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

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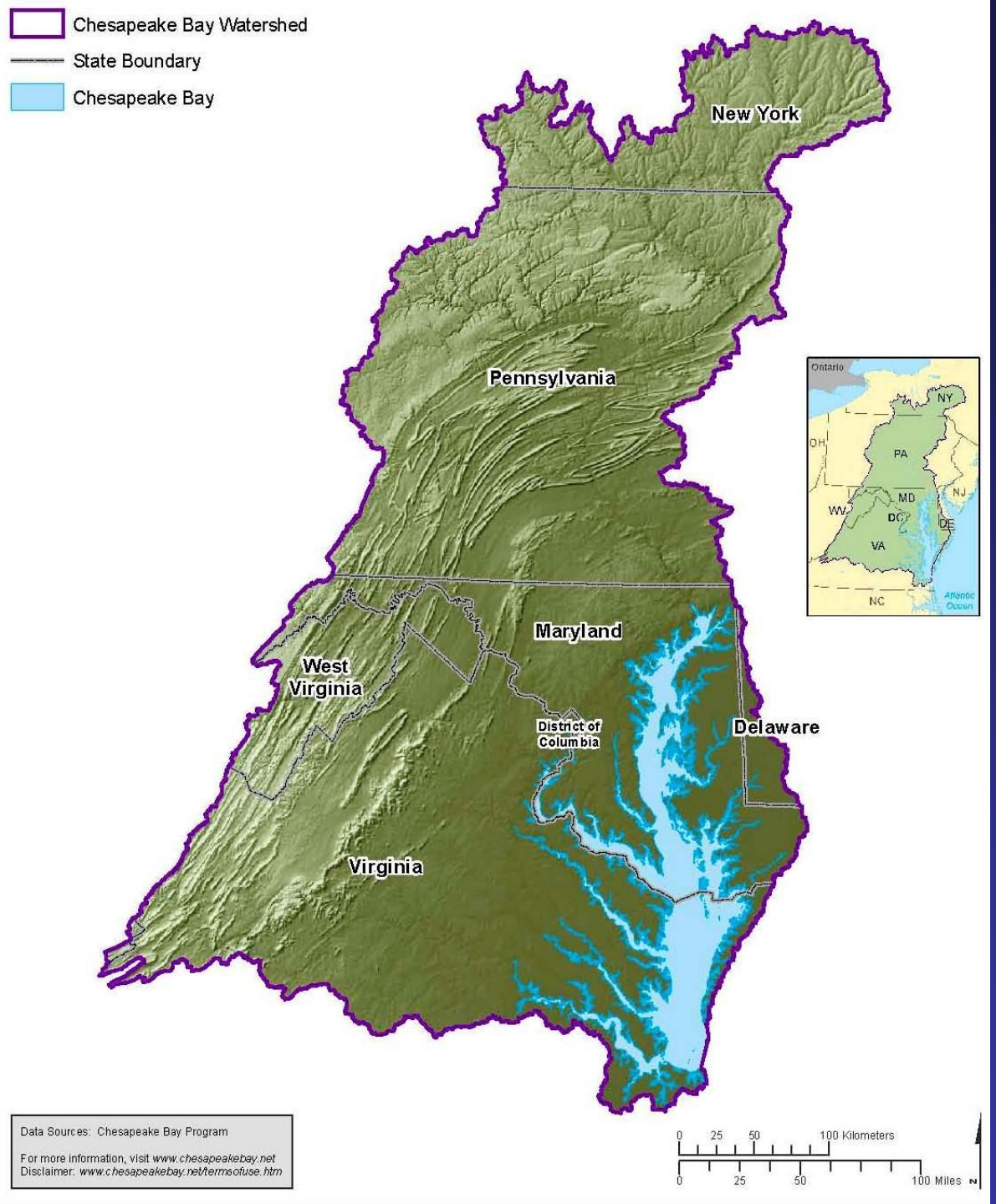

The Chesapeake Bay Watershed

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Chesapeake Bay Program

1983 CBP established (VA, MD, PA, DC, EPA, CBC)
- Pledged to restore Bay and its ecosystem

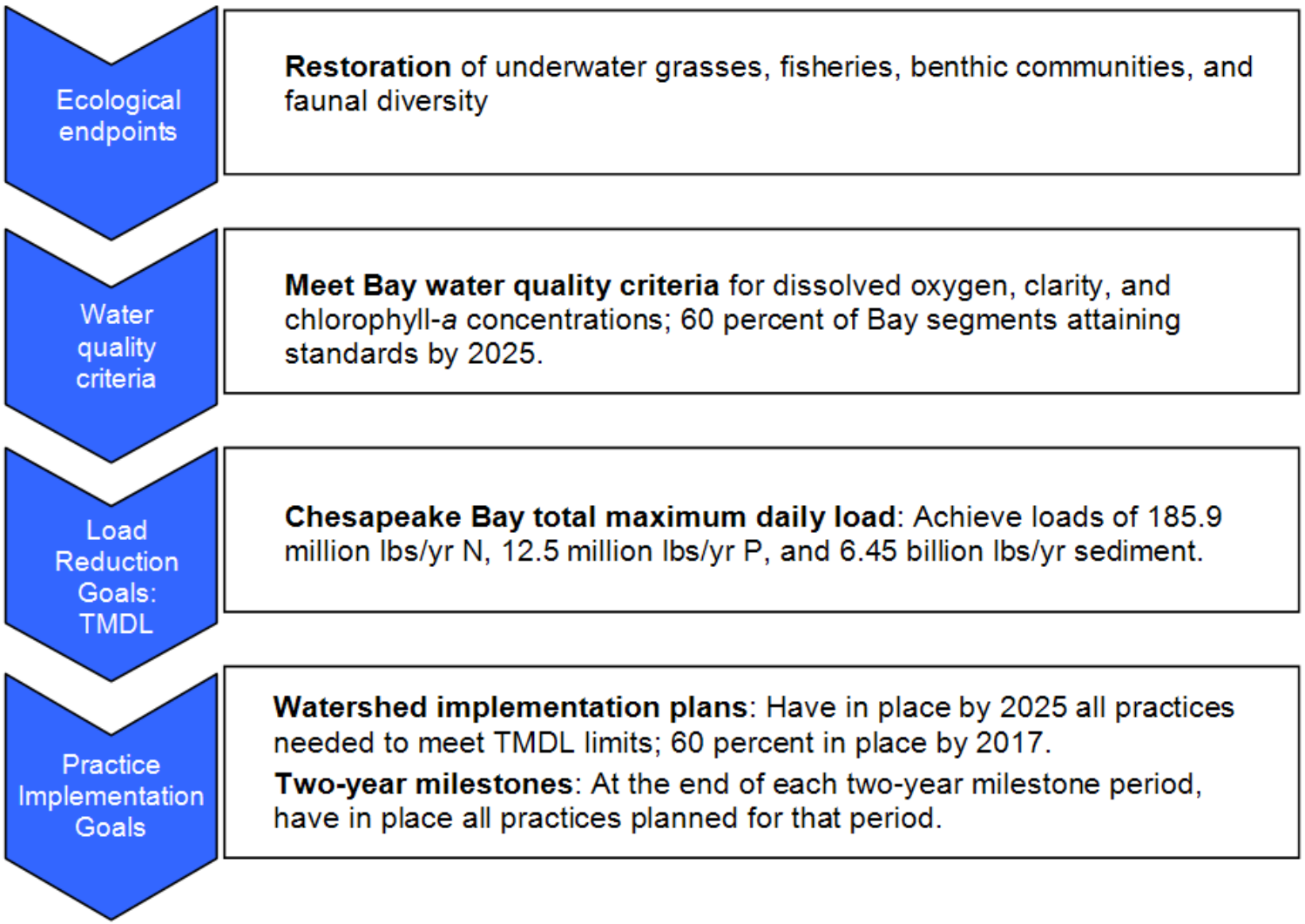
1987 commitment reaffirmed; pledge to reduce N and P entering the Bay by 40% by 2000
- 1992-93 added tributary-specific focus

2000 commitment to broader water quality standards achieved by 2010
- 2003 agreement on tributary-specific N and P cap loads
- 2007 evaluation: insufficient progress
- 2008 Chesapeake Action Plan

2009 Executive Order, two-year milestone strategy

2010 TMDL

Integration of Goals and Strategies Used in the CBP



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?

Study Process

- Sponsored by EPA, with additional funding from VA, MD, PA, and DC
- 4 committee meetings (3 information gathering) including public comment sessions
- Briefings/presentations from many individuals, agencies, and organizations
- Committee-generated questionnaire sent to jurisdictions and federal agencies
- Peer-reviewed consensus report

Committee Membership

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

Tracking and Accounting

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

Strategies to Improve Tracking And Accounting

- Consolidated regional BMP program could increase geo-referencing and tracking voluntary practices
- Targeted monitoring programs in subwatersheds could help refine BMP efficiency estimates
- More timely mechanisms for reporting and synthesizing progress needed
  - With new electronic reporting, some states wait 9+ months for a summary of BMP implementation progress
  - BayTAS and ChesapeakeStat need to incorporate mechanisms for more timely feedback

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 based on July 2009+ reporting
- Data insufficient to meaningfully evaluate implementation progress
  - All states lacked load reduction data for time period requested
  - Impossible to evaluate implementation shortfalls or successes relative to load reduction goals
- First milestone will likely be the easiest to achieve
  - States seizing low hanging fruit
  - Counting previously uncounted practices

Adaptive Management

- Strategy for moving forward despite uncertainty, through targeted management tests, deliberate monitoring programs, and mechanisms to incorporate learning to improve future decisions
- Neither the EPA nor the 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 Adaptive Management

- Careful assessment of uncertainties relevant to decision making
- Management alternatives and deliberate monitoring programs designed to address key uncertainties
- Federal guidance and examples
- Federal accountability framework that supports adaptive management
- Flexibility in regulatory and organizational structure

Strategies for Meeting Goals

- Success in meeting CBP goals will require attention to the consequences of future population levels, development, agriculture, and climate dynamics in the Bay Watershed
- Helping the public understand lag times and uncertainties associated with water quality improvements will reduce public impatience and disillusionment
- Program strategies to quantify lag times and explain uncertainties will lead to improved communication and better public support

Strategies for Meeting Goals

Report notes possible 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, numerous challenges 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