Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation

Committee on the Evaluation of Chesapeake Bay Program Implementation for Nutrient Reduction to Improve Water Quality

National Research Council

Kenneth H. Reckhow, Committee Chair
Patricia E. Norris, Committee Vice Chair
Stephanie Johnson, Study Director

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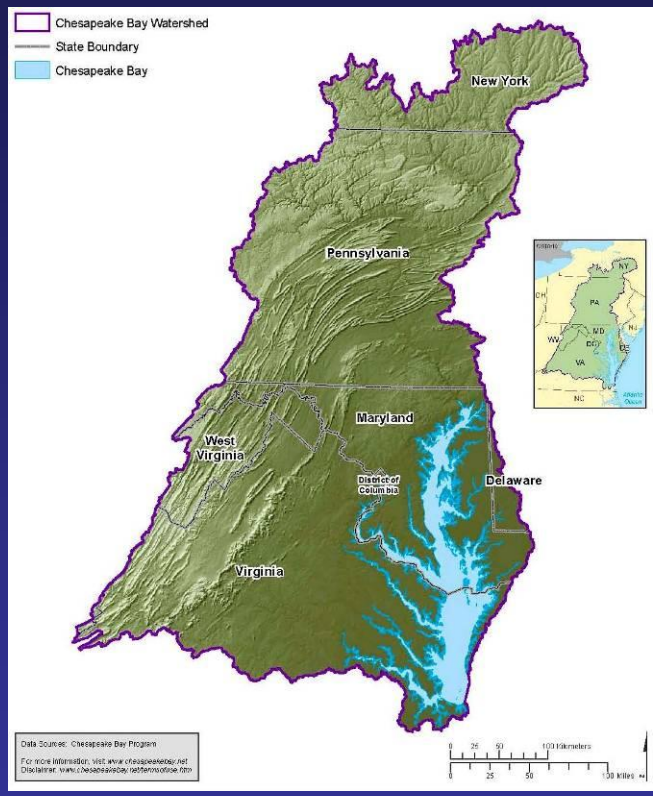
History of the Chesapeake Bay Program

- 1983 CBP established
  - Pledged to restore Bay and its ecosystem
- 1987 commitment reaffirmed; pledge to reduce N and P loads by 40% by 2000
  - 1992-93 added tributary-specific focus
- 2000 commitment to broader water quality standards achieved by 2010
  - 2003 agreement on N and P cap loads
  - 2007 evaluation: insufficient progress
  - Critical GAO (2005) review



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New Era of Accountability

2008 Chesapeake Action Plan

2009 Executive Order,
Two-Year Milestones,
Independent Evaluation

2010 TMDL, Watershed
Implementation Plans

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NRC Statement of Task

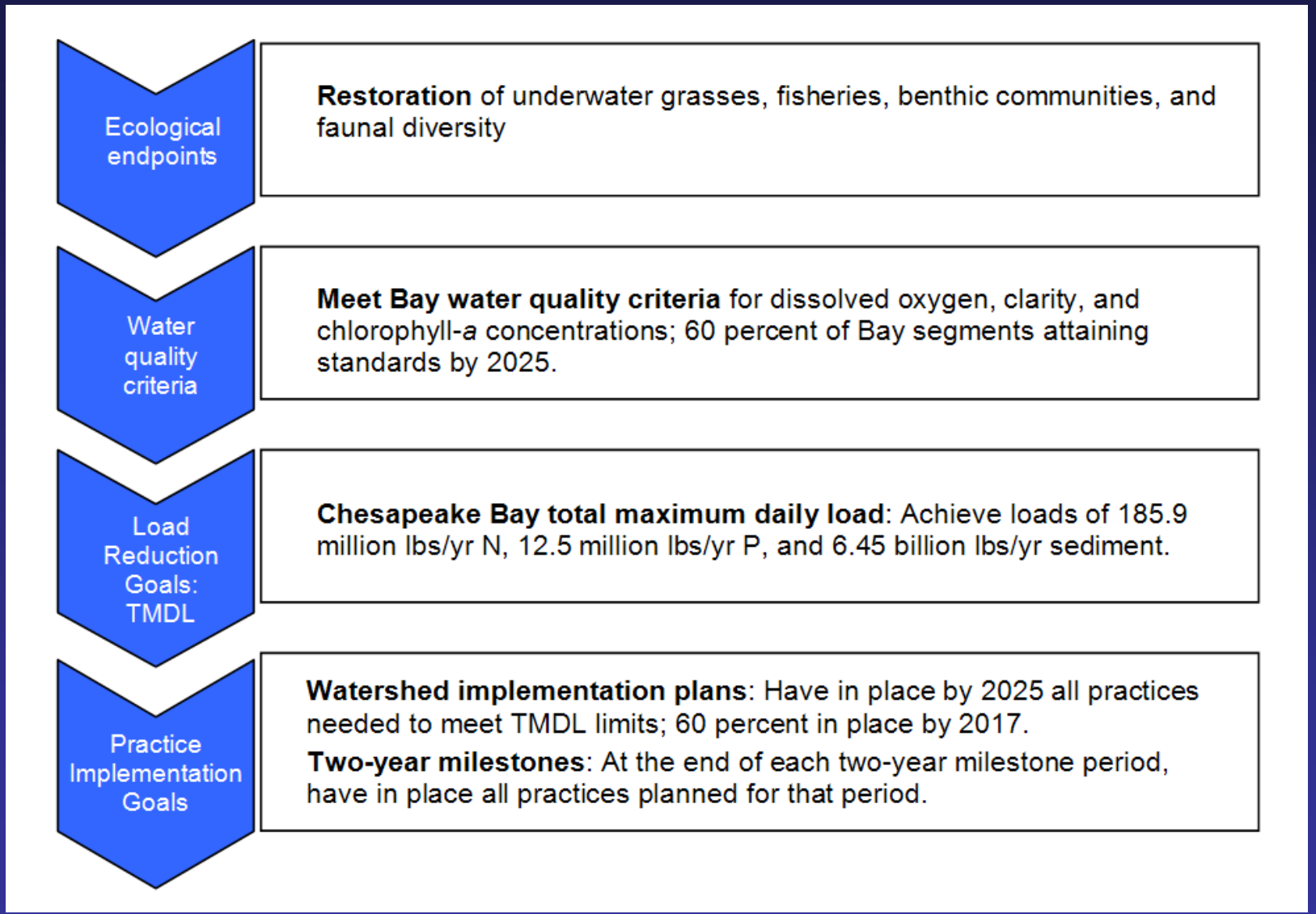
Tracking and Accounting

1. Does tracking of BMPs appear to be reliable, accurate, and consistent?
2. What tracking and accounting efforts and systems appear to be working, and not working? How can the system be strategically improved?
3. How do these inconsistencies appear to impact reported program results?

Milestones

4. Is the two year milestone strategy, and its level of implementation, likely to result in achieving the CBP nutrient and sediment reduction goals for this milestone period?
5. Have each of the states and the federal agencies developed appropriate adaptive management strategies to ensure that CBP nutrient and sediment reduction goals will be met?
6. What improvements can be made to the development, implementation, and accounting of the strategies to ensure achieving the goals?

Integration of Goals and Strategies Used in the CBP



Committee Membership

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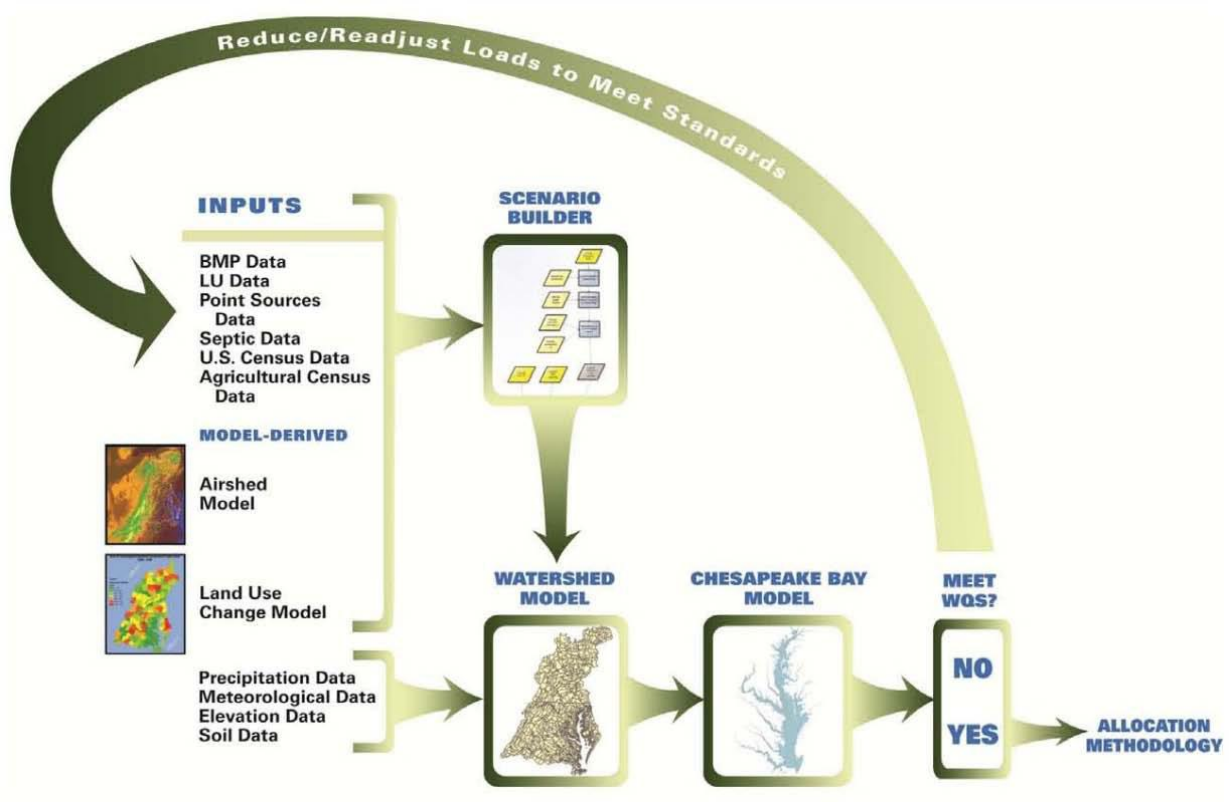
NRC Staff:
Stephanie Johnson (Study Director) and Michael Stoever (Research Associate)

Tracking Practice Implementation

Accurate, Reliable and Consistent?

- Tracking is of paramount importance because the CBP relies upon the data to estimate current and future loads



Tracking Practice Implementation
Accurate, Reliable and Consistent?

- Tracking and accounting issues:
  - Not all practices tracked in all jurisdictions (e.g., stormwater practices not tracked by 2 states)
  - Agricultural data privacy constraints
  - Field verification lacking in many states
  - Little verification of continued operation and maintenance
  - Voluntary practices rarely tracked
- Current data on practice implementation is, at best, an estimate

Tracking and Accounting of BMPs

- Current accounting not consistent across jurisdictions
  - Committee unable to quantify the magnitude or likely direction of error caused by reporting issues
- Third-party auditing would be necessary to ensure reliability and accuracy of the state and local data
- CBP and jurisdictions making strides toward improved reporting but states struggling with the large task and limited resources

Strategies to Improve Tracking And Accounting

- Consolidated regional ag. BMP program
- Targeted monitoring programs in subwatersheds
- More timely mechanisms for reporting and synthesizing progress

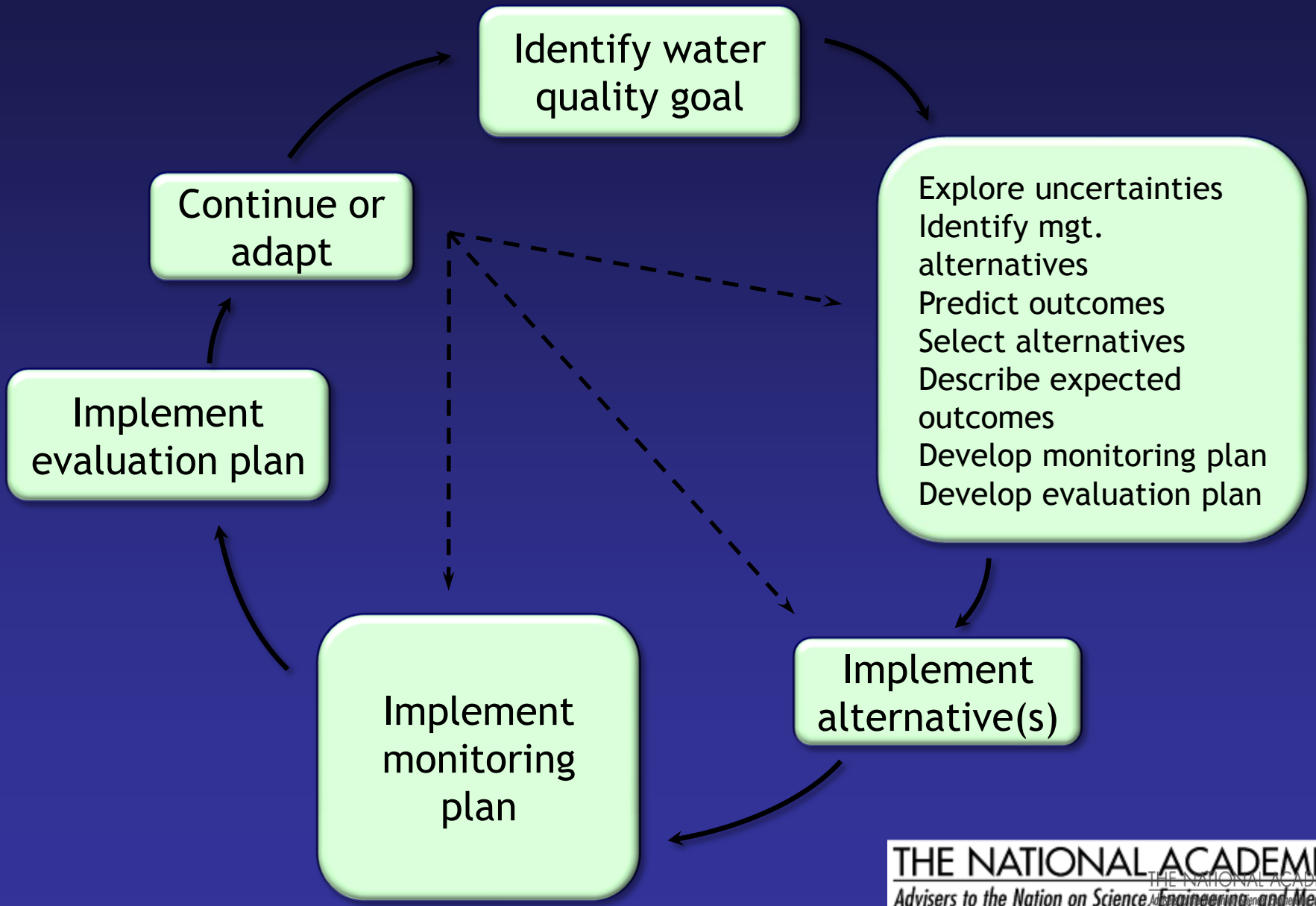
Two-Year Milestone Strategy

- Two-year milestone strategy commits states to tangible, near-term implementation goals and improves accountability
  - Improvement upon past strategies
  - Specifies contingencies for mid-course corrections
- Strategy does not guarantee goals will be met
- Consequences for nonattainment unclear
- Without timely updates and synthesis of progress, most states lack data necessary to make appropriate mid-course corrections

Milestones: Implementation

- First milestone represents ~21-22% total targeted N and P reductions
- Mixed progress reported
- Data insufficient to meaningfully evaluate implementation progress (no load data)
- First milestone will likely be the easiest to achieve
  - States seizing low hanging fruit
  - Counting previously uncounted practices

Adaptive Management

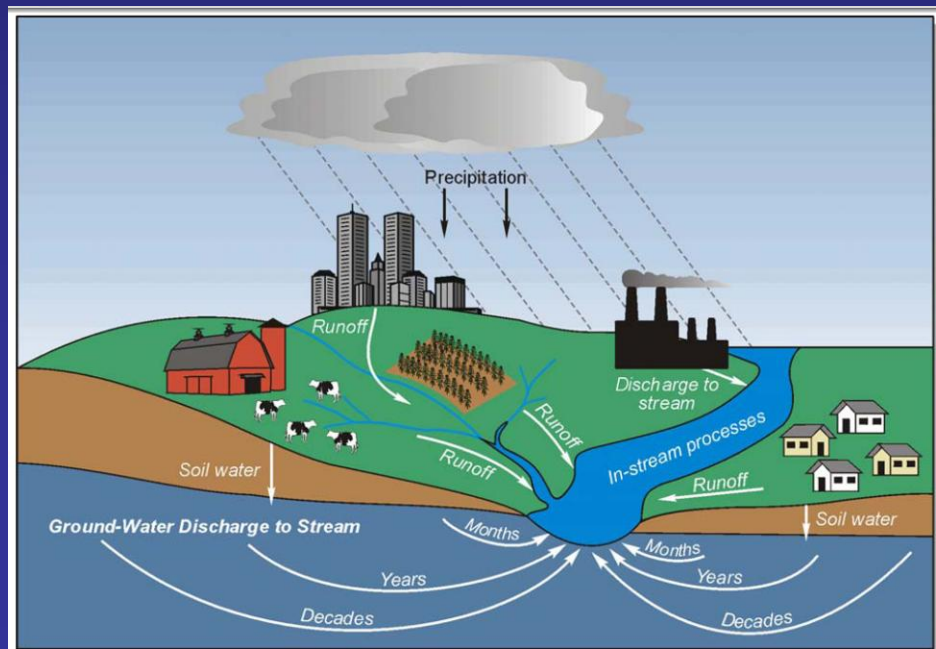


Adaptive Management

- Neither the EPA nor the CBP jurisdictions exhibit a clear understanding of adaptive management and how it might be applied
- Current two-year milestone strategy is largely a trial and error process; learning is not an explicit objective
- Elements Needed for Successful AM:
  - Careful assessment of uncertainties relevant to decision making
  - Management alternatives and deliberate monitoring programs
  - Federal guidance and examples
  - Federal accountability framework that supports adaptive management
  - Flexibility in regulatory and organizational structure

Strategies for Meeting Goals

- Attention to the consequences of future population levels, development, agriculture, and climate dynamics
- Helping the public understand lag times and will reduce public impatience and disillusionment
- Need program strategies to quantify lag times and explain uncertainties



Strategies for Meeting Goals

Strategies with unrealized potential:

Agriculture:

- Improved and innovative manure management
- Incentive-based approaches
- Alternative regulatory models

Urban:

- Regulatory models
- Enhanced individual responsibility

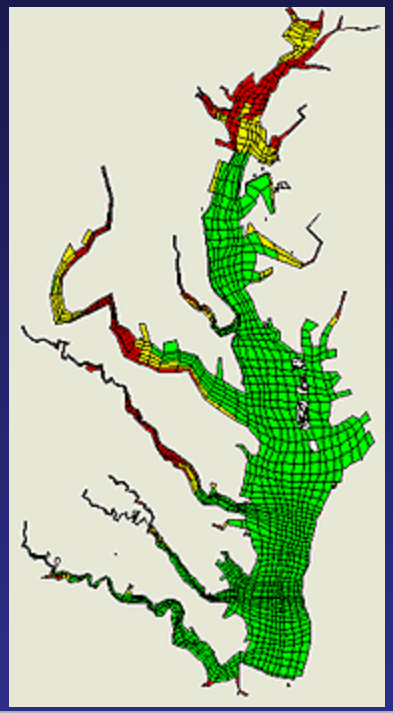
Cross Cutting:

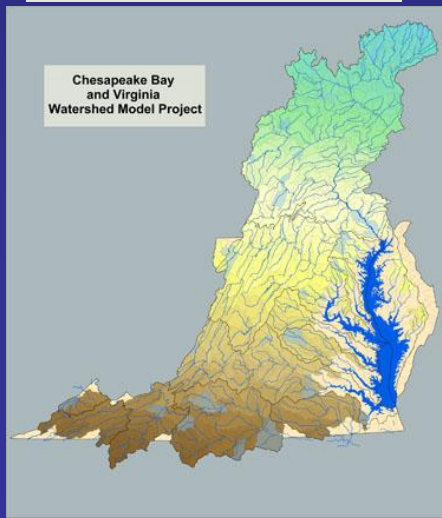
- Additional air pollution controls
- Innovative funding models

Strategies for Meeting Goals

Establishing a Chesapeake Bay modeling laboratory would ensure that the CBP has access to a suite of models at the state of the art and could help build credibility with the scientific, engineering, and management communities.

- Envisioned as a place to bring academics and CBP modelers together to bring new ideas and critical review
- Examine competing models, enhance simulations
- Integrate modeling and monitoring





Summary

- Reaching long-term load reduction goals will require substantial commitment and some level of sacrifice from those who live and work in the watershed
- The CBP has enhanced accountability by establishing two year milestones for progress
- However, issues limit consistency and accuracy of tracking and accounting of practices
- Successful applications of adaptive management will benefit from additional guidance and flexibility
- Because public support is vital to sustaining the program, quantifying and communicating lag times and uncertainties will be necessary

The full report is available as a free pdf at

http://www.nap.edu.

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