Scenario for E3 "Everything, Everywhere by Everyone"

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E3 Scenario

- The E3 scenario is a "what-if" scenario of watershed conditions with theoretical maximum levels of managed controls on load sources.
  - There are no cost and few physical limitations to implementing BMPs for point and non-point sources in E3.
  - It's a what-if scenario, one of several reference points.
- It is used with the No-Action scenario to define "controllable" loads, the difference between No-Action and E3 loads.
  - "Controllable" loads are a component of the methodology to allocate target loads needed to meet water quality standards to different regions of the Chesapeake Bay watershed.
  - Planning targets also take into consideration the relative impacts of load reductions from regions throughout the watershed on water quality standards.

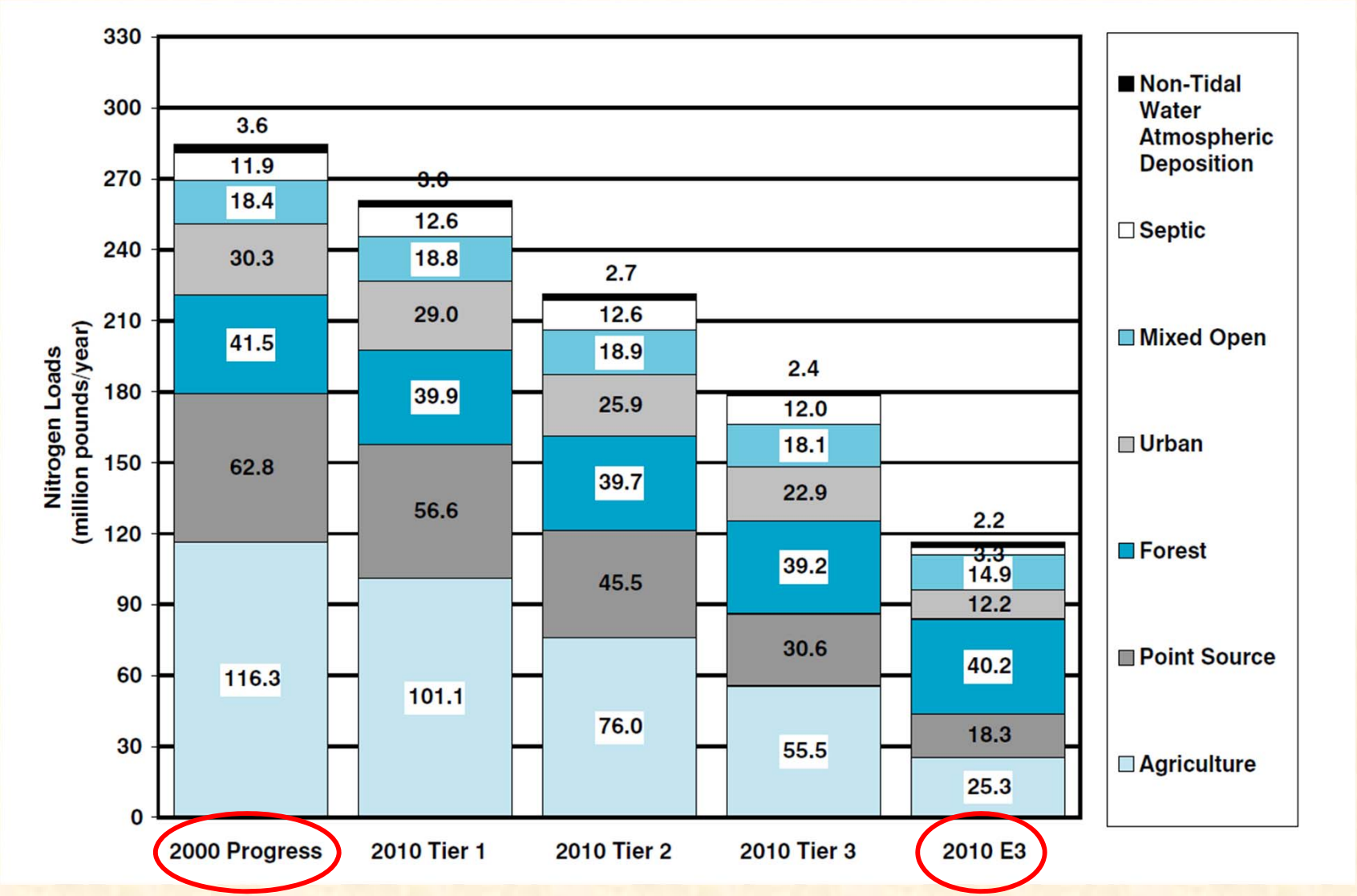
E3 Scenario

- Differences between No-Action and E3 scenario loads provide equity among regions of the Chesapeake Bay watershed in that assumptions of point source controls and nonpoint source practice and program implementation levels for both scenarios are spatially universal.
  - Differences among regions occur because of more "inherent" differences in, for example, animal and human populations, the number and types of wastewater facilities, agricultural land types and areas, urban land areas, atmospheric deposition, etc.
- Generally, E3 implementation levels and their associated reductions in nutrients and sediment could not be achieved for many practices, programs and control technologies when considering physical limitations and participation levels.
- No-Action and E3 scenario conditions can be determined for historic years (beginning around 1985), current year, or projected future years.

E3 Scenario

- E3 includes most technologies, practices and programs that have been reported by jurisdictions as part of annual model assessments, Milestones, and WIPs – and that have been approved for use in progress assessments with the Chesapeake Bay Watershed Model.
  - For most non-point source BMPs, it is assumed that the load from every available acre of the relevant land area is being controlled by a suite of existing or innovative practices. In addition, management programs convert landuses from those with high-yielding nutrient and sediment loads to those with lower.
  - E3 does not include the entire suite of practices due to the goal of achieving maximum load reductions. BMPs that are fully implemented in the E3 scenario have been estimated to produce greater reductions than alternative practices that could be applied to the same land base.
  - E3 load reductions could be exceeded through greater effectiveness of practices and technologies in the future because of, for example, employment of new technologies and greater efforts on operation and maintenance.

E3 Scenario
Example



Nitrogen loads delivered to the Chesapeake Bay and its tidal tributaries by source for all loading scenarios (Progress + Tiers + E3); Chesapeake Bay Watershed Model (TMDL version)

E3 Scenario
Urban Practices

- E3 Stormwater Management
  - Regions with Karst topography (low permeability) and Coastal Plain Lowlands (high groundwater)
    - 50% of area – impervious cover reduction
    - 30% of area – filtering practices designed to reduce TN by 40%, TP by 60%, and SED by 80% from a pre-BMP condition
    - 20% of area – infiltration practices designed to reduce TN by 85%, TP by 85%, and SED by 95% from a pre-BMP condition
  - Ultra-urban regions – defined as high- and medium-intensity land cover
    - 50% of area – impervious cover reductions, e.g. cisterns and collections systems to capture rainwater for reuse
    - 30% of area – filtering practices, e.g., sand filters, bio-retention, dry wells
    - 20% of area – infiltration practices, e.g., infiltration trenches and basins
  - Other urban/suburban regions
    - 10% of area – impervious cover reduction
    - 30% of area – filtering practices, e.g. sand filters, bio-retention
    - 60% of area – infiltration practices

E3 Scenario

Urban Practices = MD Version

- E3 Environmental site design / low-impact development on new development
  - Environmental site design / low-impact development practices (or equivalent) applied to all urban growth
  - Environmental site design and low-impact development practices are designed to reduce TN by 50%, TP by 60%, and SED by 90% from a pre-BMP condition
- E3 Stormwater retrofits on existing urban
  - All old and recent development retrofitted with a suite of filtration practices (categorized as filters and vegetated open channels) that, in combination, are designed to reduce nutrient and sediment load from a pre-BMP condition as TN = 40%, TP = 60%, and TSS = 80%.

E3 Scenario
Urban Practices

- E3 Riparian forest buffers on urban
  - 10% of pervious riparian areas without natural vegetation (forests and wetlands) associated with urban lands are buffered as forest for each modeled hydrologic segment in the Chesapeake Bay watershed
  - The area of un-buffered riparian land is determined using the best available data 1) 1:24K National Hydrography Dataset, and 2) 2001 land cover
- E3 Tree planting on urban
  - Urban riparian forest buffers account for tree plantings in the urban sector

E3 Scenario
Urban Practices

- E3 Erosion & sediment controls
  - Controls of the runoff from 100% of construction areas
  - MD version = Controls of the runoff from all bare-construction landuse areas are assumed to be at a level so that the construction loads are equal to the nutrient and sediment edge-of-stream loads from pervious urban under E3 conditions
- E3 Nutrient management on urban
  - All pervious urban acres are under nutrient management in that there are no applications of fertilizer nutrients

E3 Scenario

Urban Practices for Phase 6 WSM

- There are several approved reports from the urban expert panels, USWG that should be considered and, if appropriate, incorporated with E3:
  - New State Stormwater Performance Standards
  - Stormwater Retrofits
  - Nutrient Management
  - Stream Restoration
  - Enhanced Erosion and Sediment Controls
  - Nutrient Discharges from Grey Infrastructure
  - Shoreline Erosion Control Practices (Shoreline Management)
  - Filter Strip/Stream Buffer Upgrade Expert Panel
  - Tree Planting/Expanded Tree Canopy
  - Etc.

Nutrient and Sediment Trends at the River Input Monitoring Stations

Monitoring station	Total nitrogen load		Total phosphorus load		Suspended-sediment load	
	Long term	Short term	Long term	Short term	Long term	Short term
SUSQUEHANNA RIVER AT CONOWINGO, MD	Improving	No trend	Degrading	Degrading	Degrading	No trend
POTOMAC RIVER AT WASHINGTON, DC	Improving	Improving	Improving	Improving	Improving	Improving
JAMES RIVER AT CARTERSVILLE, VA	Improving	No trend	Improving	Degrading	Degrading	Degrading
RAPPAHANNOCK RIVER NR FREDERICKSBURG, VA	Improving	Improving	No trend	No trend	No trend	Improving
APPOMATTOX RIVER AT MATOACA, VA	Improving	Degrading	Degrading	Degrading	No trend	Degrading
PAMUNKEY RIVER NEAR HANOVER, VA	No trend	Degrading	Degrading	No trend	Degrading	Degrading
MATTAPONI RIVER NEAR BEULAHVILLE, VA	Improving	Degrading	Improving	No trend	Improving	Improving
PATUXENT RIVER NEAR BOWIE, MD	Improving	Improving	Improving	Improving	Improving	Degrading
CHOPTANK RIVER NEAR GREENSBORO, MD	Degrading	Degrading	Degrading	Degrading	Improving	Degrading

Summary of long-term (1985-2014) and short-term (2005-2014) trends in nitrogen, phosphorus, and suspended- sediment loads for the River Input Monitoring stations.

[Improving or degrading trends classified as likelihood estimates greater than or equal to 66 percent]

Questions and Comments?