

The Chesapeake Bay TMDL - A Driver for New Stormwater Strategies

Jane McDonough

October 21, 2010





Presentation Overview

Chesapeake Bay Restoration

- Where We've Been
- Where We Are
- Where We're Going
- How We're Getting There

Chesapeake Bay Restoration

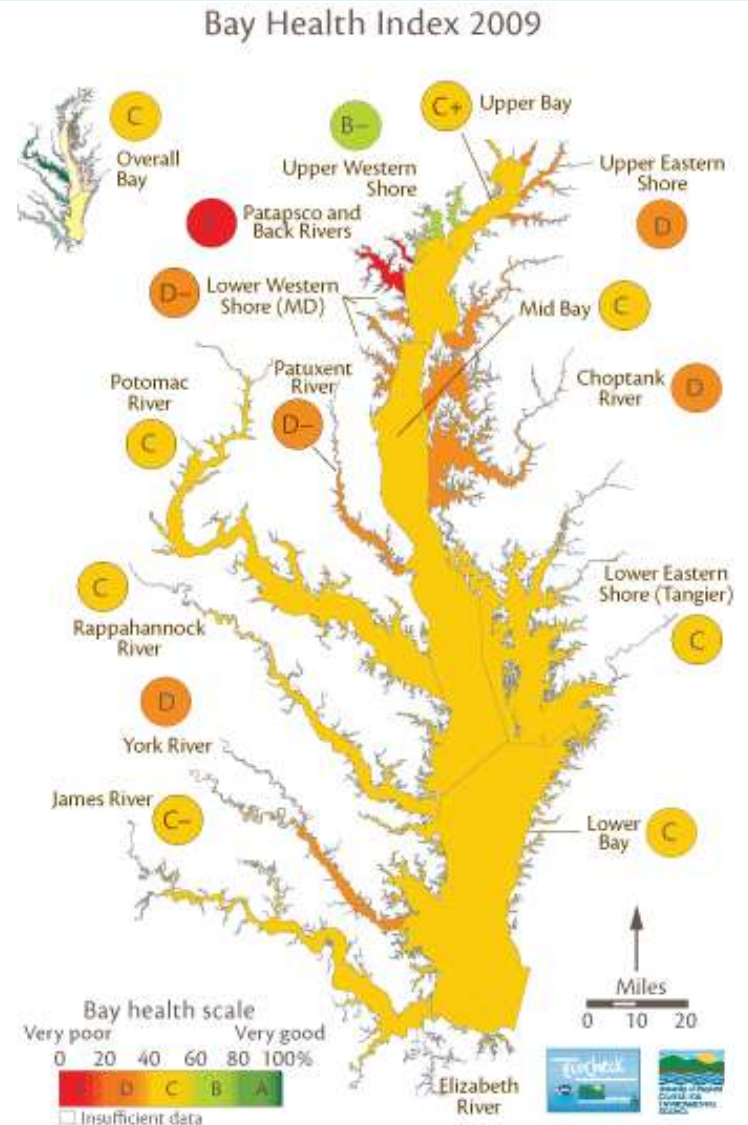
Where We've Been



Chesapeake Bay Restoration

Where We've Been

- 1970's studies identified **nutrients** as primary source of Bay degradation and loss of living resources (low DO)
- Current overall Bay Health Index = **C**



Watershed Conditions

Geographical Extent of Nutrient Loads from Land

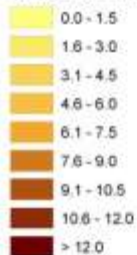
Multiple Jurisdictions – MD, VA, PA, DC, NY, DE, WV, Federal Lands
+ atmospheric deposition from numerous states

All Sources of Total Nitrogen

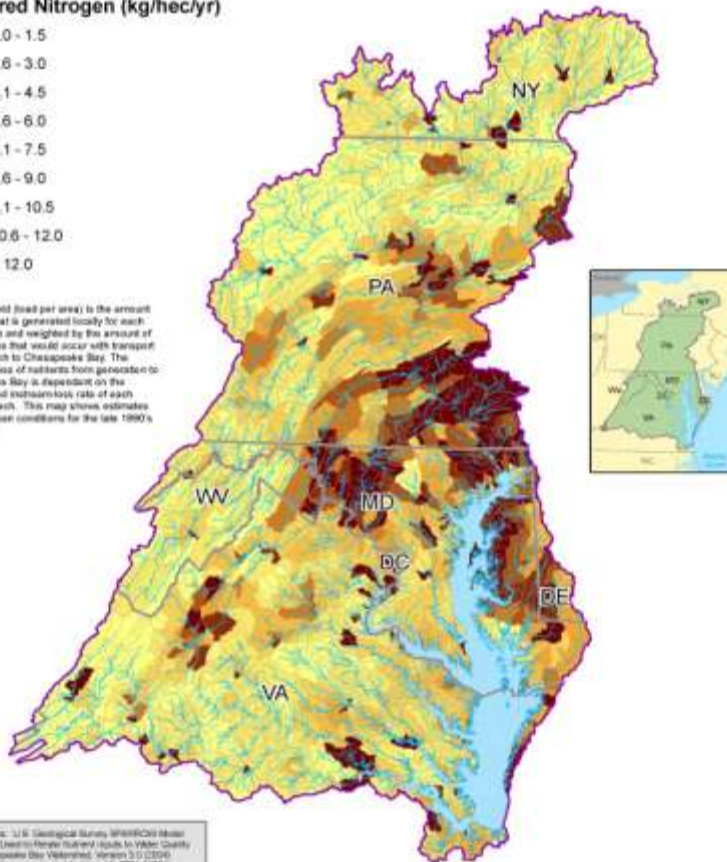
Delivered Yield to the Chesapeake Bay



Delivered Nitrogen (kg/hectare/yr)



Delivered yield (load per area) is the amount of nutrient that is generated locally for each stream reach and weighted by the amount of in-stream loss that would occur with transport from the reach to Chesapeake Bay. The summative loss of nutrients from generation to delivery to the Bay is dependent on the travel time and in-stream loss rate of each individual reach. This map shows estimates based on mean conditions for the late 1990's time period.



Data Source: U.S. Geological Survey (SPRINT) Model
Digitized Data Used to Model Nutrient Loads to Water Quality
in the Chesapeake Bay Watershed, Version 3.0 (2004)
<http://hd.water.usgs.gov/publications/2004-1433/>

For more information, visit www.chesapeakebay.net
Disclaimer: www.chesapeakebay.net/fisheries/faq



Created by JW, 2/12/08

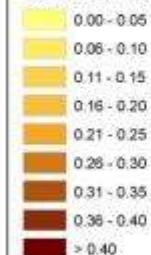
UTM Zone 18N, NAD 83

All Sources of Total Phosphorus

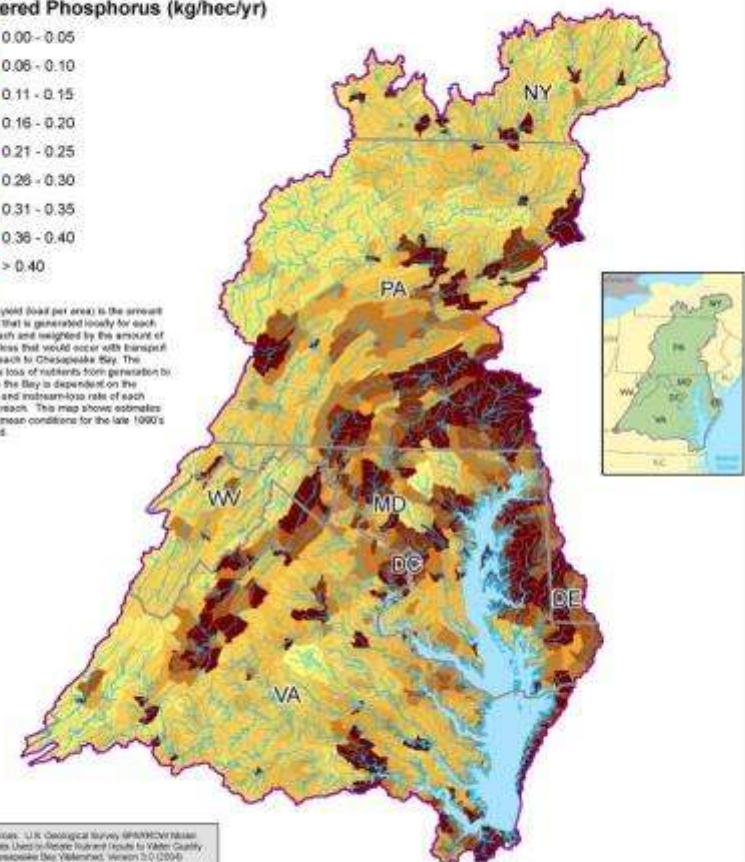
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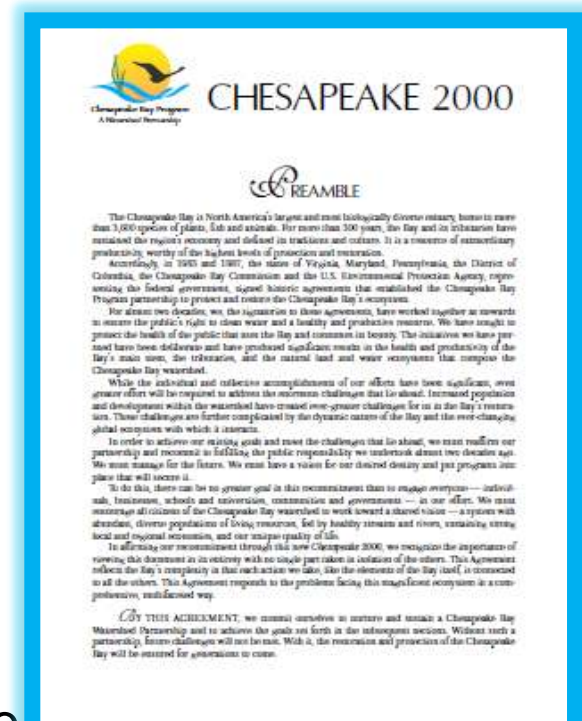
Created by JW, 2/13/08

UTM Zone 18N, NAD 83

Chesapeake Bay Restoration

Where We've Been

- **1983 Chesapeake Bay Agreement**
 - Formation of Executive Council (MD, VA, PA governors, DC mayor, EPA administrator & CBC Chair)
- **1987 Chesapeake Bay Agreement**
 - Goal to reduce N&P 40% by Y2K
- **Chesapeake 2000 – Agreed to**
 - Set WQ conditions to protect living resources
 - Establish specific nutrient load reductions
 - Establish Tributary Strategies to meet load reductions
 - Headwater states signed
- **Tributary Strategies - 2004**
 - Each state established Tributary Strategies to achieve cap loads by **2010**

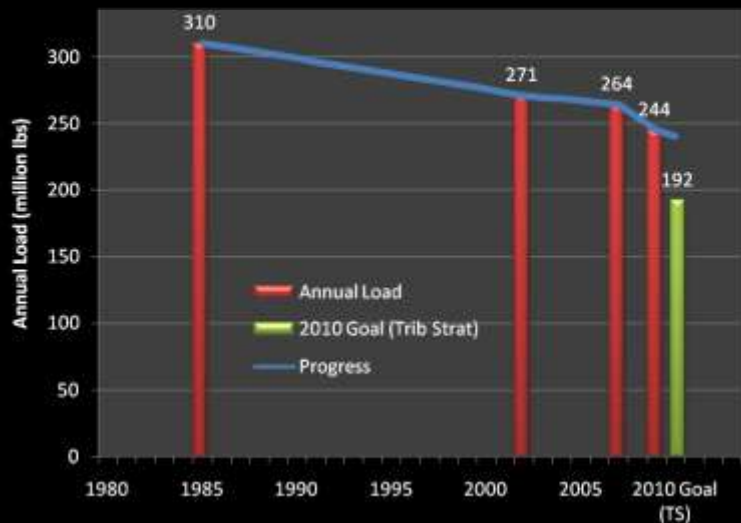
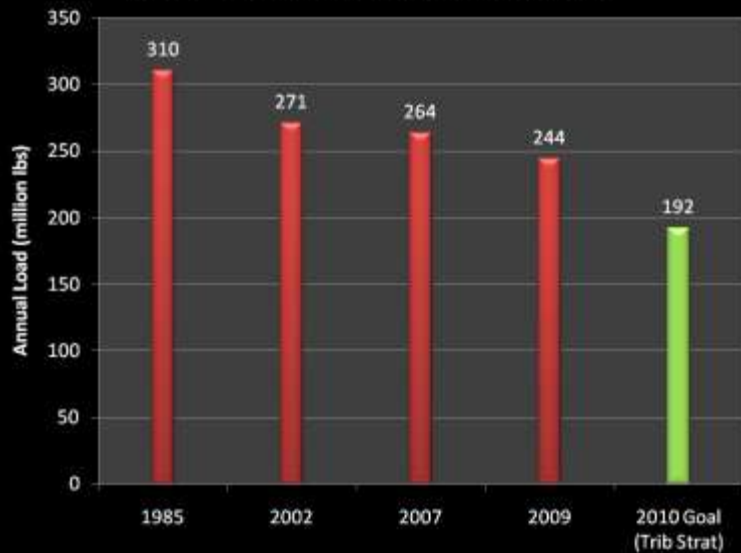


Chesapeake Bay Restoration

Where We've Been – Progress Toward Voluntary Goals

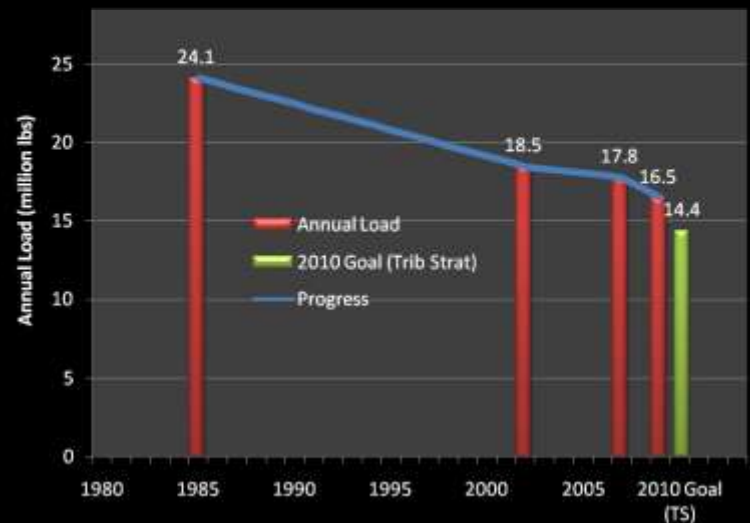
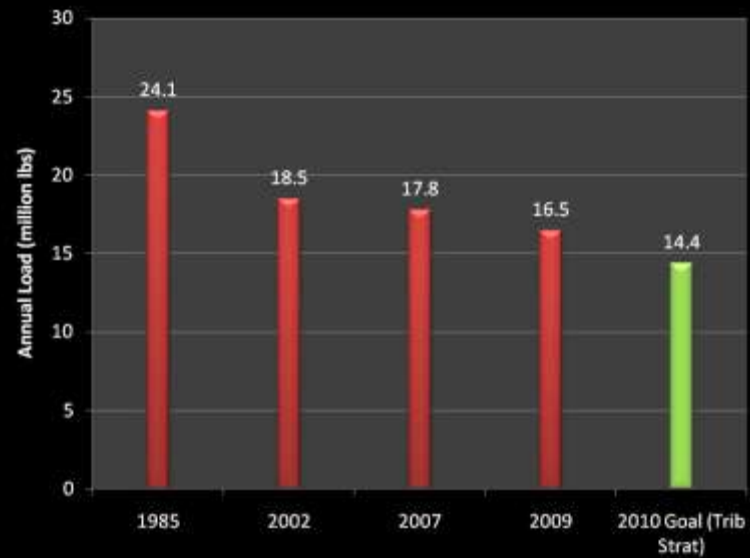
Baywide - Total Annual Nitrogen Load

(CBP Watershed Model Phase 5.3, Jul-30-2010, with air)



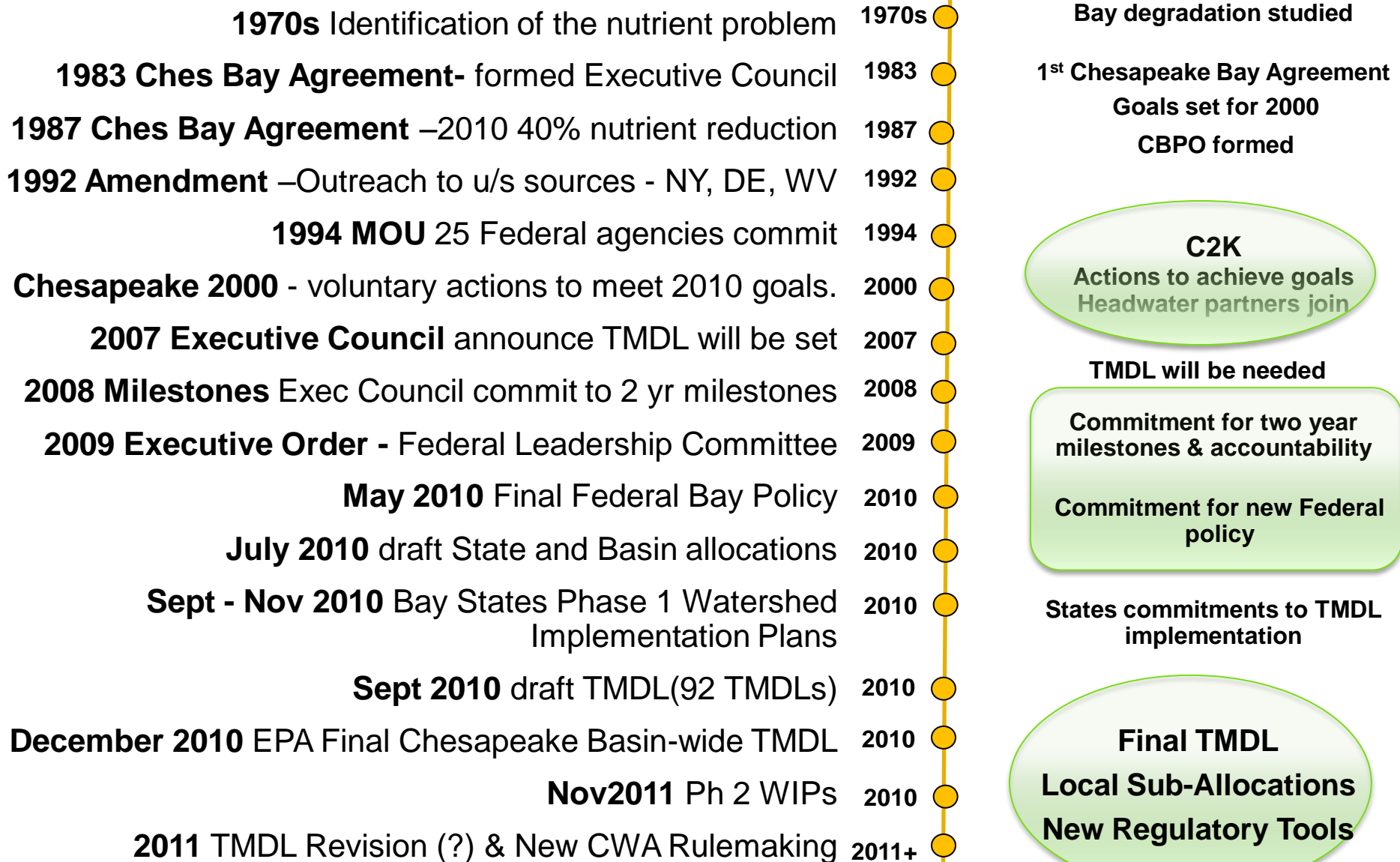
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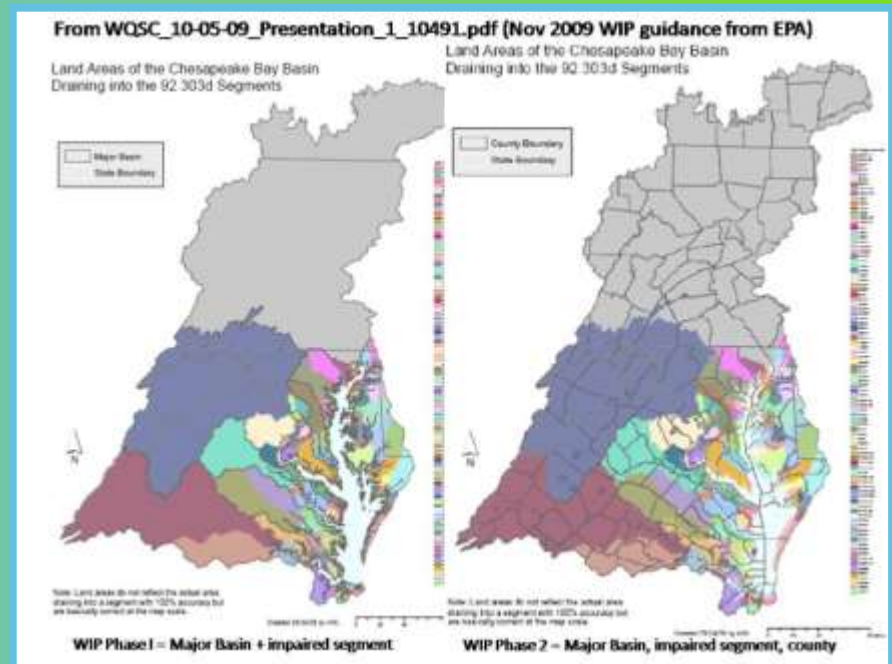
Chesapeake Bay Restoration

Where We've Been - Program History



Chesapeake Bay Restoration

Where We Are – *WIPPING up the TMDL*



Accountability Framework - A New Era of Oversight

Accountability Framework Defined

- December 29, 2009 - EPA finalized new roadmap for accelerating restoration
 - Evolved Sept 2008 – Dec 2009, core issues over NPS authority & definition of “reasonable assurance”

Accountability Framework



Bay
TMDL

Executive
Order
13508

CWA
Authorities

- Restoration through framework based on:

1. The Chesapeake Bay TMDL
2. Executive Order - EO13508 Chesapeake Bay Restoration & Protection (Federal Leadership)
3. The authorities of the Clean Water Act

Dec 2010

May 2010

2011+

AECOM

Accountability Framework - A New Era of Oversight

Basinwide TMDL

TMDL to be finalized December 2010

- Load limits for N, P, Sediment
- Eight major basins, 92 jurisdictional sub-basins = 92 allocations, each including:
 - Waste Load Allocations (WLA)
 - Load Allocations (LA)
 - Margin of Safety

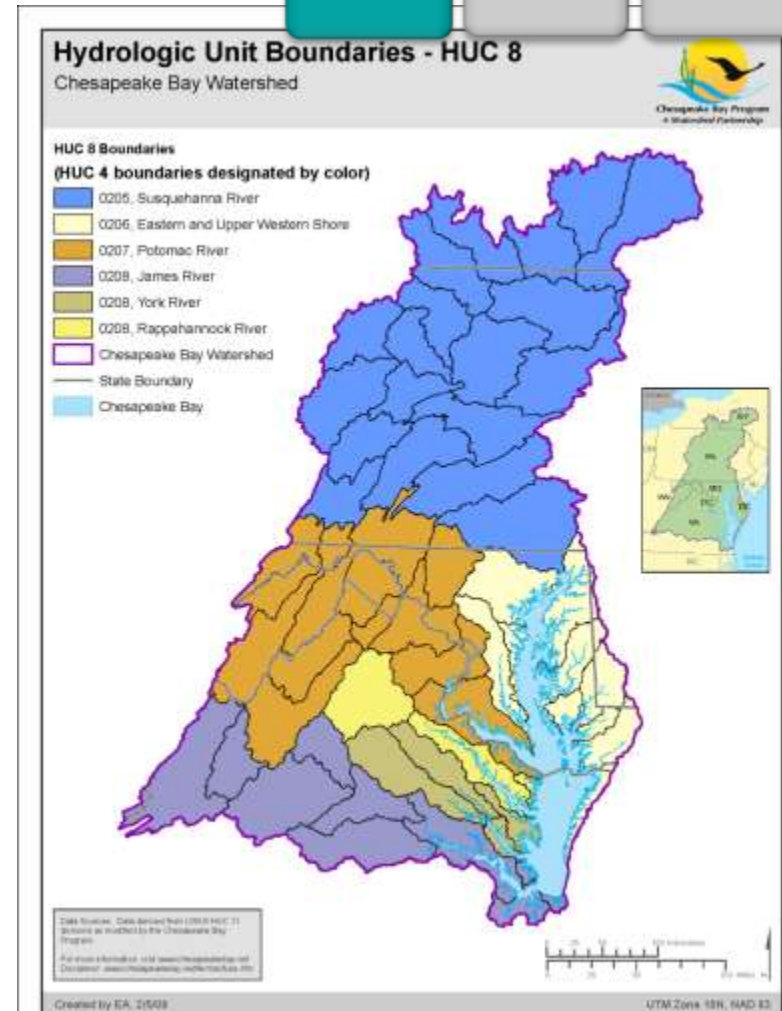
Accountability Framework



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WLAs = point sources = WWTPs, IWTPs, MS4, industrial SW, construction outside MS4, CAFOs

LAs = NPS sectors = non-CAFO ag, unregulated SW, OSDS, forest

Chesapeake Bay Restoration – WIPPING up the TMDL

Accountability Framework

➤ Executive Order 13508 - Bay Restoration Strategy (May 2010)

1. WIPs - *Watershed Implementation Plans* describing state actions
2. Metrics - The jurisdictions must meet 2 year milestones for implementing pollution controls
3. Consequences - EPA may impose a variety of consequences for inadequate plans or failure to meet the milestones

Consequences

Accountability Framework



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- State grants *to improve permitting, enforcement and other key regulatory activities*

State
Actions

“...we’re increasing support and accountability to be sure we get the job done.”



---Lisa Jackson, Dec 29, 2009

AECOM

Accountability Framework - A New Era of Oversight

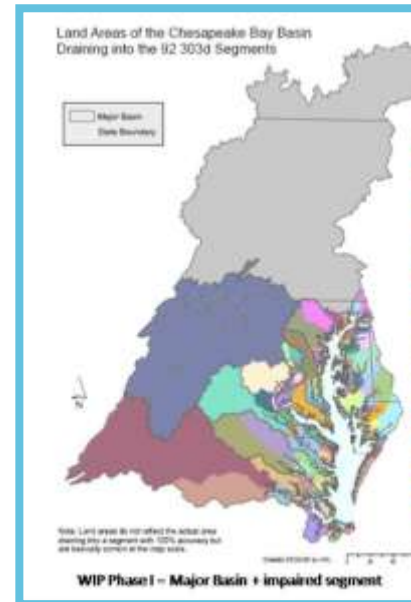
The Schedule

WIP = State Watershed Implementation Plan

WIP & TMDL Schedule:

- Phase 1 Draft WIPs Sept 1, 2010
- Draft TMDL Sept 24, 2010
- Phase 1 Final WIPs Nov 29, 2010
- **Final TMDL Dec 31, 2010**
- Phase 2 WIPs Nov 1, 2011
- Phase 3 WIPs Nov 1, 2017

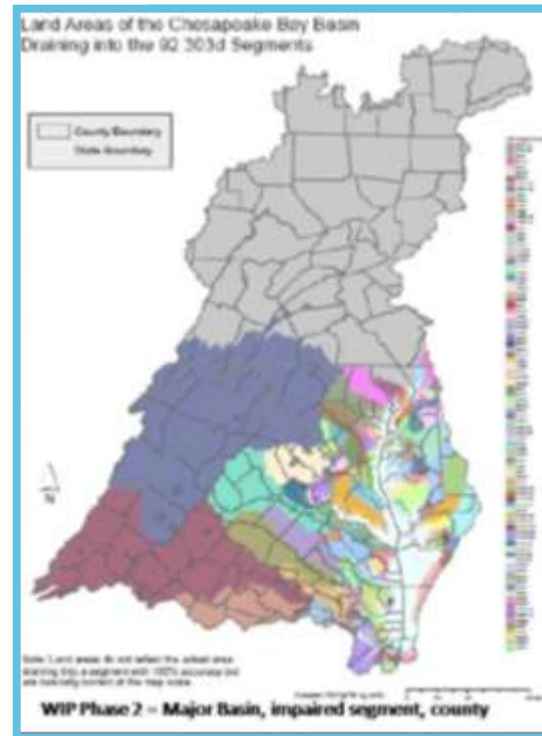
- EPA establishes annual load targets for N, P, S for major basins & jurisdictions
- States divide targets into NPS sectors & point sources in each impaired segment
- States provide description of authorities, actions, and control measures
- EPA finalizes annual limits



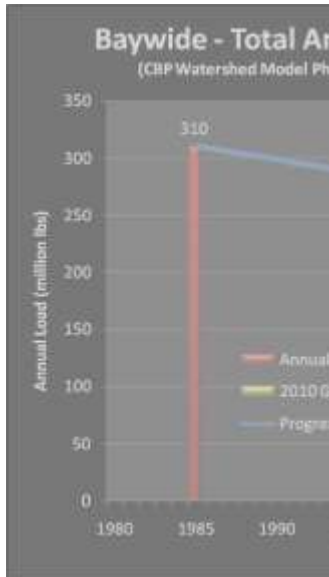
Chesapeake Bay Restoration

Where We Are – WIPPING Up the TMDL

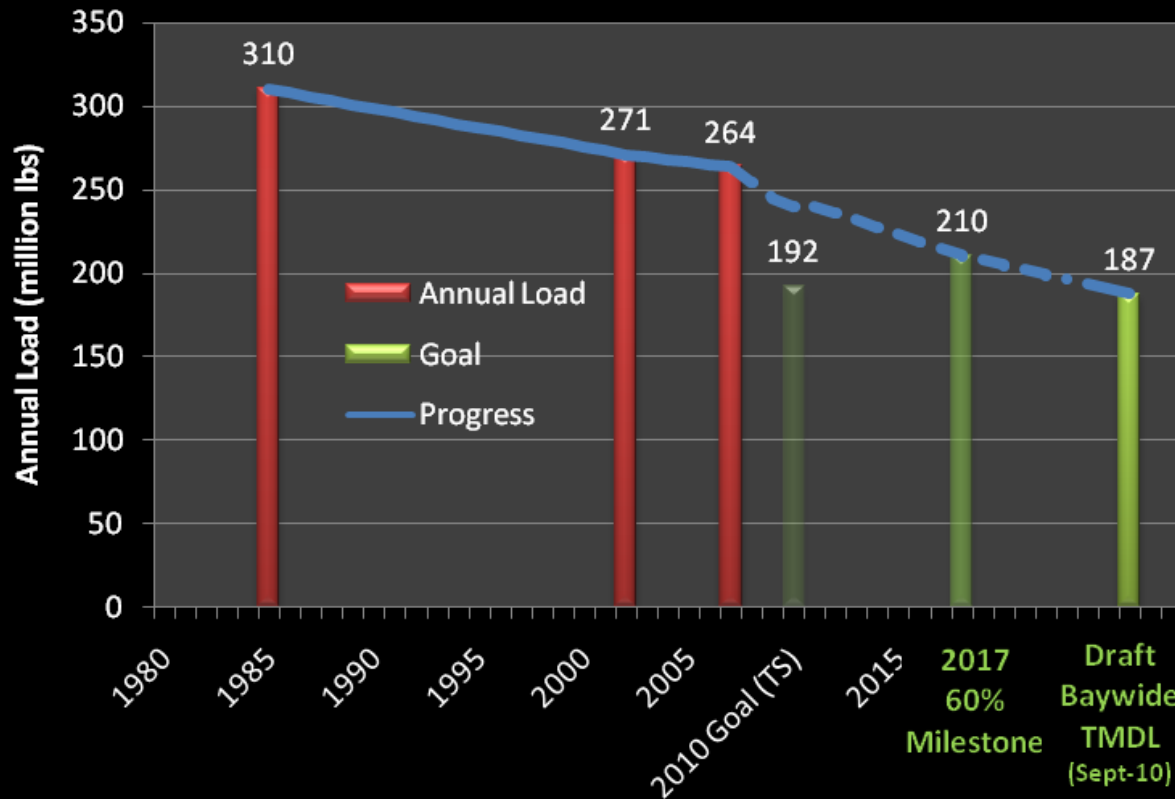
- Phase 2 WIPs (2011)
 - Allocate LAs and WLAs to county scale
 - Sub-allocation to watersheds, facilities or sources
 - Detailed targets and schedule, tracking and reporting protocols



Where We Are – The Chesapeake Bay TMDL Draft (September 24) – To be finalized December 2010

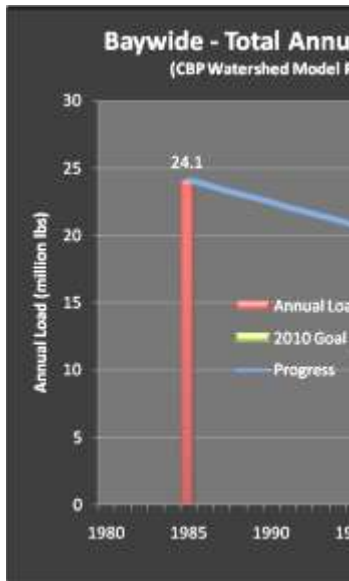


Baywide - Total Annual Nitrogen Loads Progress to Date Compared to Goals (CBP Watershed Model Phase 5.3, Jul-30-2010, excluding air)

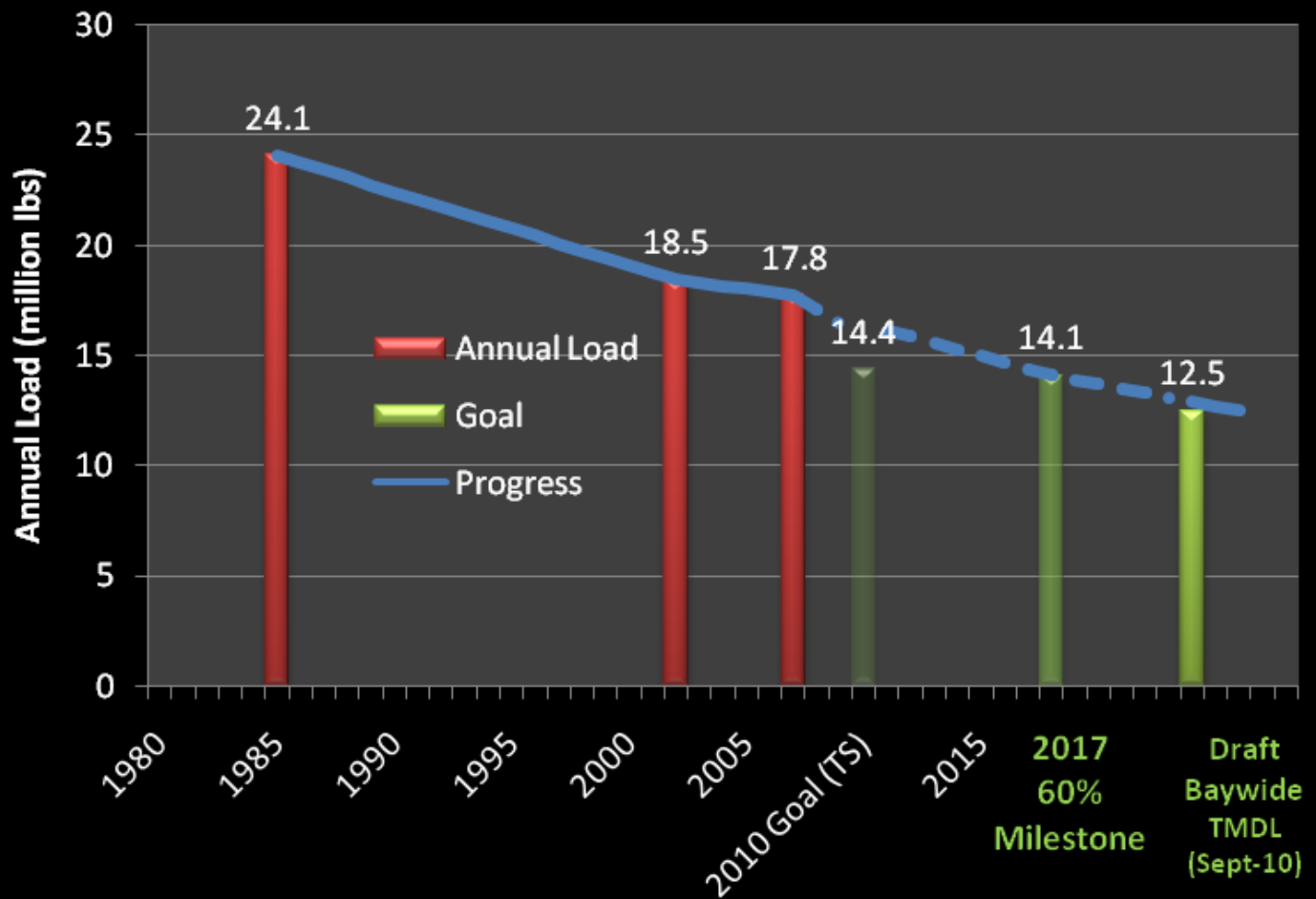


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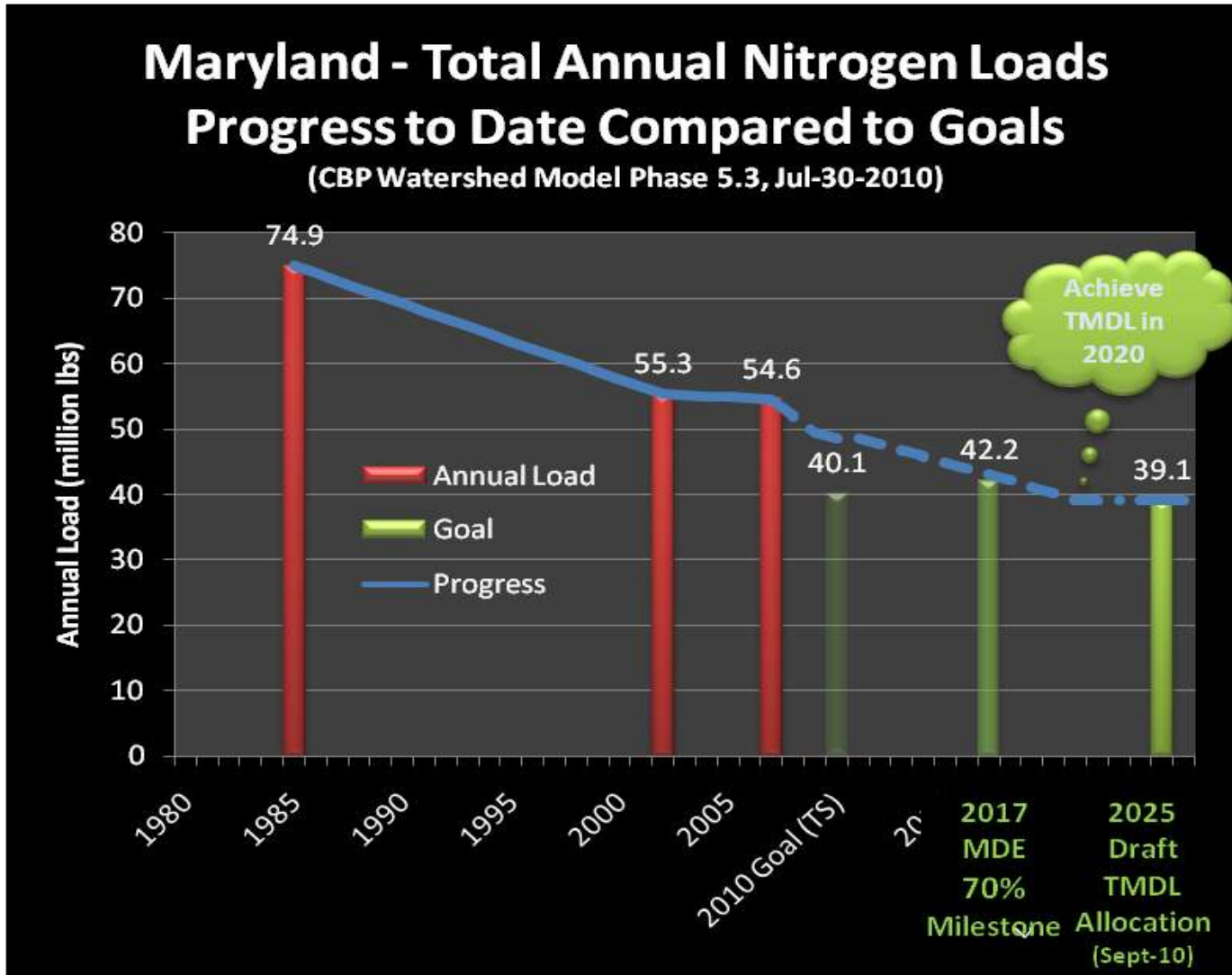


Baywide - Total Annual Phosphorus Loads Progress to Date Compared to Goals (CBP Watershed Model Phase 5.3, Jul-30-2010)



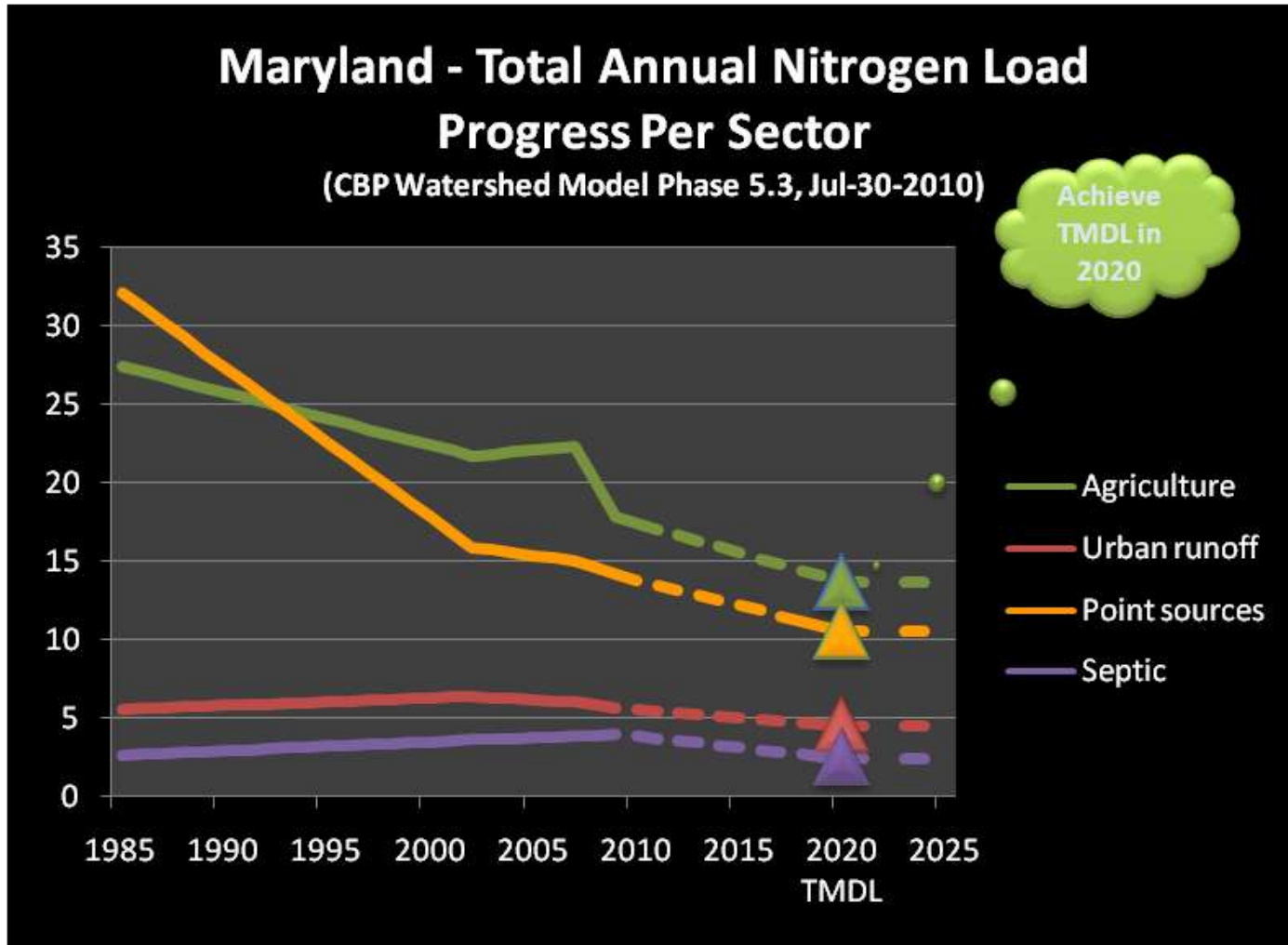
Where We Are – The Chesapeake Bay TMDL

Maryland's Progress



Where We've Been

Maryland – By Sector



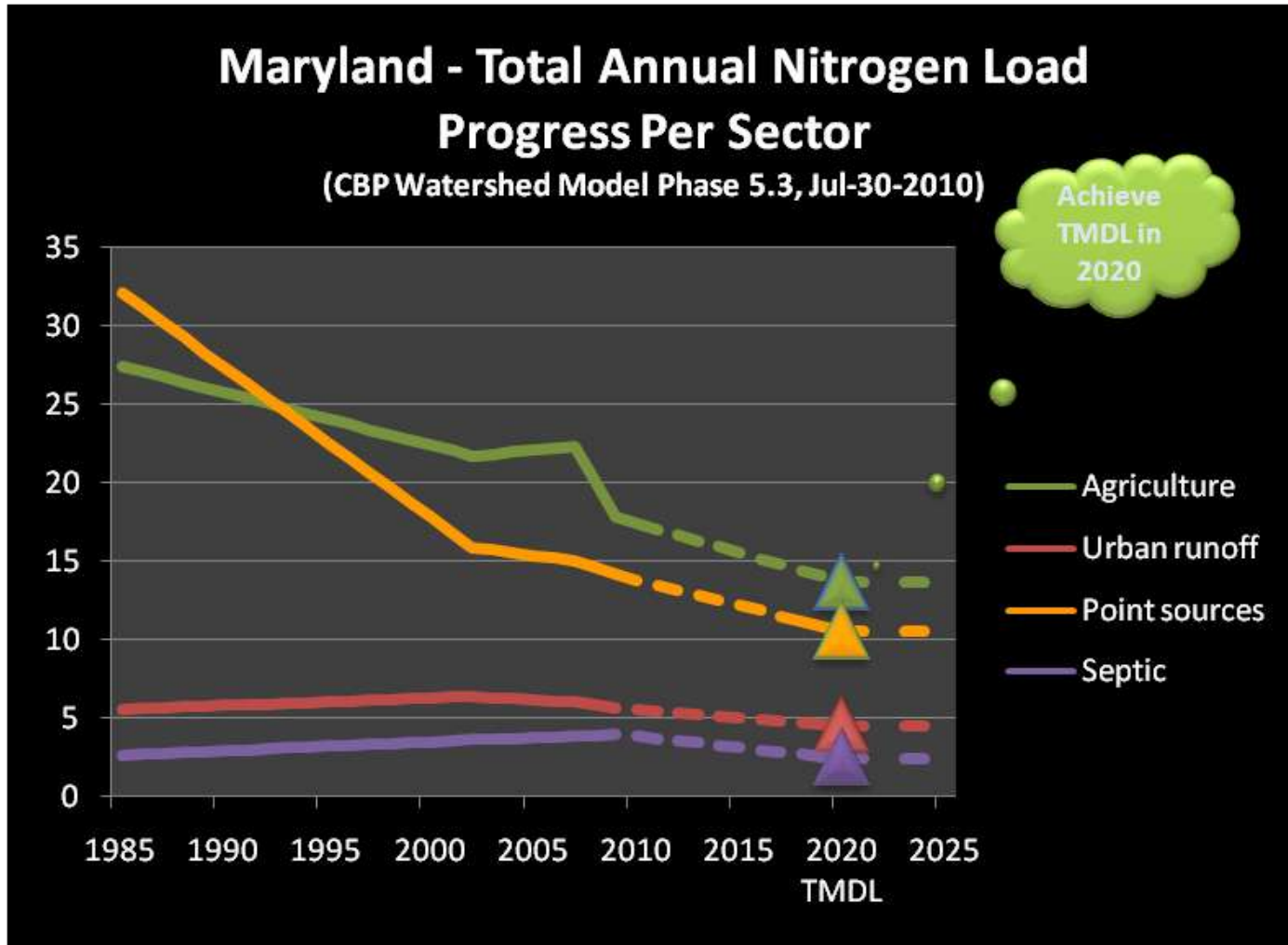
Chesapeake Bay Restoration

Where We're Going



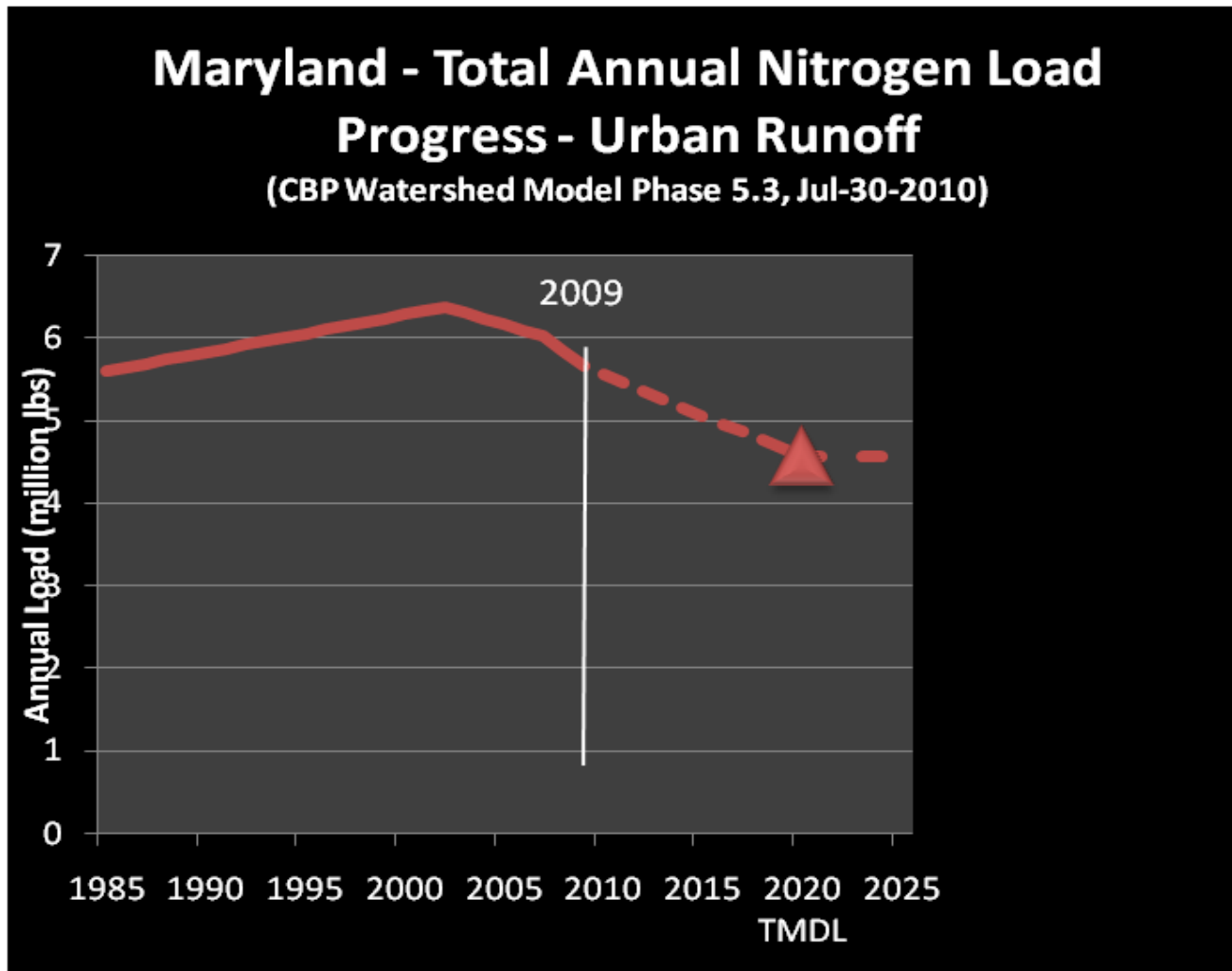
Where We're Going

Maryland – By Sector



Where We're Going

Maryland - Stormwater

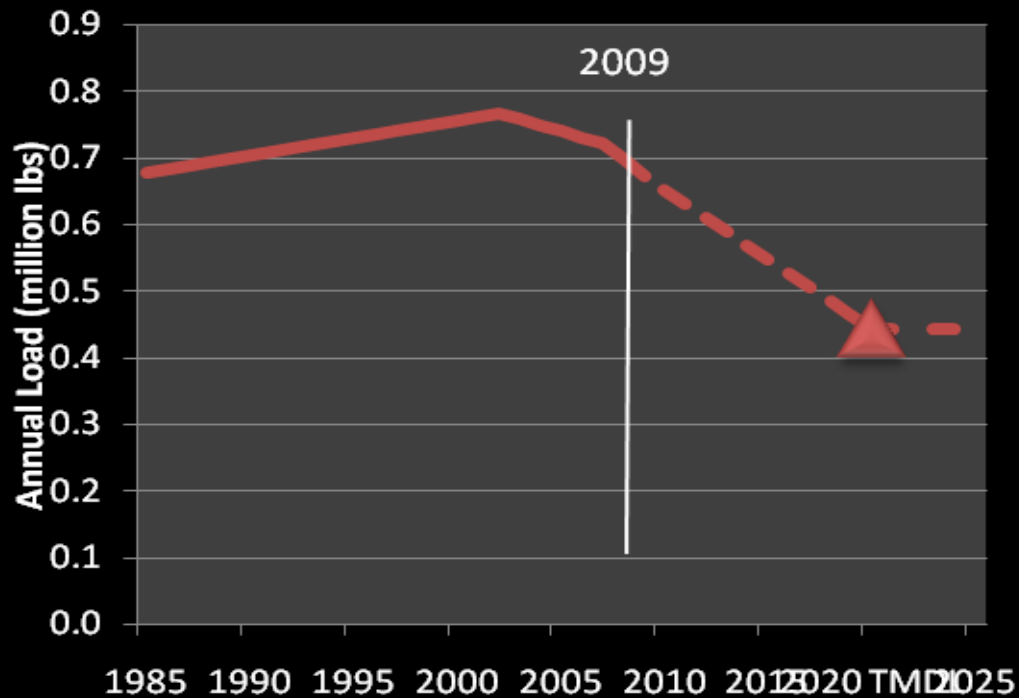


Where We're Going

Maryland - Stormwater

Maryland - Total Annual Phosphorus Load Progress - Urban Runoff

(CBP Watershed Model Phase 5.3, Jul-30-2010)



Chesapeake Bay Restoration

How We're Getting There



Where We're Going

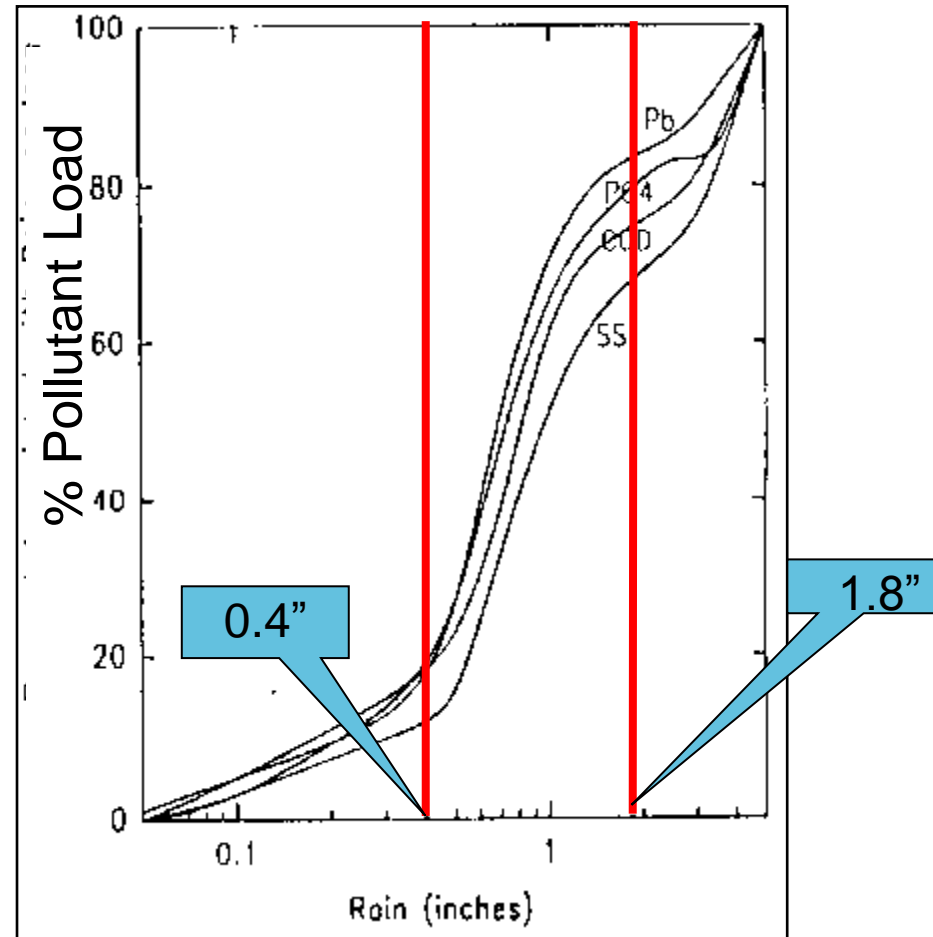
Maryland - Stormwater

Urban Stormwater Hydrology

- Most of the pollutants in stormwater runoff come from small and moderate size storms
- Smaller storms are much more frequent and account for majority of runoff



Percent pollutant load



Accountability Framework - A New Era of Oversight

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Dec 2010

May 2010

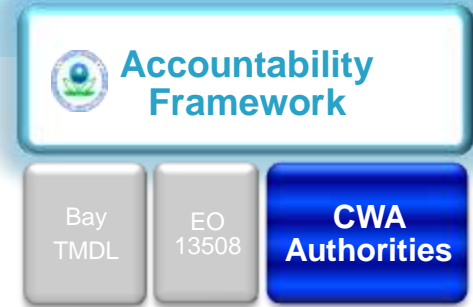
2011+

AECOM

Accountability Framework - A New Era of Oversight

Clean Water Act Authorities

Proposed Rulemaking Oct 26, 2009 Post-Construction Stormwater Management



Stormwater - Expand MS4 program to include high-growth areas & strengthen standards

- Expand NPDES program
- Establish SWM standards
- Align the program with 2008 NRC recommendations

KEY NRC Report Recommendations

"A straightforward way to regulate stormwater contributions to waterbody impairment would be to use flow or a surrogate impervious cover, as a measure of stormwater loading"



"Efforts to reduce stormwater flow will automatically achieve reductions in pollutant loading. Moreover, flow is itself responsible for additional erosion and sedimentation that adversely impacts surface water quality."



"Stormwater control measures that harvest, infiltrate, and evapotranspire stormwater are critical to reducing the volume and pollutant loading of small storms."



Accountability Framework - A New Era of Oversight

Clean Water Act Authorities

Proposed Rulemaking: Oct 26, 2009
Post-Construction Stormwater Management
Current Considerations



Accountability Framework

Bay TMDL

Executive Order 13508

CWA Authorities

Expand permitting beyond urban

Post-construction SWM stds

Uniform requirements for all MS4s

Retrofit existing development

Chesapeake Bay add'l requirements

- Expand to developing areas
- County or other jurisdictional boundaries?
- Criteria to define permit area: % impervious?
- Cover specific types or sizes of development?

- Mimic natural infiltration, recharge evapotranspiration, harvest & reuse
- Considering storm size stds, imperv limits, site by site, regional criteria
- Same for new vs redevelopment?

- To replace Phase I & II
- Apply Phase I inspection, monitoring, other to all
- Apply 6 Minimum Control Measures to all
- Require all to control industrial discharges

- Require retrofit in all MS4s?
- Require retrofit plans
- Require plan implementation
- Start with large MS4s?
- Limit to WQ impaired waters?

- Additional rules for active construction
- Buffer requirements
- Further extend area of coverage
- May apply Chesapeake Bay rules to other sensitive areas of US



Reduce Runoff

Residual Designation


Retrofit

AECOM

Accountability Framework - A New Era of Oversight

Clean Water Act Authorities

Proposed Rulemaking: Oct 26, 2009
Post-Construction Stormwater Management
Current Considerations


Accountability Framework
 Bay TMDL Executive Order 13508 **CWA Authorities**



Chesapeake Bay add'l requirements

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Reduce Runoff

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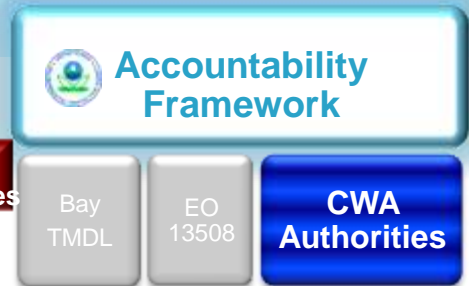
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Clean Water Act Authorities

New Rulemaking: October 15, 2009

Clean Water Act Enforcement Plan

("Clean Water Act Action Plan" after Feb 22, 2010)



- Improve national WQ compliance & enforcement program:
 - **Target enforcement to most important problems**
 - stormwater (urban streets& construction sites)
 - CSOs & sanitary sewer overflows
 - CAFOs
 - **Strengthen oversight of the states**
 - Ensure that states protect WQ and consistently apply the law through permits & vigorous enforcement
 - EPA to disapprove permits & pursue federal enforcement if states too lenient
 - **Improve transparency and accountability**
 - Electronic reporting & make data available to the public

State Actions

Accountability Framework - A New Era of Oversight

Clean Water Act Authorities

New Strategy: May 12, 2010 Chesapeake Bay Compliance and Enforcement Strategy

- Key elements of the Strategy include:
 - Identify significant dischargers of industrial, municipal, agricultural pollutants in
 - Identify nutrient & sediment impaired watersheds
 - Target key regulated non-compliant business sectors”
 - CAFOs
 - WWTPs and IWTPs
 - Stormwater NPDES point sources including MS4s, construction & industrial
 - Air deposition sources of nitrogen regulated under CAA, including power plants
- Identify compliance and enforcement opportunities

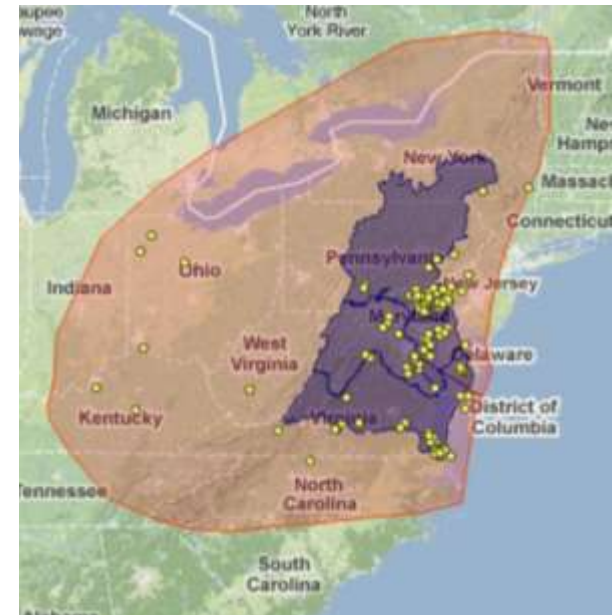


Accountability Framework

Bay TMDL

EO 13508

CWA Authorities



Enforcement
Fines & Consent Decrees

Chesapeake Bay Restoration

How We're Getting There – State WIPs

WIP “Actions” to reduce nutrient & sediment include:

- Increased stormwater control
- Expansion of permit coverage
- Increased requirements in revised MS4 permits
- Enforcement
- New offset and trading programs (nutrients & ecosystem)

WIP “Contingencies” - WIPs will describe measures to be taken if progress is not achieved, such as:

- State-imposed impervious fees
- Require conversion of non-performing OSDS to public sewer
- **Development offset requirements**
- **Restrictions on new permits**



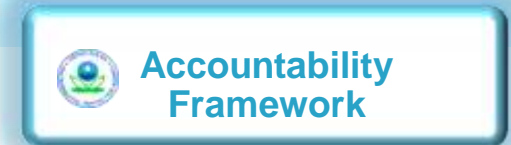
Consequences

Development Controls

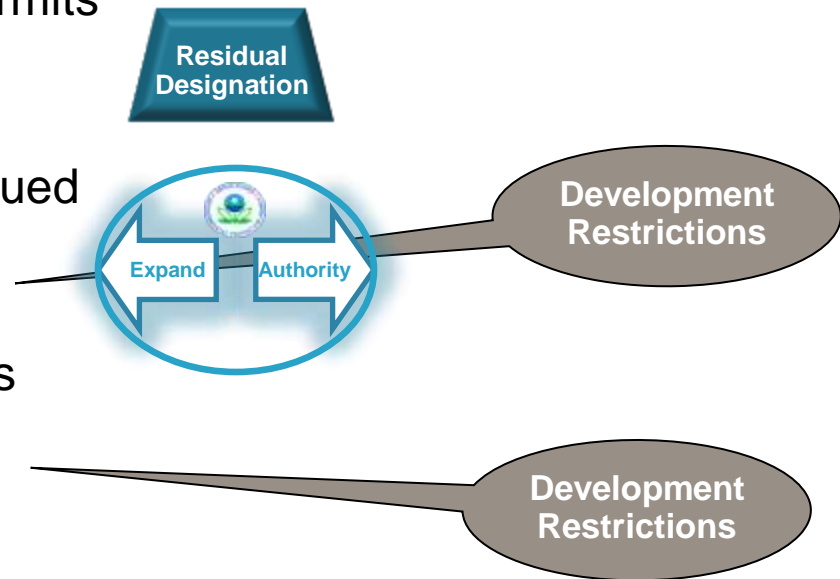
Accountability Framework - A New Era of Oversight

EPA Consequences

- **The jurisdictions (States) must meet 2-year milestones**
- EPA may impose a variety of consequences for inadequate plans or failure to meet the milestones, including:
 1. Expand coverage of NPDES permits to sources that are currently unregulated
 2. Increasing oversight of state-issued NPDES permits, e.g., object to permits
 3. Require net improvement offsets



Residual Designation. The CWA recognizes that sources such as commercial properties may need to be regulated on a case-by-case basis.



Accountability Framework - A New Era of Oversight

EPA Consequences



Accountability Framework

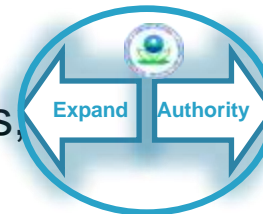
Bay TMDL

Executive Order 13508

CWA Authorities

- EPA consequences, continued:

4. Establish finer scale WLAs and LA's in the Bay TMDL than those proposed in the WIPs, e.g., to MS4s



5. Require additional reductions from point sources, e.g., **reallocate NPS reductions to point sources such as WWTPs & CAFOs**

Push WWTPs to LOT(\$\$\$), and/or Development Restrictions

6. Increase and target federal enforcement and compliance – air & water



7. Condition or redirect EPA grants

8. **Federal promulgation of local nutrient WQ standards** where states not protective of designated uses



Control or Redirect Development

Implications and Strategies



Implications

Emphasis on Runoff Control

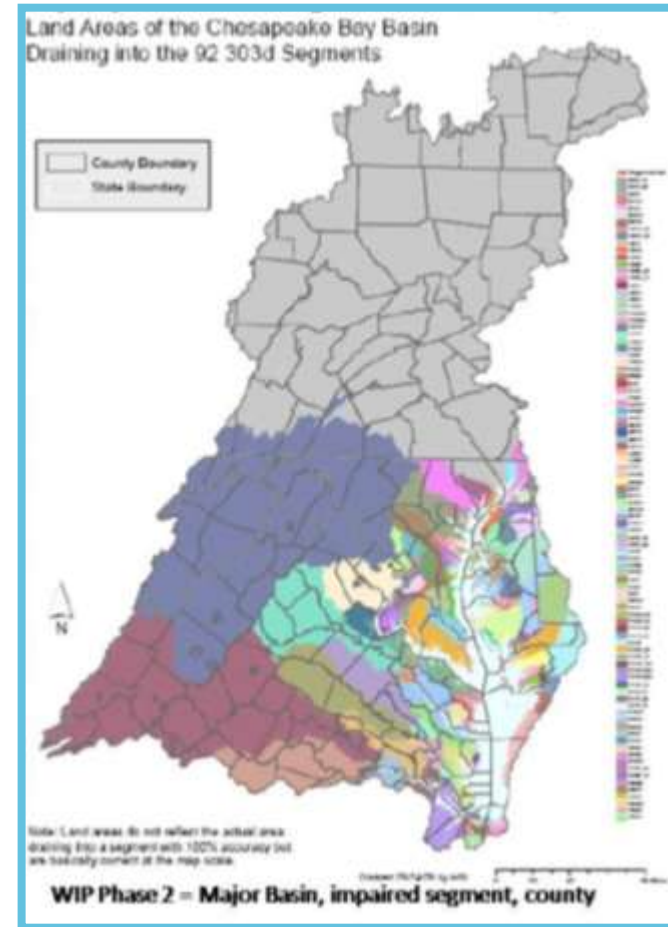
1. New regulations
2. Onsite control of frequent storm events
3. Water quality retrofit programs
4. Performance requirements tied to permits
5. Accountability through annual reporting
6. Nutrient and sediment reduction
7. New design, construction and operational standards
8. New growth and redevelopment challenges
9. Market based incentives
10. More \$\$ investment – stormwater utilities, increased public awareness



Strategies to Prepare for TMDL

Data + Science + Watershed & Process Knowledge

1. NPDES permit compliance
2. Plan capital improvement & funding needs
3. Plan organizational & program needs
4. Prepare development planning & offset strategies to restore or maintain water quality
5. Monitor (participate in) state technical assessments & sub-allocation discussions
6. Strengthen database and reporting of current SWM practices
7. Strengthen BMP effectiveness data (monitoring)
8. Keep excellent records (credit “confidence level”, NPDES compliance, unknowns, etc)
9. Educate



Thank You

jane.mcdonough@aecom.com

301-362-5284

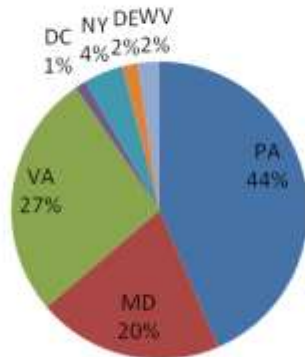


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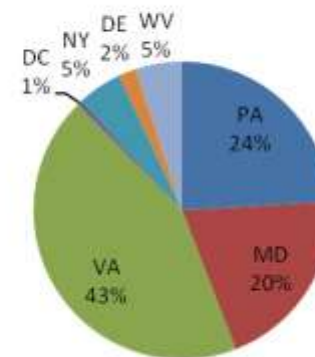
Where We've Been – Progress Toward Voluntary Goals

- Current (2009) Load by Jurisdiction (million lbs/year)

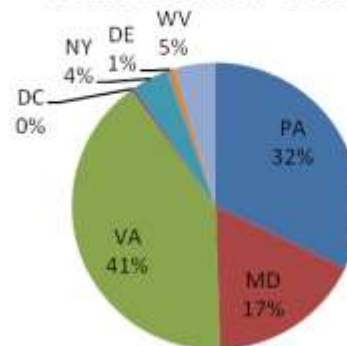
Total Annual Nitrogen Loads by Jurisdiction - 2009



Total Annual Phosphorus Loads by Jurisdiction - 2009



Total Annual Sediment Loads by Jurisdiction - 2009



Watershed Conditions

Relative Contribution from Drainage Basins

WATERSHEDS

1. Susquehanna River
2. Potomac River
3. Rappahannock River
4. James River
5. Upper Western Shore
6. Patapsco and Back Rivers
7. Lower Western Shore
8. Patuxent River
9. York River
10. Elizabeth River
11. Upper Eastern Shore
12. Choptank River
13. Lower Eastern Shore

