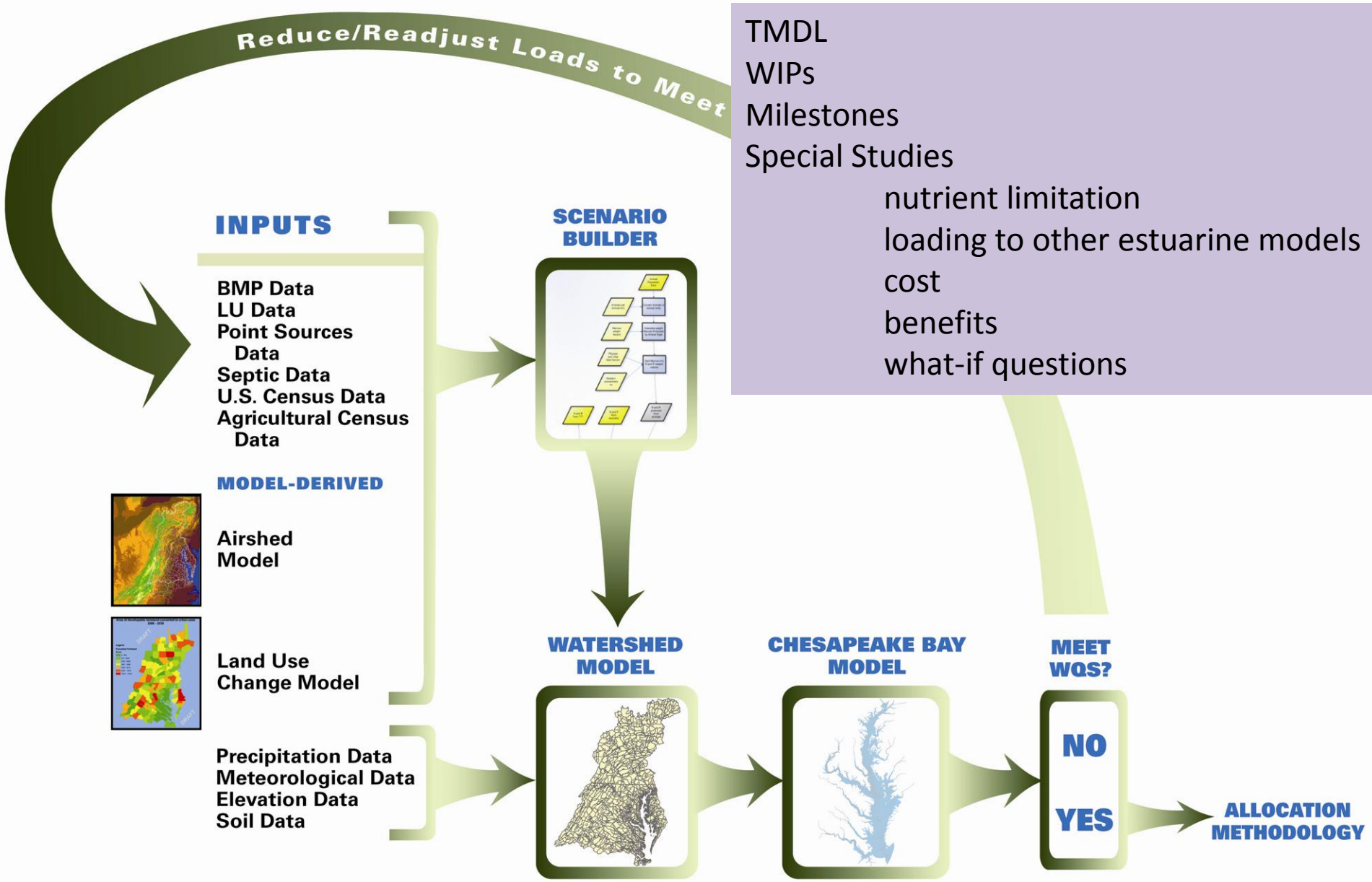
The Current CBP Modeling Lab

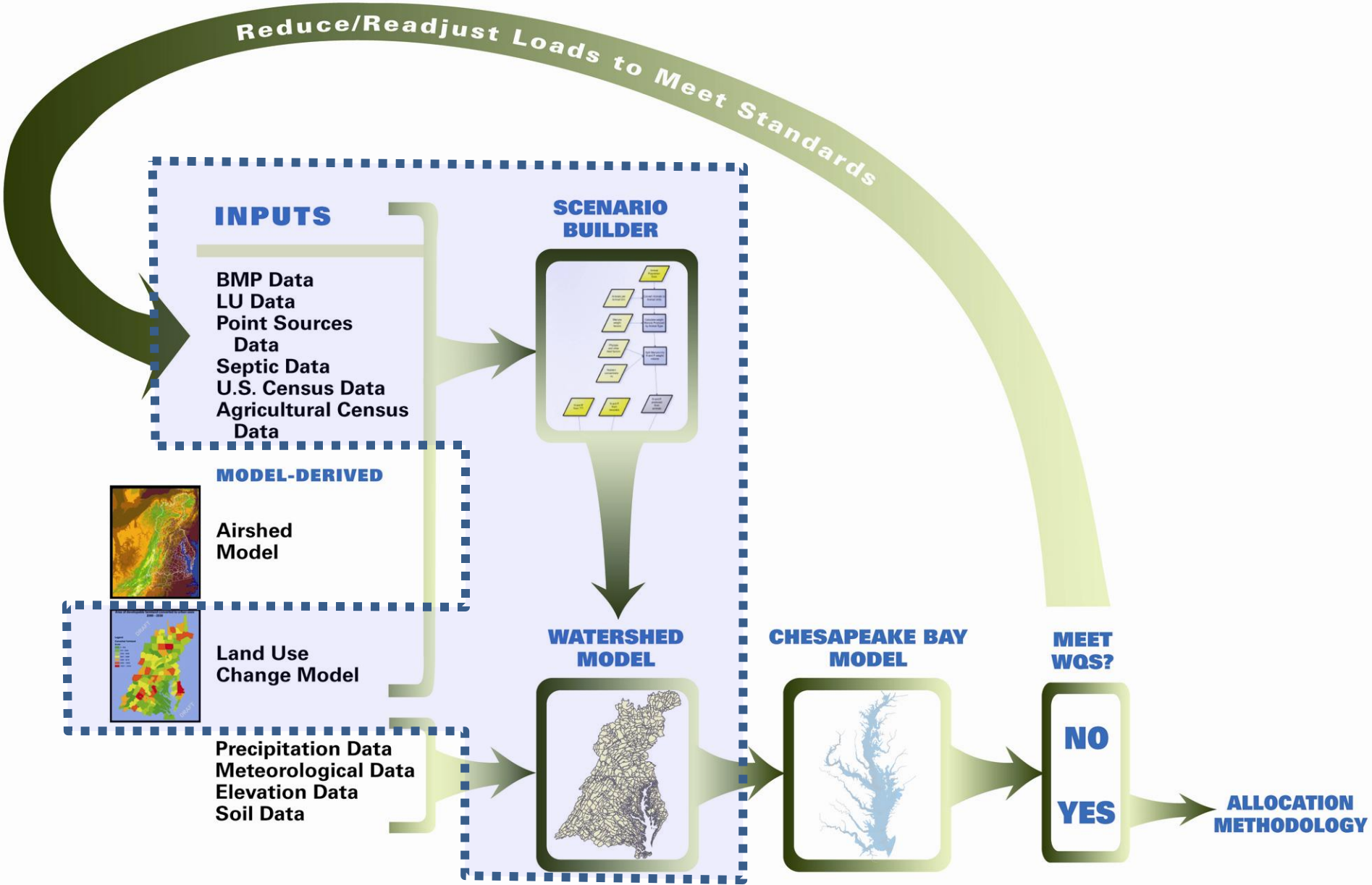
Gary Shenk
Lewis Linker

Chesapeake Bay Partnership Models

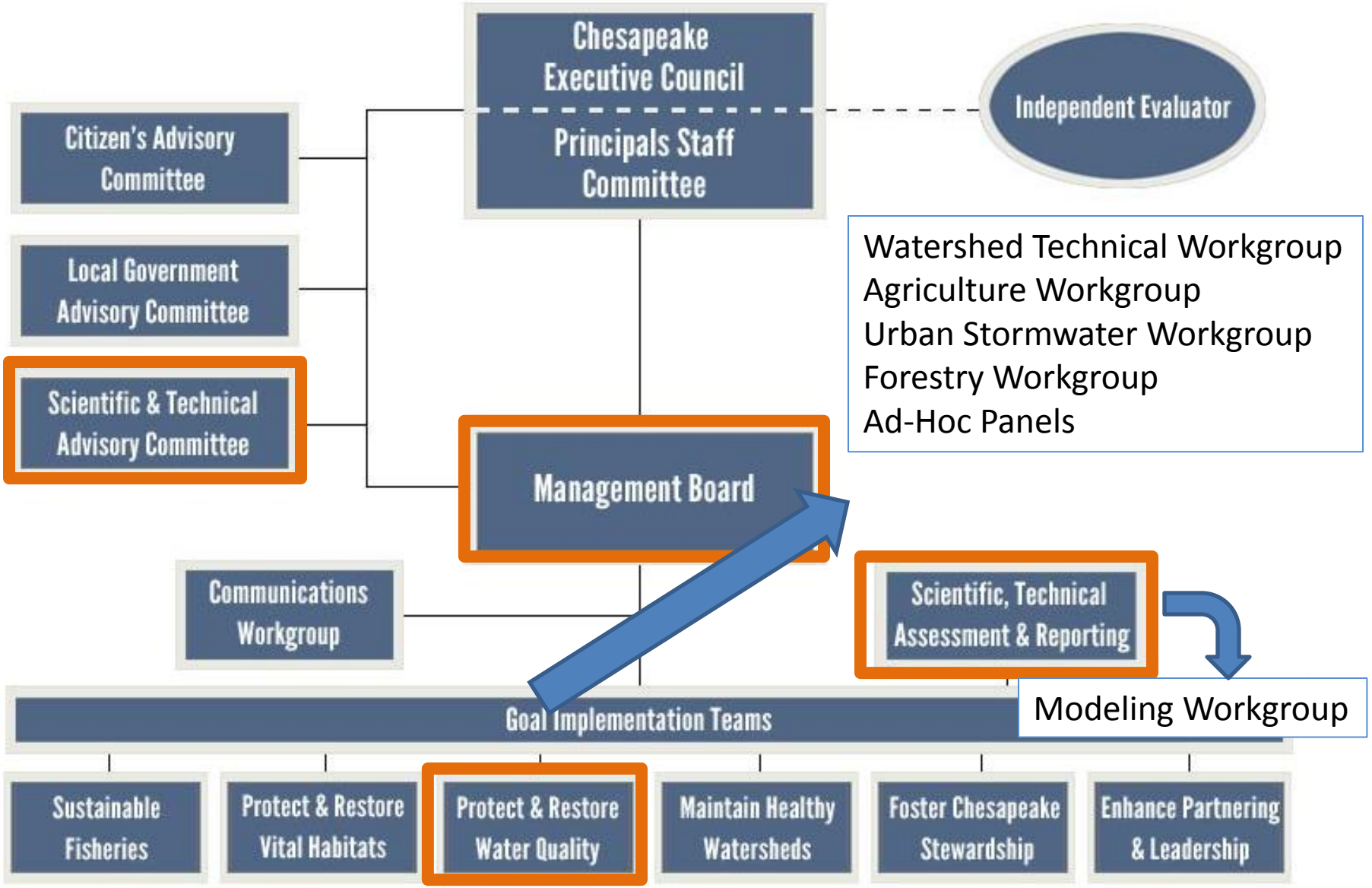


TMDL
WIPs
Milestones
Special Studies
- nutrient limitation
- loading to other estuarine models
- cost
- benefits
- what-if questions

Focus of recent stakeholder input



Chesapeake Bay Program Partnership



Agricultural Workgroup

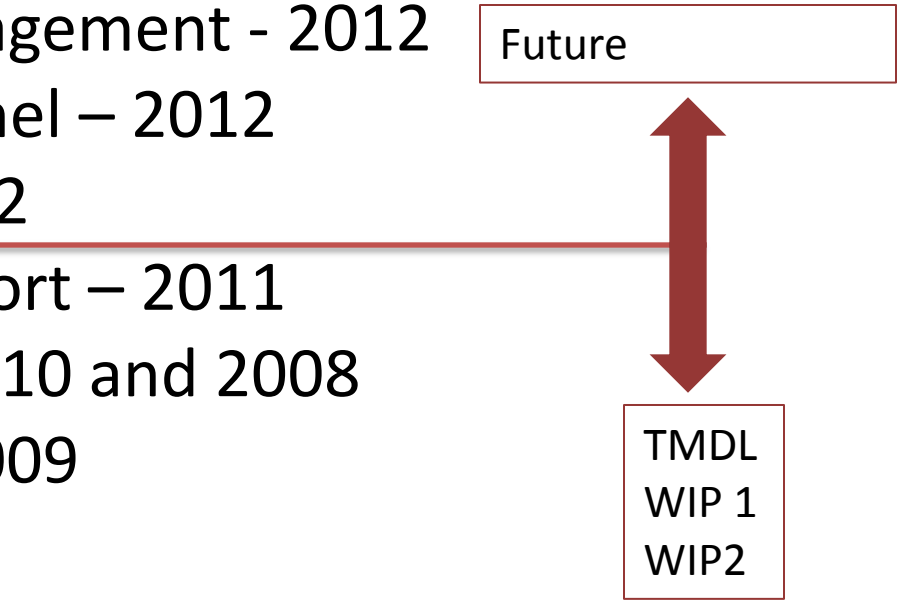
- **Federal**
  - USDA, EPA
- **State**
  - Chesapeake Bay Commission, Delaware Department of Agriculture, Maryland Department of Agriculture, NY DEC, PA Department of Environmental Protection, Pennsylvania Department of Environmental Protection, Pennsylvania State Conservation Commission, VA DCR, VA DEQ, West Virginia Department of Agriculture, WV DEP
- **University**
  - Chesapeake Research Consortium, Cornell University, Penn State University, University of Delaware, University of Maryland, West Virginia University
- **Industry Groups**
  - Delaware Maryland Agribusiness Association, Delaware Pork Producers Association, Delmarva Poultry Industry, Inc., MD Farm Bureau, VA Farm Bureau, VA Grain Producers Producers Association, Virginia Agribusiness Council, Virginia Poultry Association, U.S. Poultry & Egg Association,
- **Local organizations**
  - Cortland County Soil and Water Conservation District, Lancaster County Conservation District, Madison Co. SWCD, Upper Susquehanna Coalition
- **NGOs**
  - American Farmland Trust, Environmental Defense Fund, Keith Campbell Foundation for the Environment, MidAtlantic Farm Credit, PA NoTill Alliance

One Ad-Hoc Subgroup of the Agricultural Workgroup

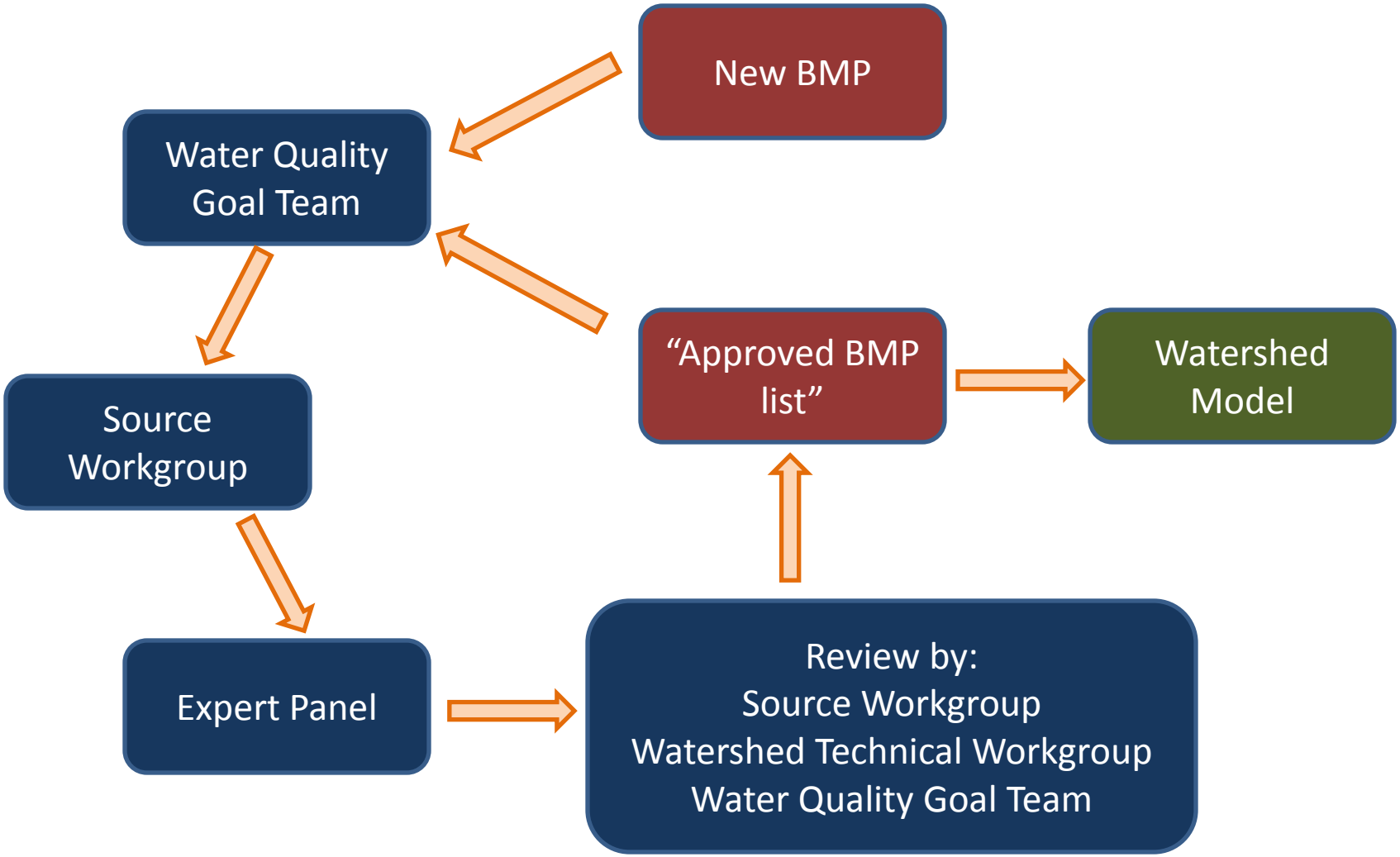
Mid-Atlantic Water Program, U.S. Department of Agriculture-Natural Resources Conservation Service, Virginia Department of Conservation and Recreation, Virginia Department of Forestry, Pennsylvania State Conservation Commission, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Maryland Department of Agriculture, Maryland Department of Natural Resources, Maryland Department of the Environment, University of Maryland Cooperative Extension, University of Maryland-College Park, Delaware Department of Agriculture, Delaware Department of Natural Resources and Environmental Control, Delaware Maryland Agribusiness Association, West Virginia Department of Agriculture, West Virginia Department of Environmental Protection, Cacapon Institute - West Virginia, New York Department of Environmental Conservation, Upper Susquehanna Coalition, American Farmland Trust, Chesapeake Bay Commission, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Environmental Protection Agency, Keith Campbell Foundation for the Environment, Pinchot Institute, Piedmont Environmental Council

STAC – Partial List of Relevant Products

- Multiple Models for Management - 2012
- Phosphorus Dynamics Panel – 2012
- Healthy Watersheds - 2012
- Review of LimnoTech Report – 2011
- Land Change Modeling 2010 and 2008
- Reduction Efficiencies - 2009
- Cover Crops - 2008
- Modeling in the CBP 2010 and beyond - 2008
- WSM review 2008 and 2005
- Atmospheric Deposition 2007
- Stream Restoration 2006



BMP Effectiveness Estimation Process



Expert Review Panels; Planned and Active

Agriculture

- Nutrient Management
- Poultry Litter
- Conservation Tillage
- Cover Crop Panel
- Manure Treatment Technologies
- Animal Waste Storage Systems
- Manure Injection/Incorporation
- Cropland Irrigation Management

Urban

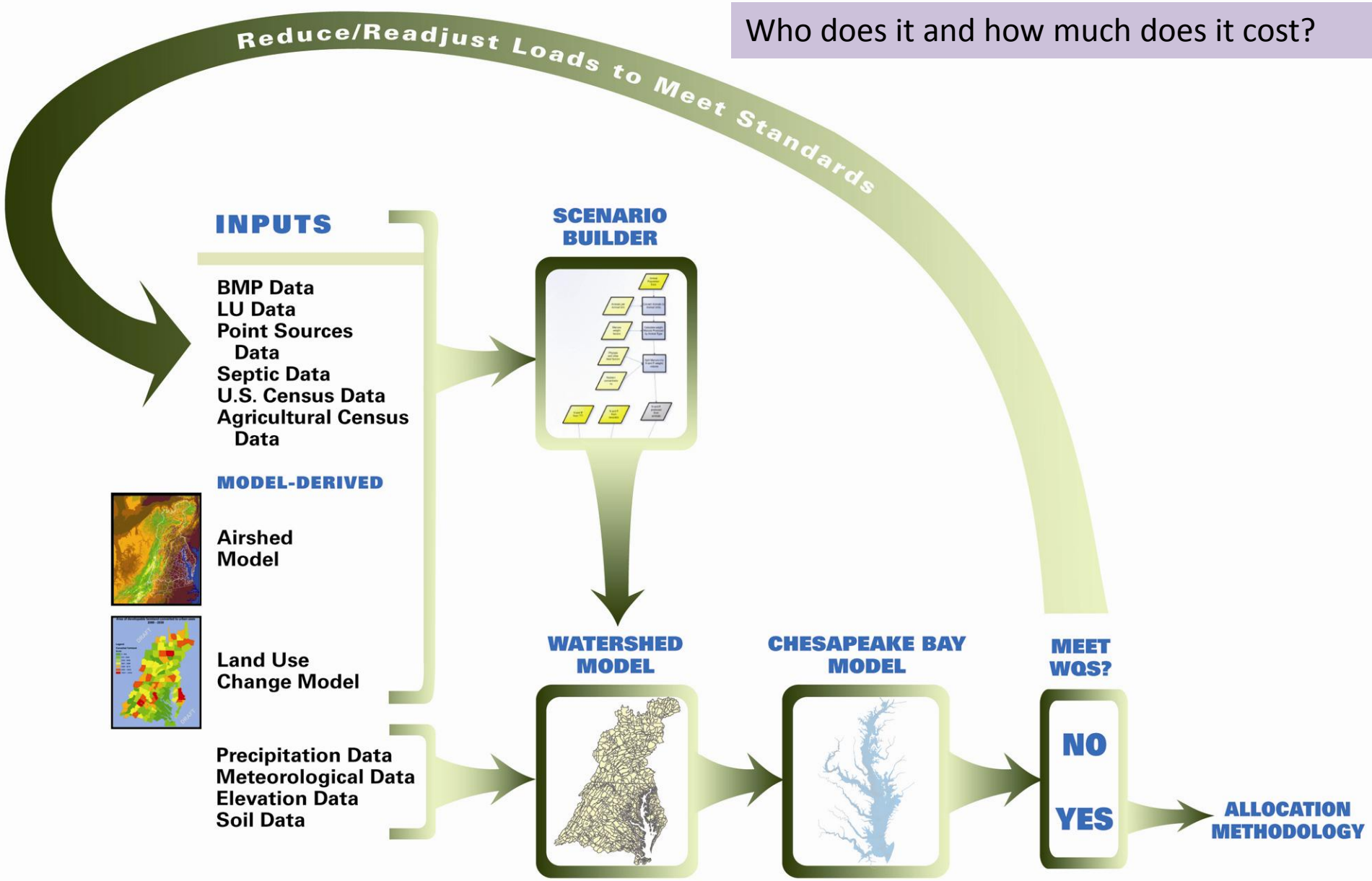
- Urban Retrofits
- Performance Based Management
- Stream Restoration
- LID and Runoff Reduction
- Urban Fertilizer Management
- Erosion and Sediment Control
- Illicit Discharge Elimination
- Impervious Disconnect
- Floating Wetlands
- MS4 Minimum Management Measures

Forestry

- Riparian Buffers
- Urban Tree Planting
- Forest Management
- Urban Filter Strips and Upgraded Stream Buffers

Chesapeake Bay Partnership Models

Who does it and how much does it cost?

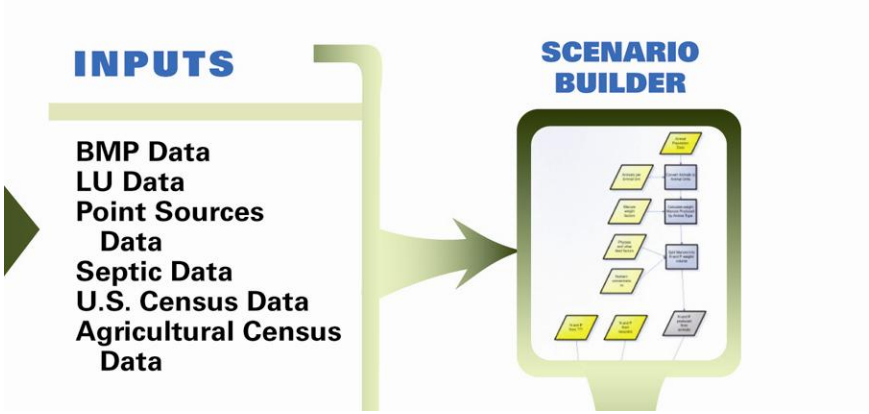


Scenario Builder / Data / CAST

- Development
  - 2 programmers + Db manager
  - 1/2 TetraTech
- Application
  - 1 EPA
  - 1 UMCES
  - 1 UMCP
  - 1/2 TetraTech

$900k

Development and Application are continuous and interwoven

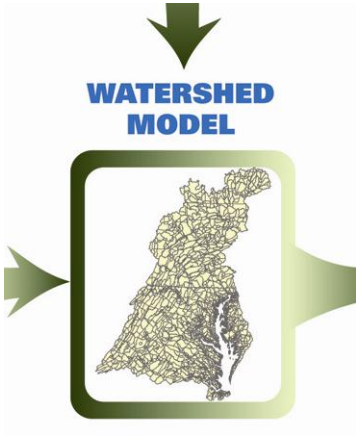


Watershed Model

- Development and Application
  - 1 Penn State
  - 1 UMCES
  - 1/2 EPA
  - 1 Linux Admin

$400k

Development and Application are continuous and interwoven

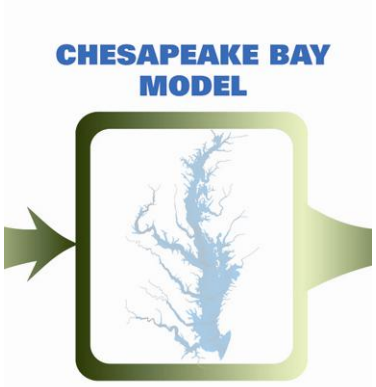


Estuarine Model

- Development
  - 2 COE
- Application
  - 1 VIMS
  - 1/2 EPA

$500k

Development and Application are separated in space and time

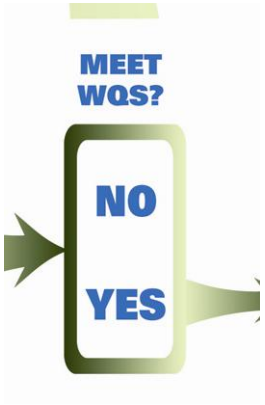


Criteria Assessment

- Development & Application
  - 1.5 UMCES
  - 1 CRC

$200k

Development and Application are separated in space and time



Land Use Change Model

- Development & Application
  - 3 USGS

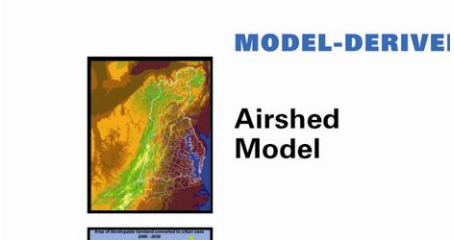
$400k

Development and Application are Interwoven – development is very high Amount of time spent

Land Use Change Model

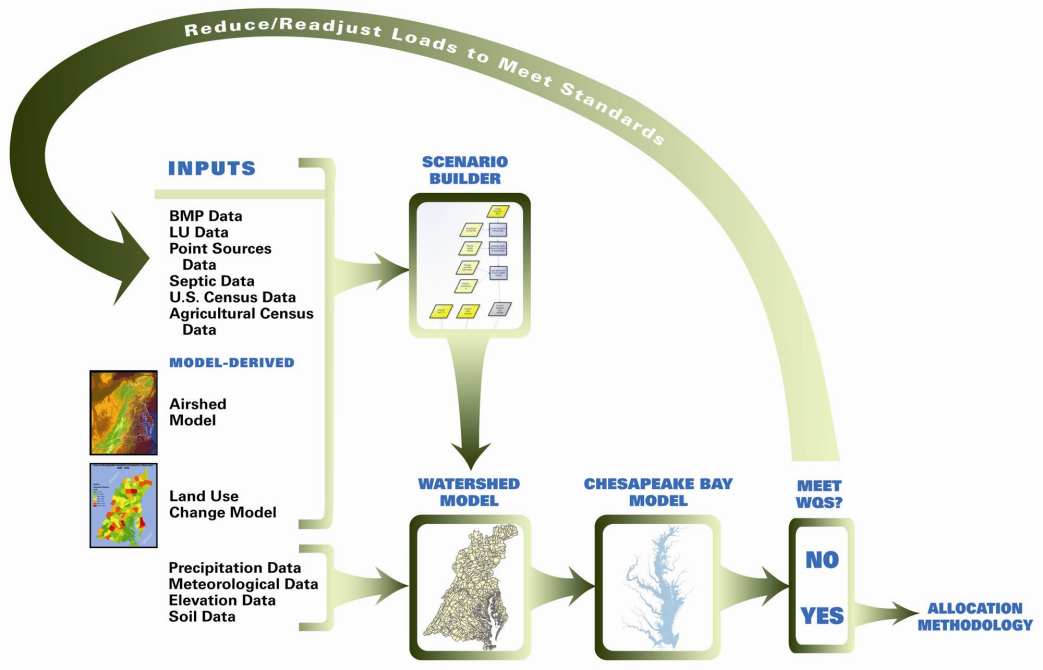
Atmospheric Model

- Development & Application
  - Almost Free! $0-$60k a year
  - 0.05 FTE for application



Facilities

- Office Space
  - 18 * 9200 = $166k
- Computers
  - 10k/year



Chesapeake Bay Partnership Models

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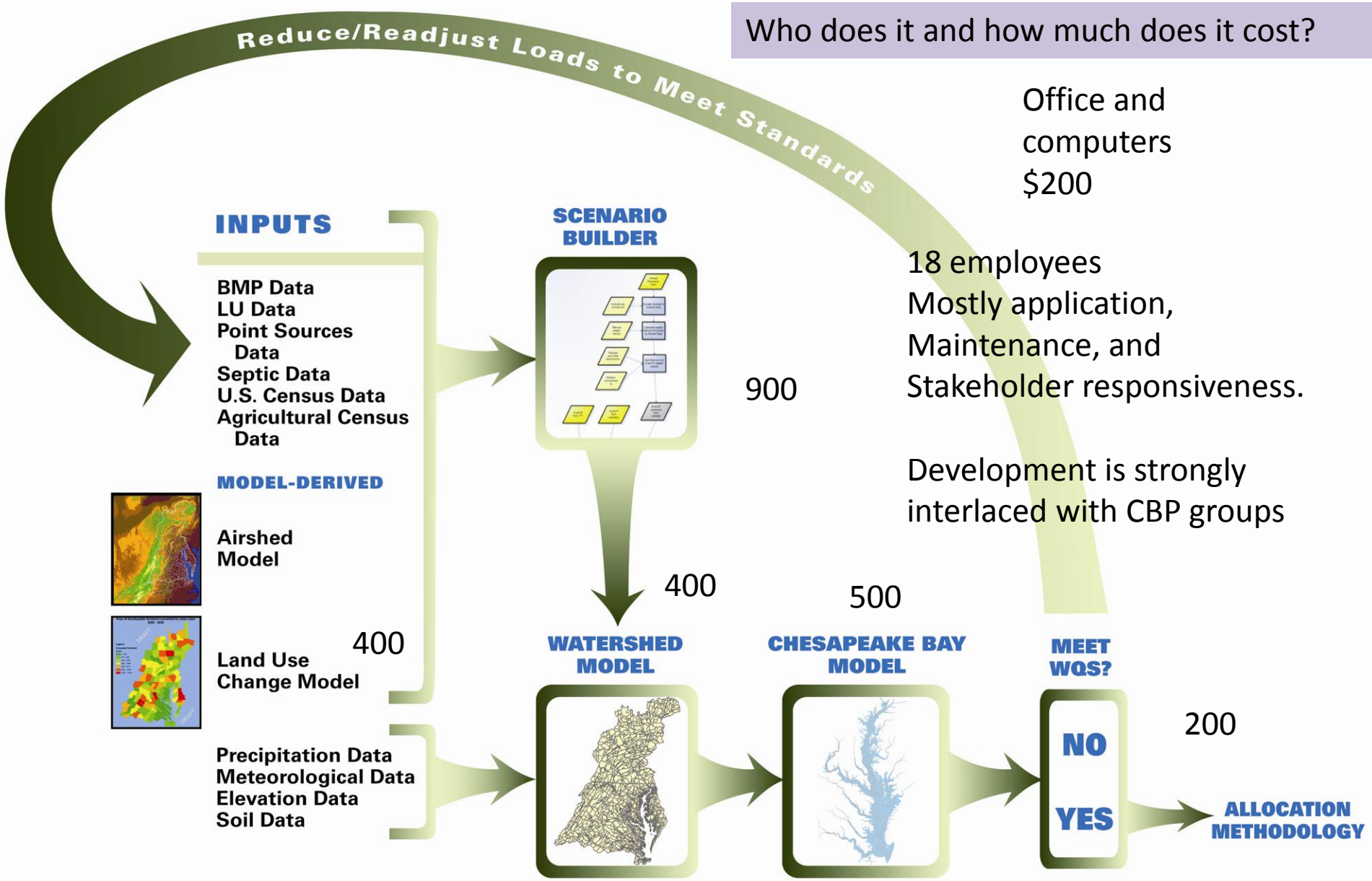

Office and computers
$200

18 employees
Mostly application, Maintenance, and Stakeholder responsiveness.

Development is strongly interlaced with CBP groups