Crediting Conservation and Finer Scale Modeling

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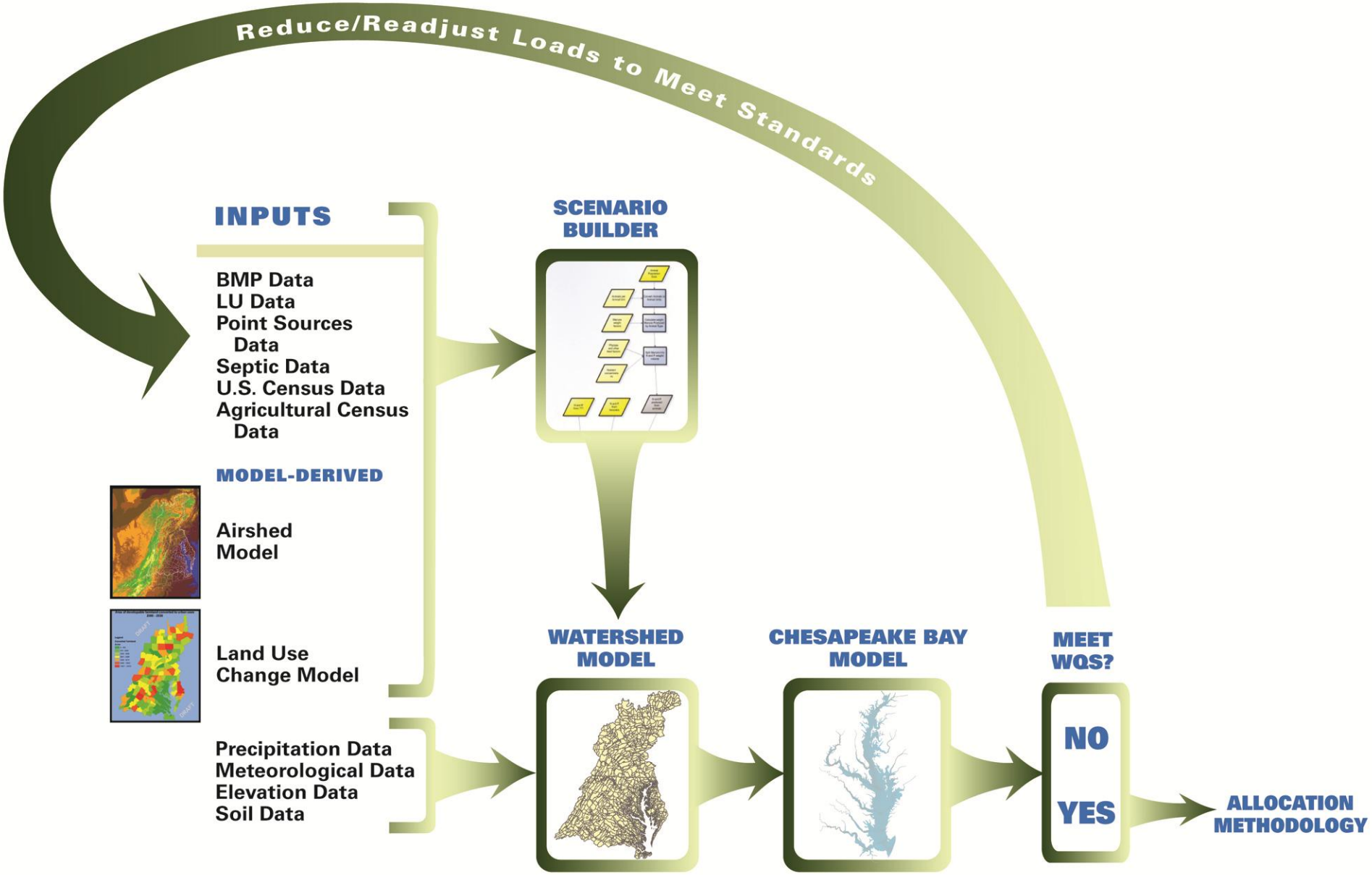
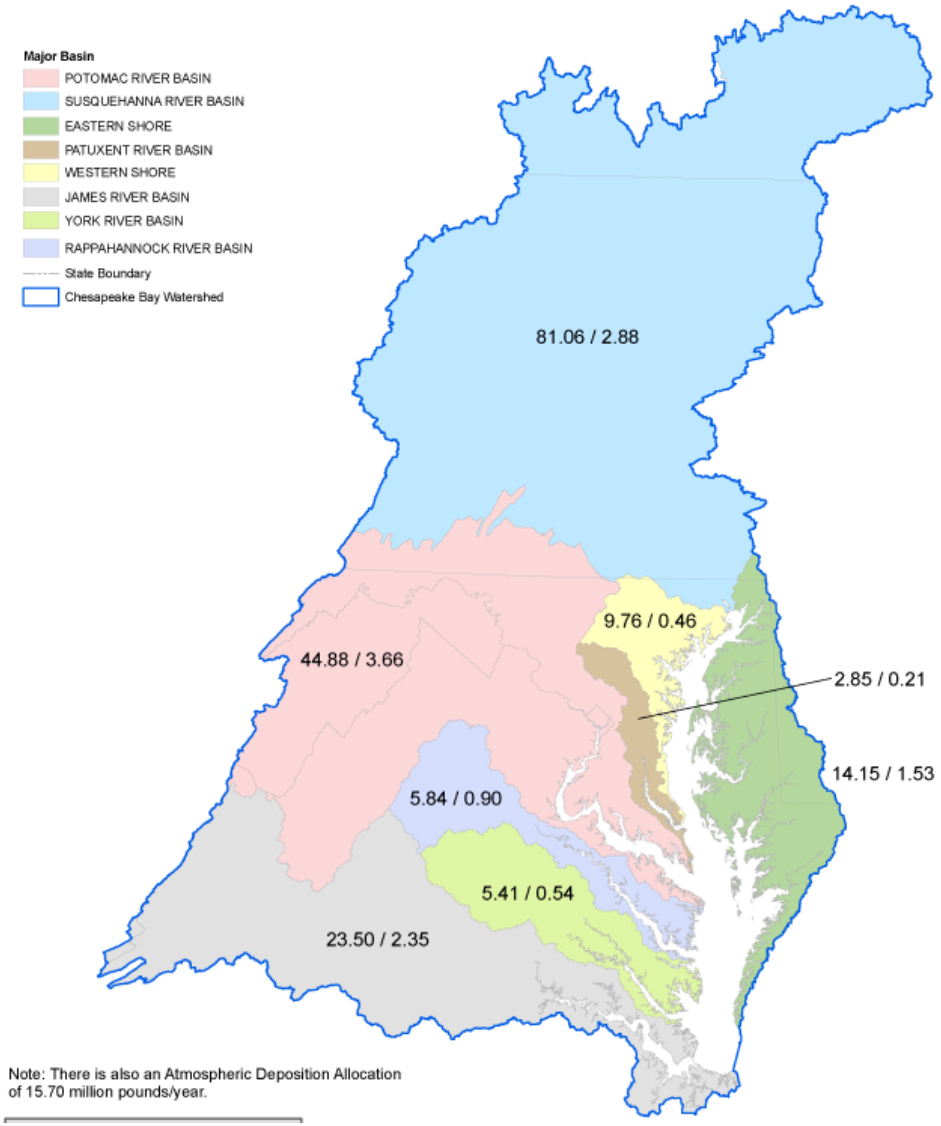
Maintain Healthy Watersheds GIT
9/11/13

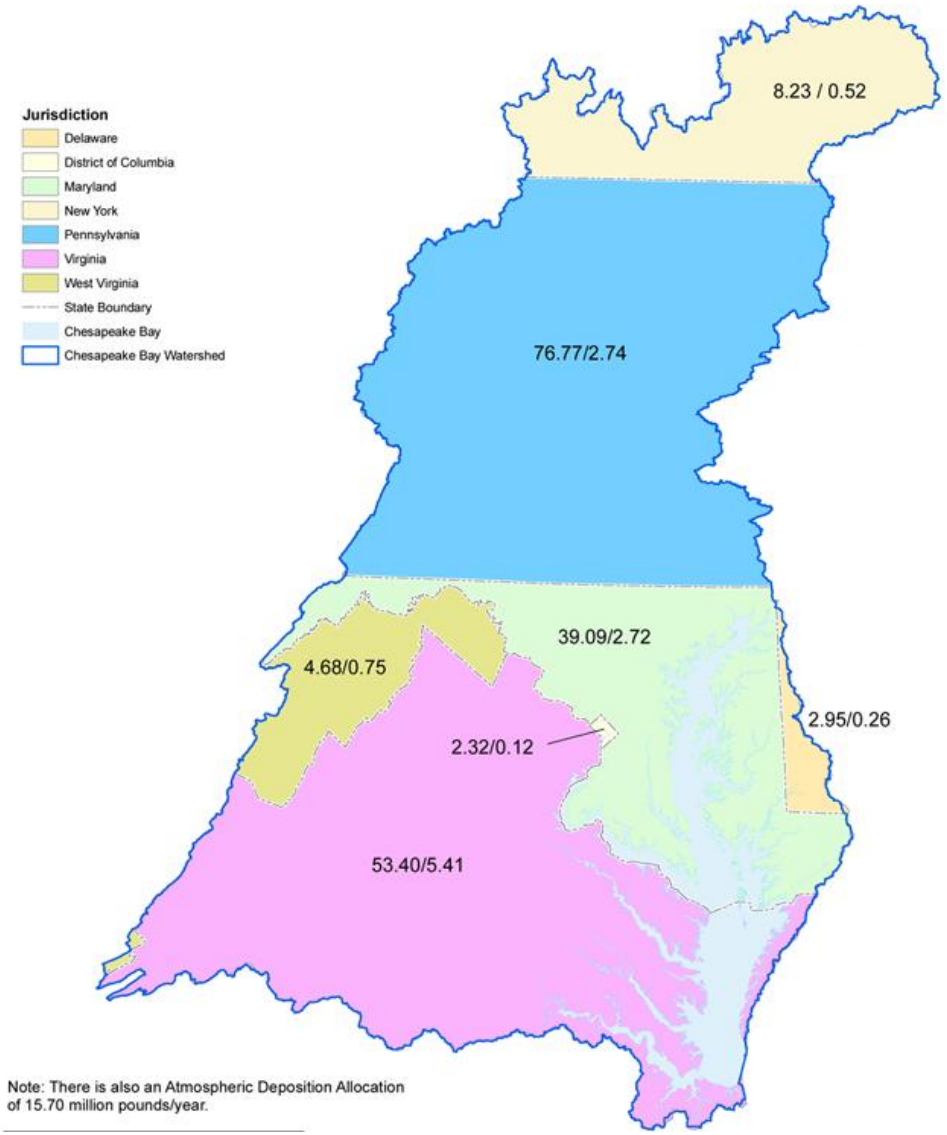
Chesapeake Bay Partnership Models

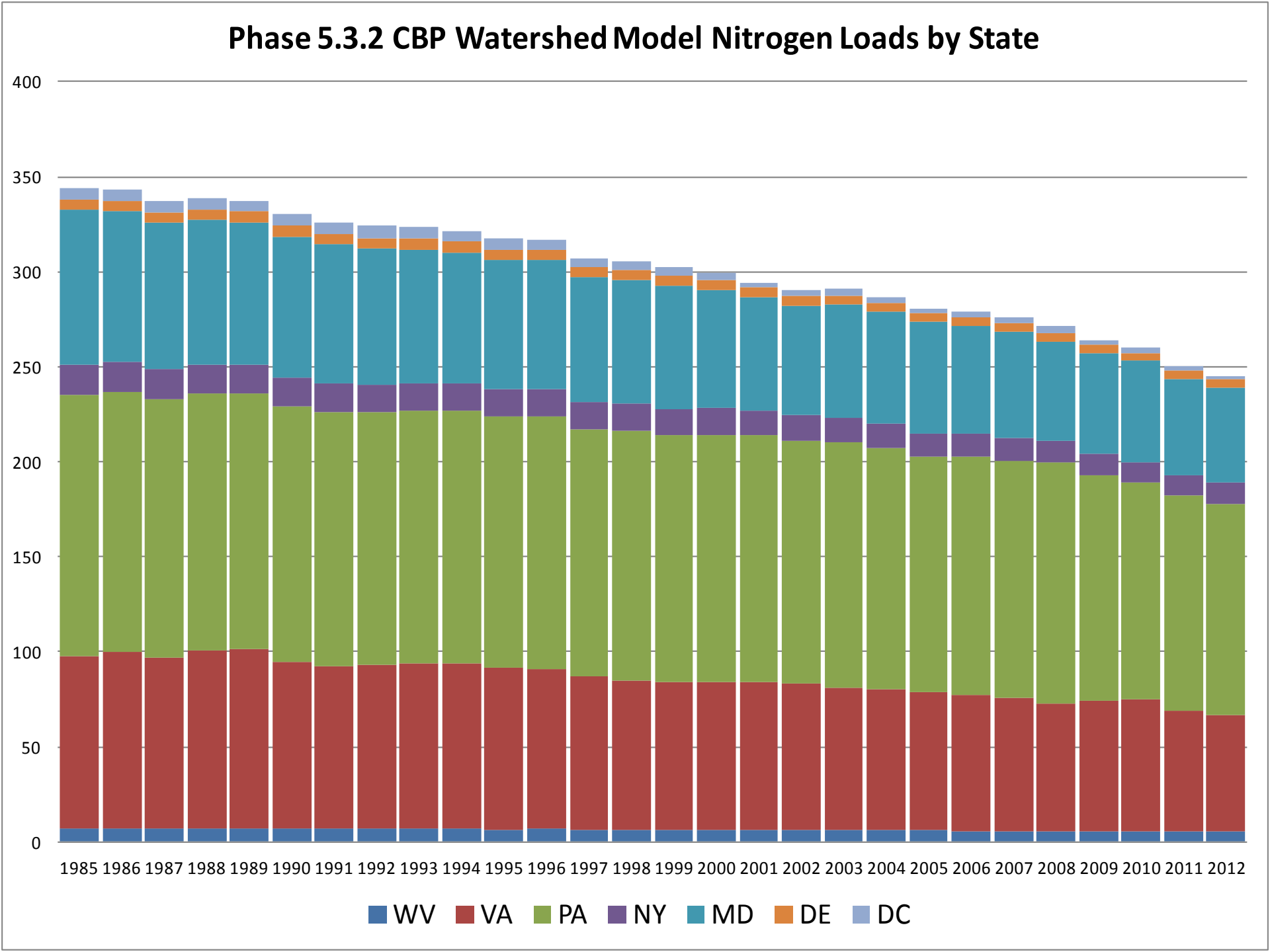


Pollution Diet by River



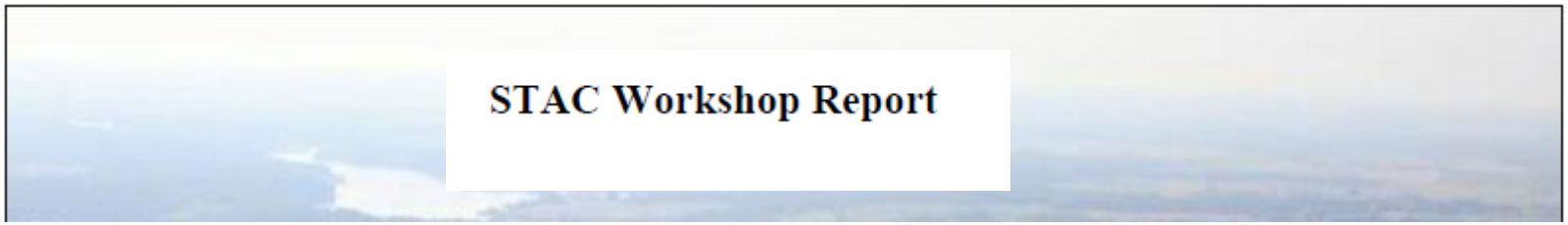
Pollution Diet by State




Phase 5.3.2 CBP Watershed Model Nitrogen Loads by State
400
350
300
250
200
150
100
50
0
1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
WV
VA
PA
NY
MD
DE
DC

- 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



- 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

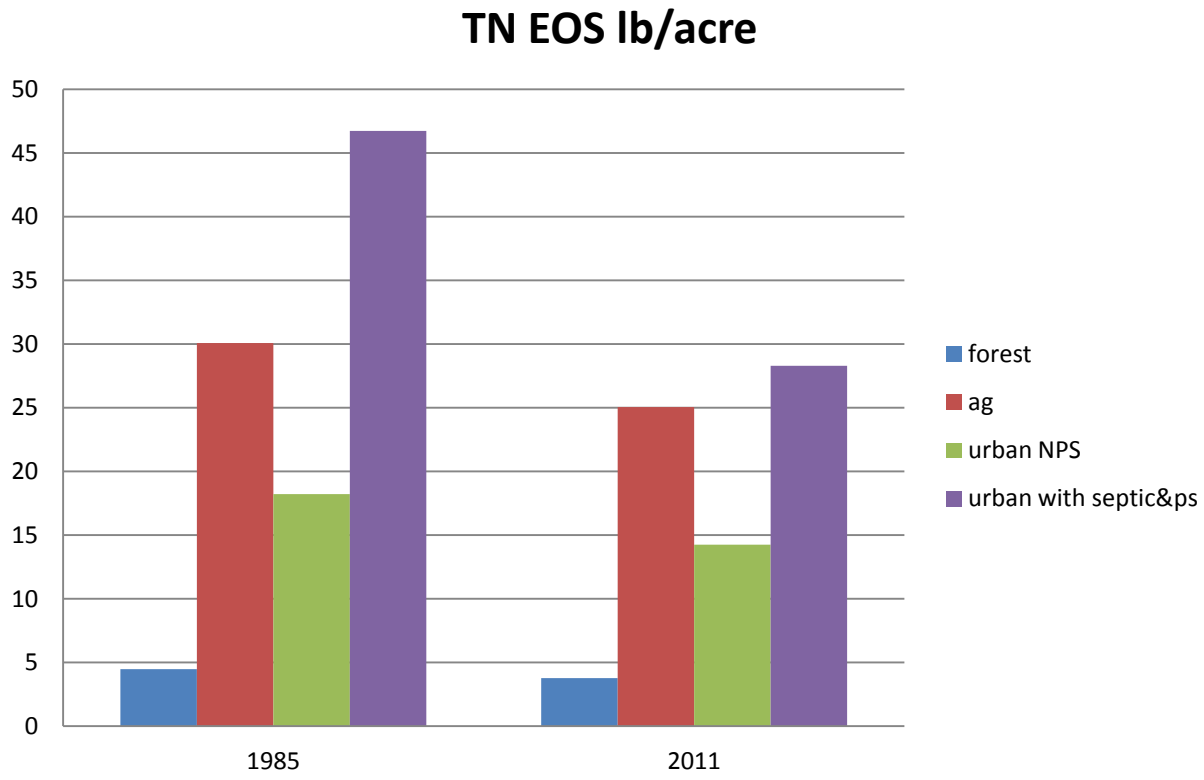
Lots of agreement

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

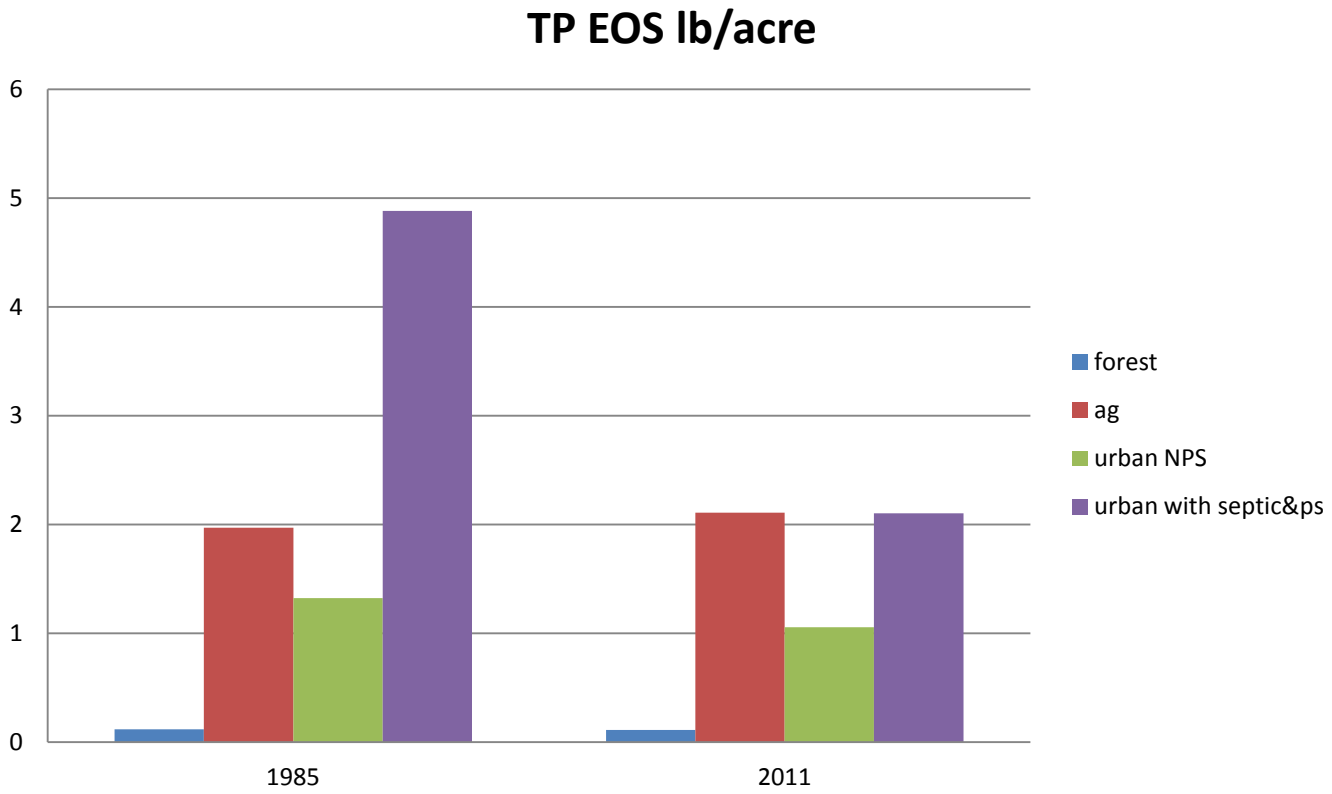


Source: Phase 5.3.2 Watershed model

Originally based on:

- Literature Surveys
- Additional Primary Literature
- USGS Statistical Model (Sparrow)

Land use Loads - Phosphorus



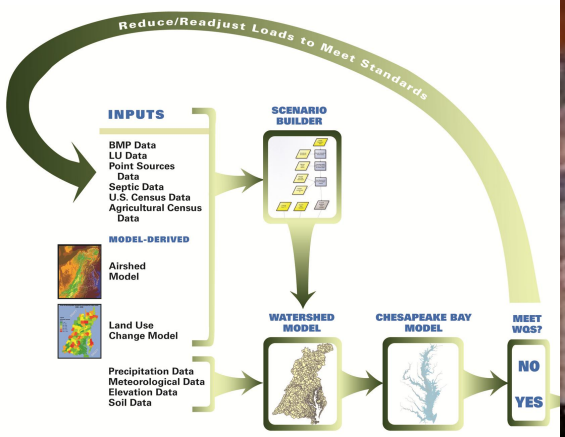
Source: Phase 5.3.2 Watershed model

Originally based on:

Literature Surveys
Additional Primary Literature
USGS Statistical Model (Sparrow)

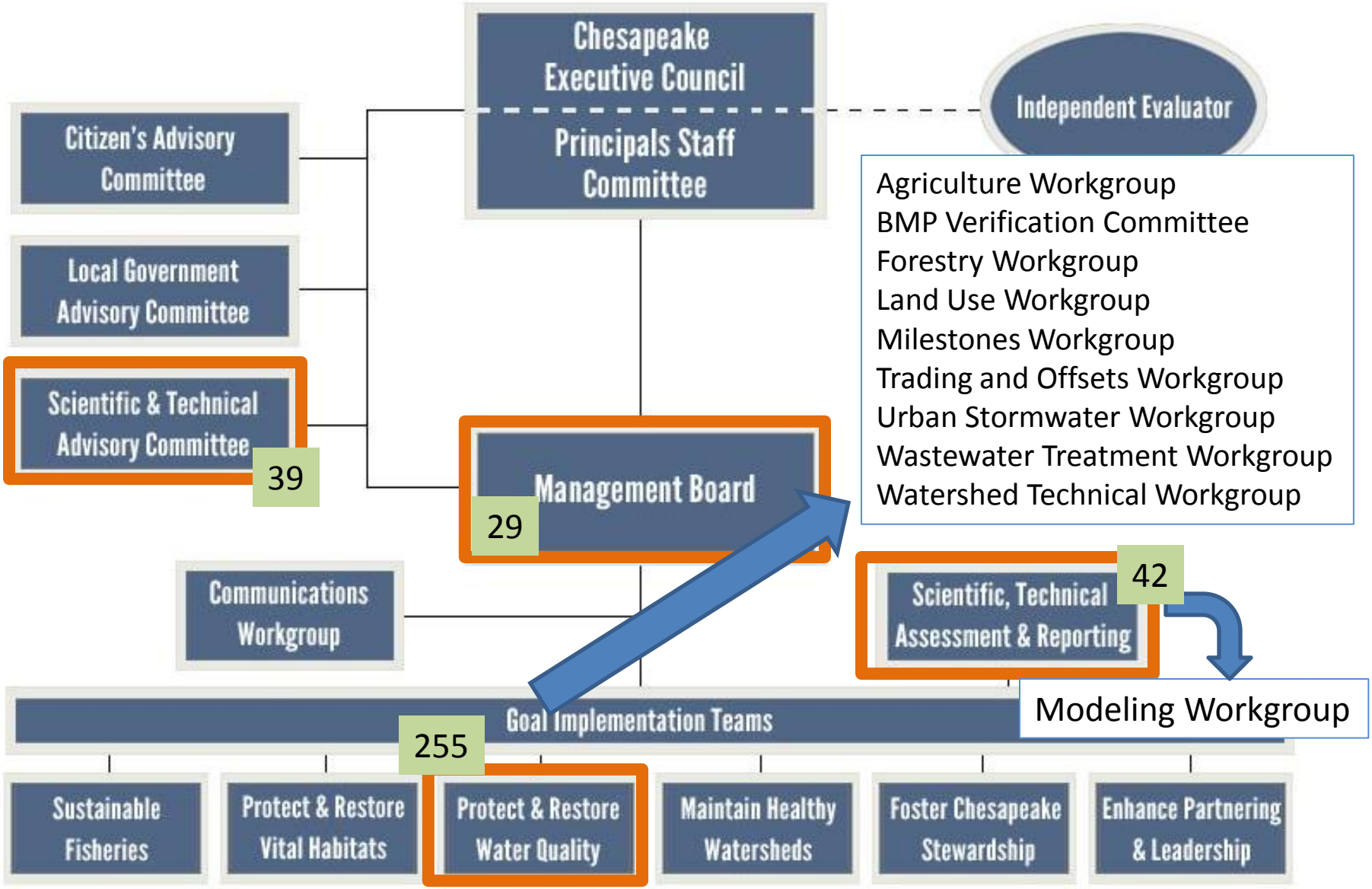
What's on the table for Phase 6?

Define natural land uses
Incorporate small-scale effects



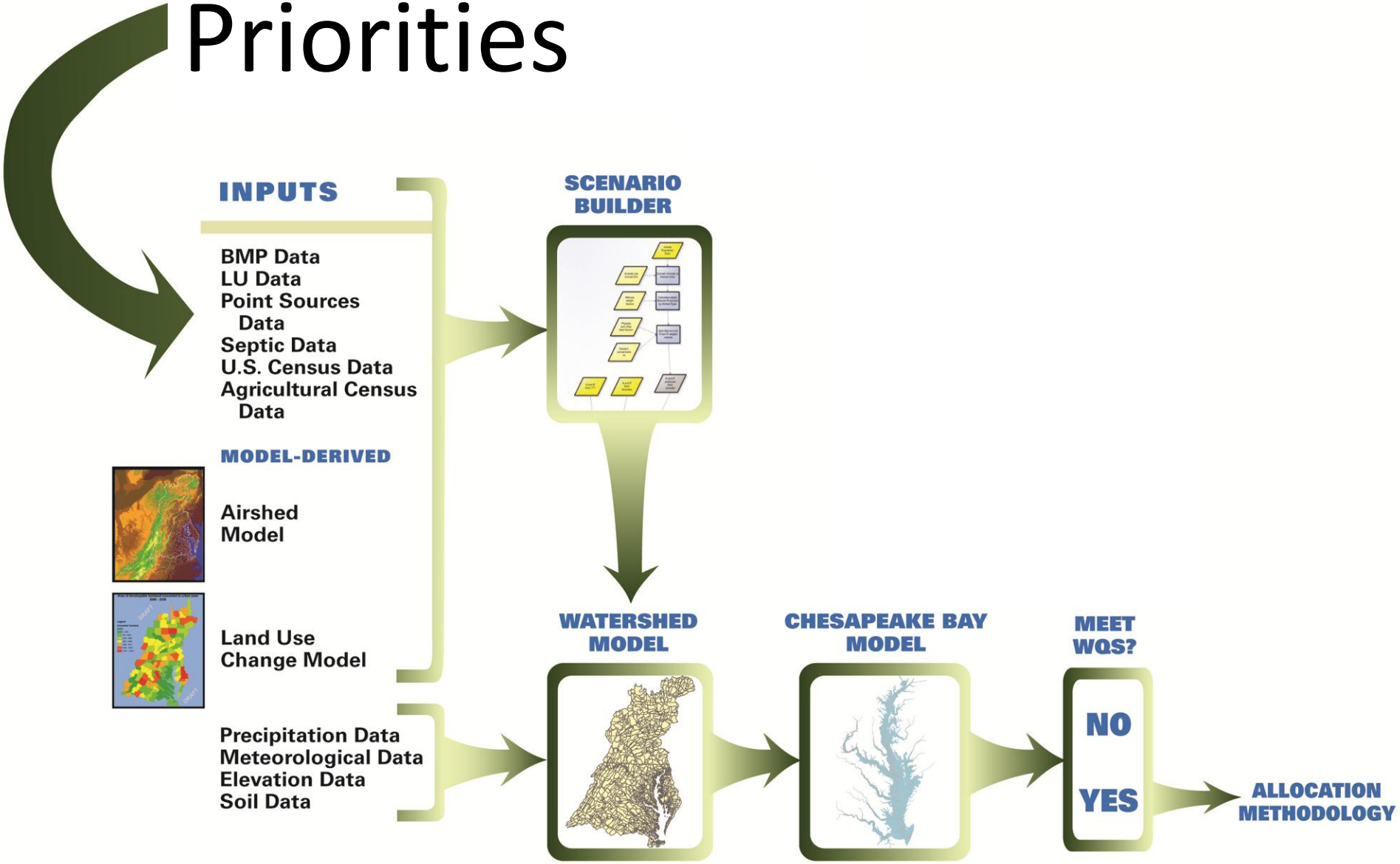
Model related Membership as of 7/2013 – 365 individuals

Chesapeake Bay Program Partnership

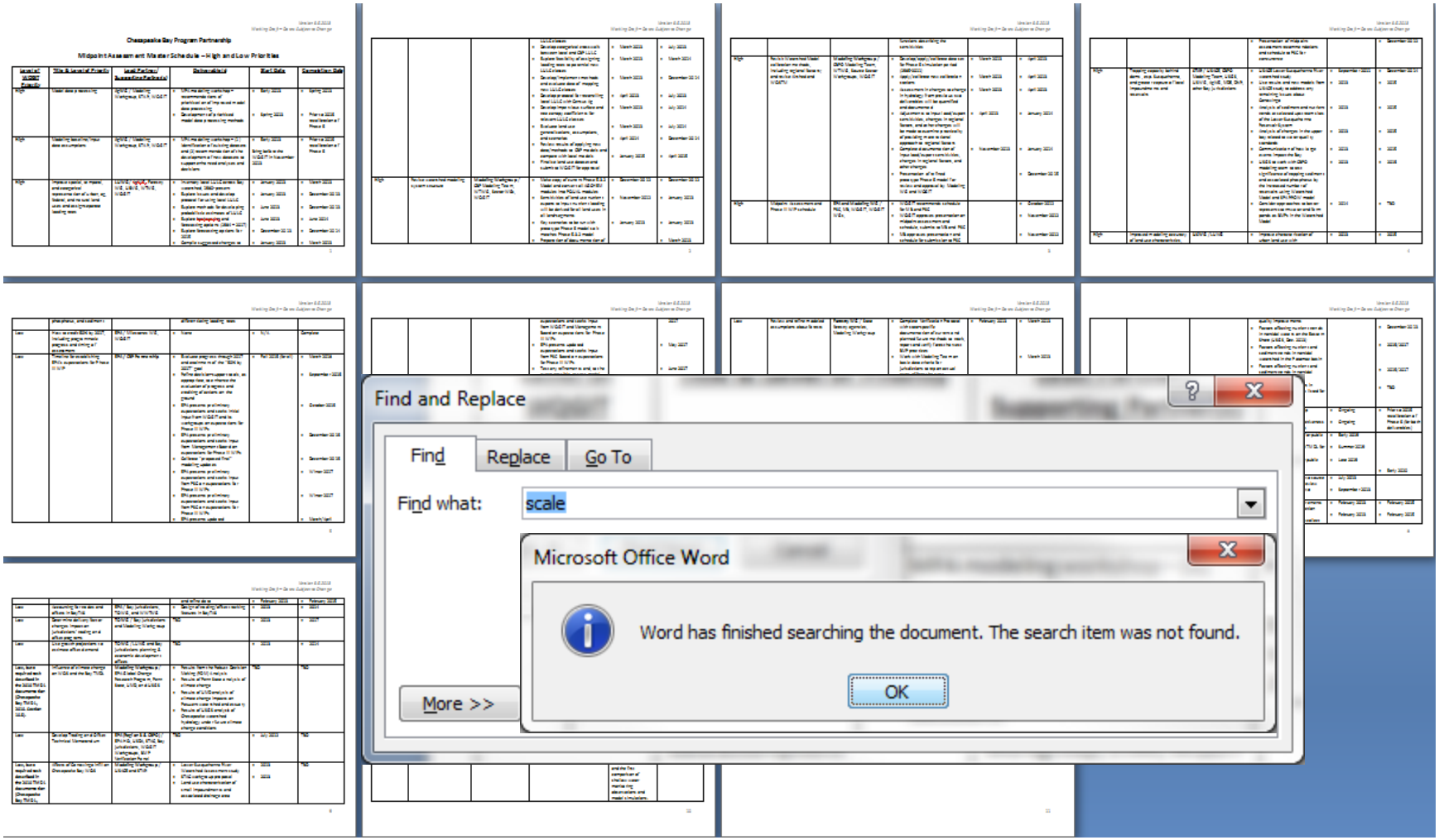


Chesapeake Bay Partnership Models

Priorities



WQGIT Priorities for phase 6



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

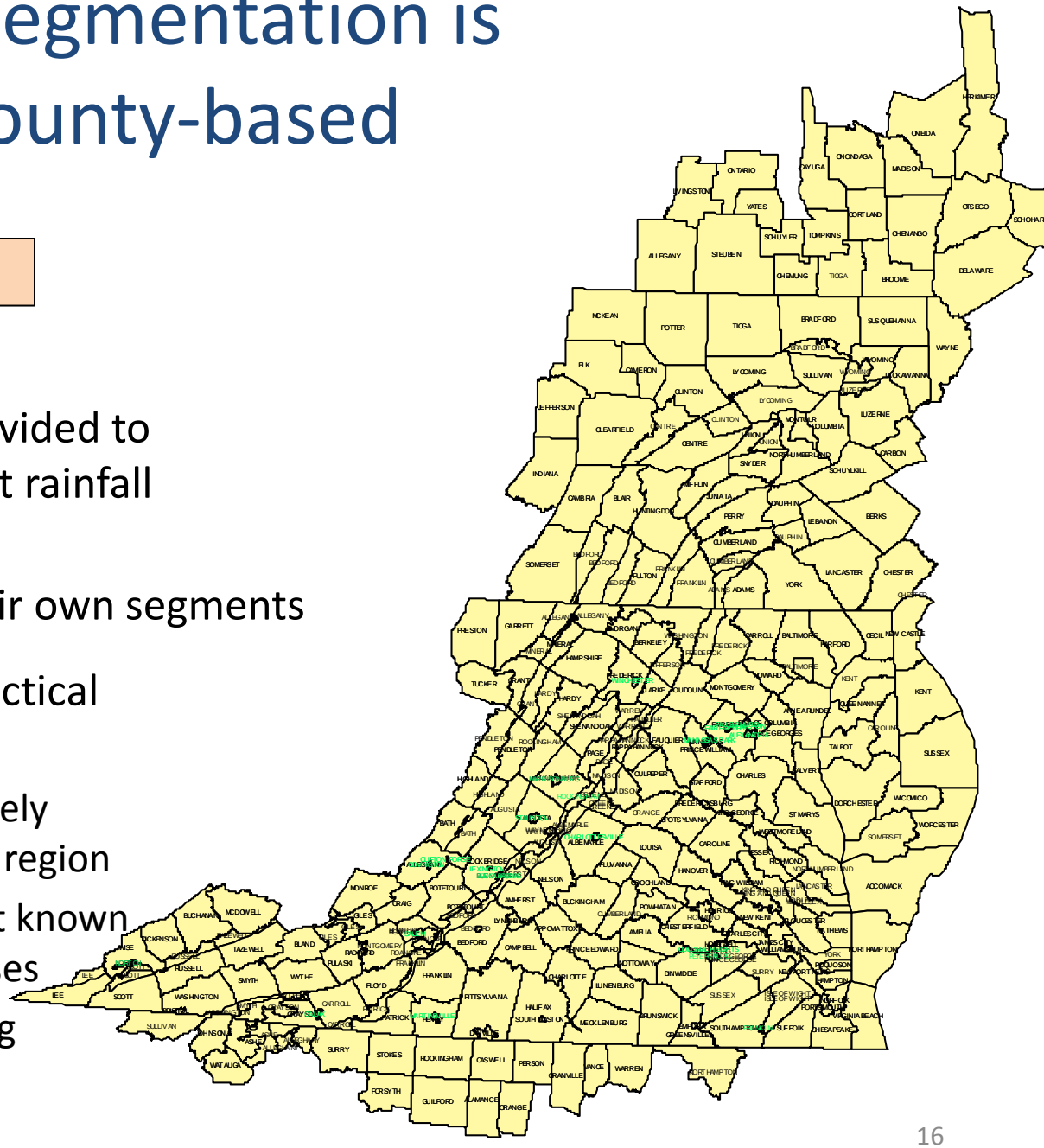
Phase 5 land segmentation is primarily county-based

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

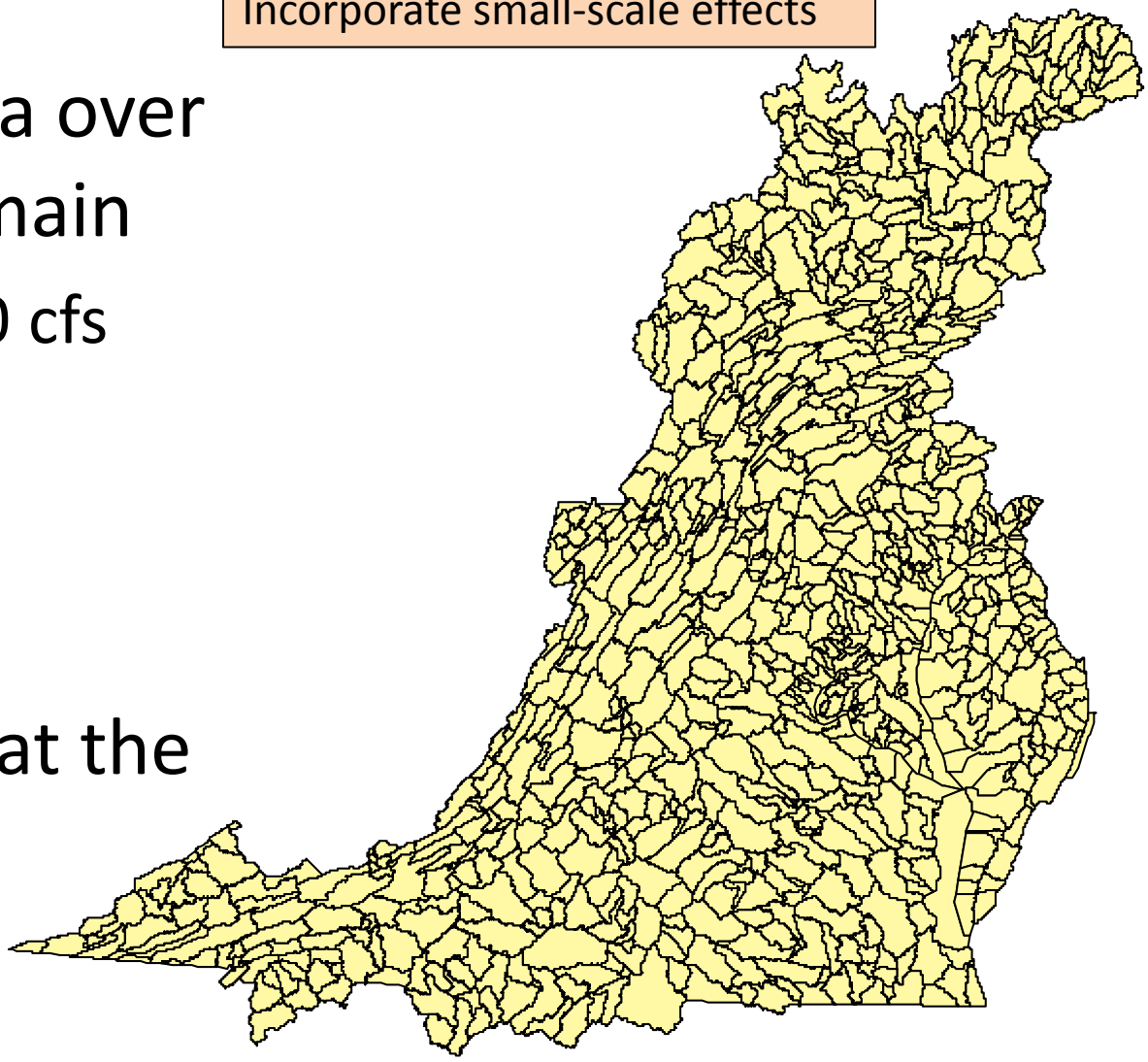


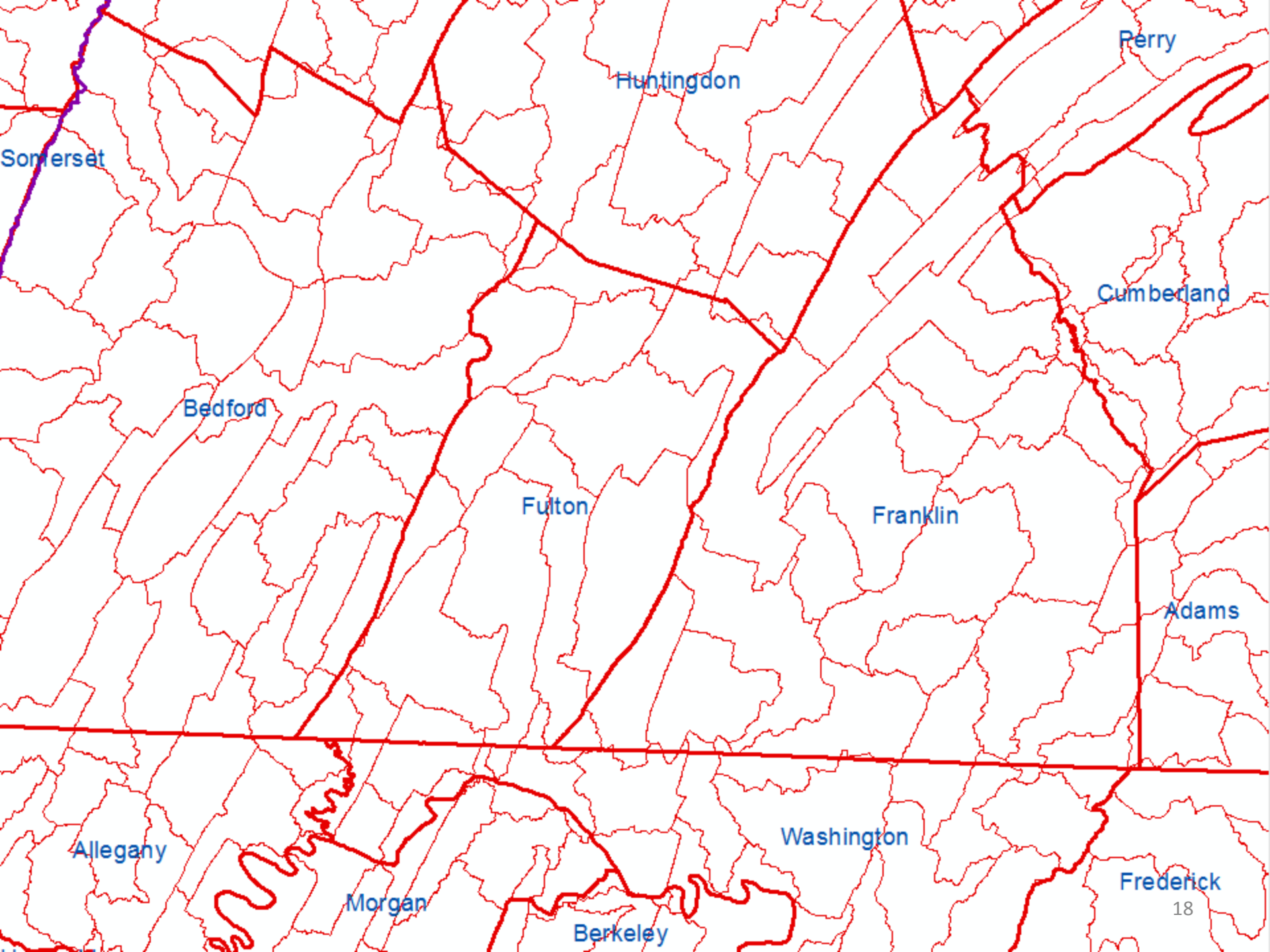
Phase 5 river segmentation

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




Perry
Huntingdon
Somerset
Cumberland
Bedford
Fulton
Franklin
Adams
Allegany
Washington
Frederick
Morgan
Berkeley

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

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