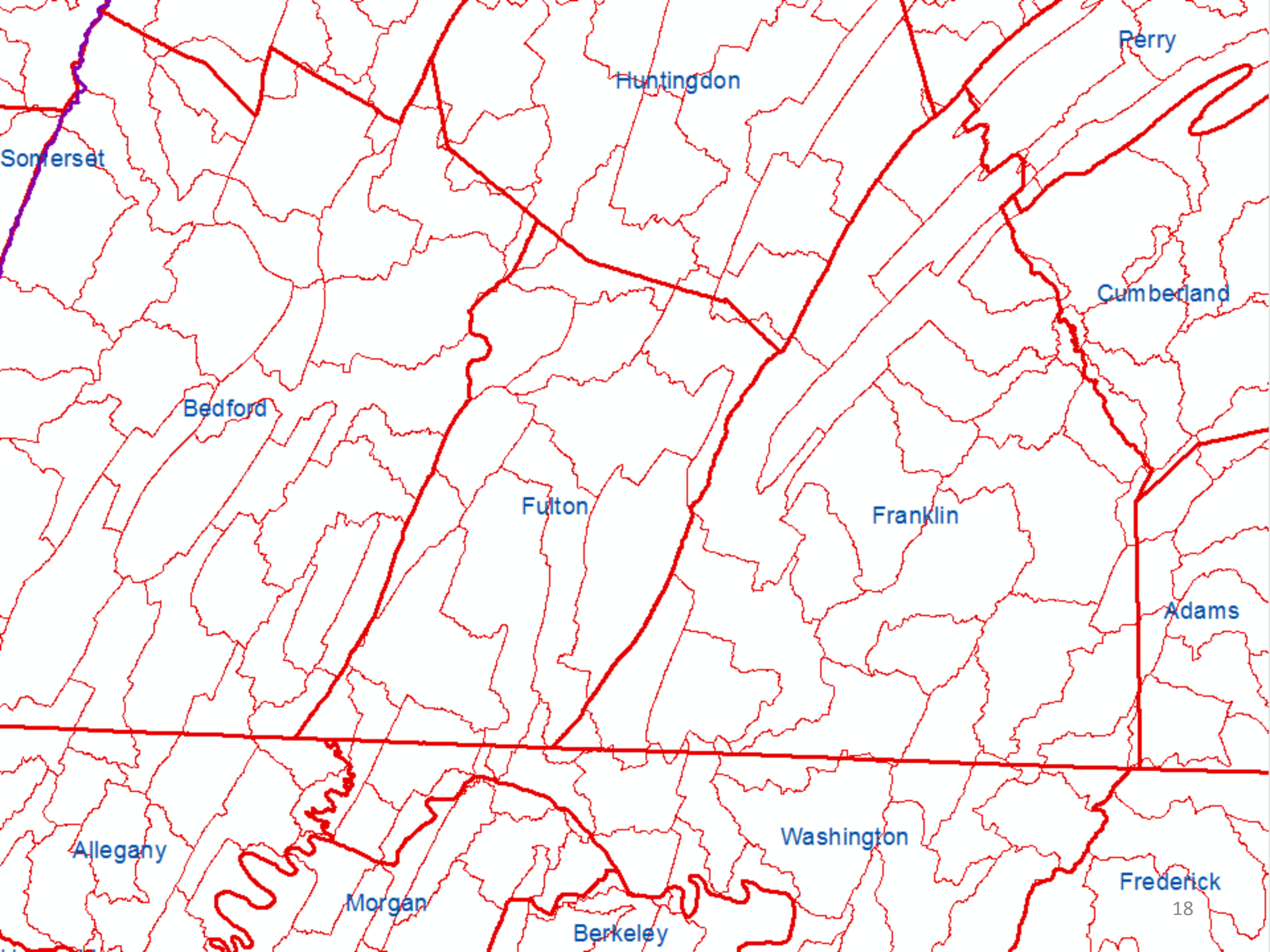


# Phase 5 river segmentation

Incorporate small-scale effects

- Consistent criteria over entire model domain
  - Greater than 100 cfs
  - or
  - Has a flow gage
- Near the limit of meaningful data at the time





# Other Projects to get at the scale question

- Center for Watershed Protection
  - Separating out the land contribution of sediment and the stream erosion contribution.
- Collaborators with several large proposals working with small scale models to understand watershed process
  - Johns Hopkins, UMCES, USGS, VaTech, GFDL, Princeton, Penn State

Incorporate small-scale effects

Model related Membership as of 7/2013 – 365 individuals

# Chesapeake Bay Program Partnership

