



Phase 6 Model Scenarios, E3 Update, and Schedule

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WQGIT Meeting
June 26, 2017



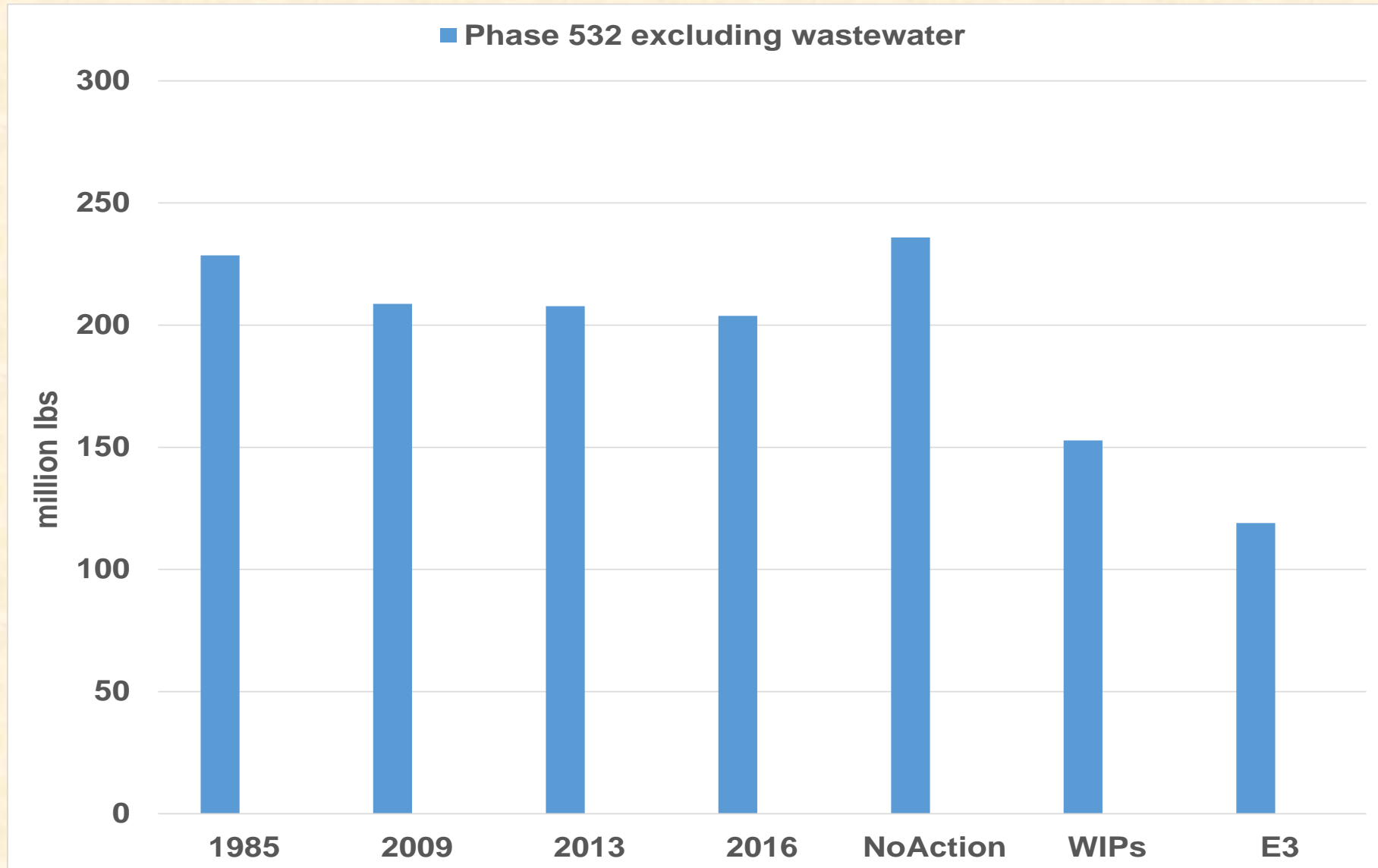
Initial Set of Phase 6 Model Scenarios

- 1985 – 2013 Progress, inclusive
 - BMP and wastewater data from jurisdictions for Phase 6 2014 Progress – 2016 Progress are due 9/1/17
- Phase II WIPs
- No-Action
- E3
 - No-Action and E3 are one component of the Planning Target calculations
 - Equity rule = Major river basins that contribute the most to the Bay water quality problems must do the most to resolve those problems (on a pound-per-pound basis)



Phase 5

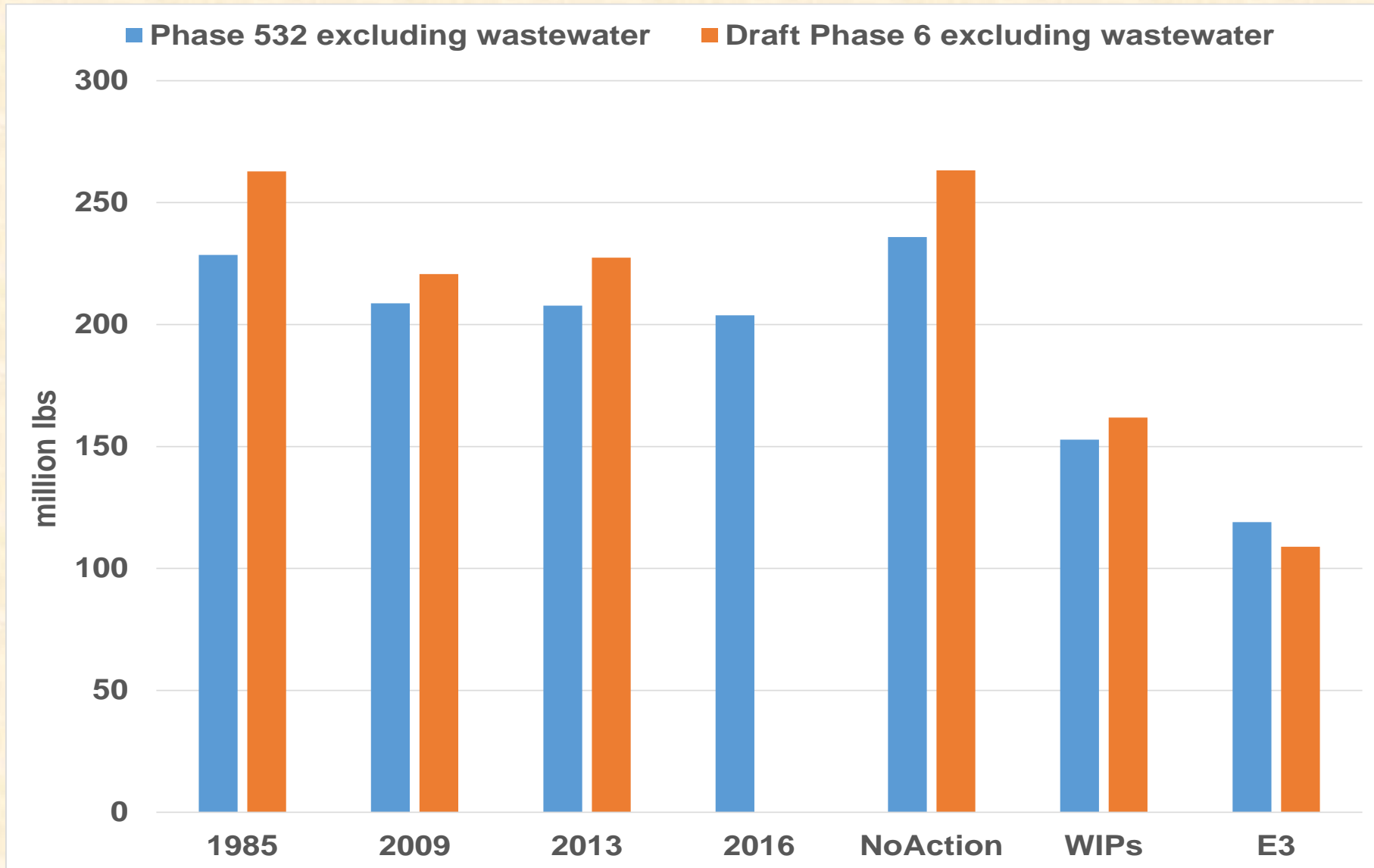
Nitrogen Loads, CB Watershed-wide (excludes wastewater)





Phase 5 and Phase 6

Nitrogen Loads, CB Watershed-wide (excludes wastewater)

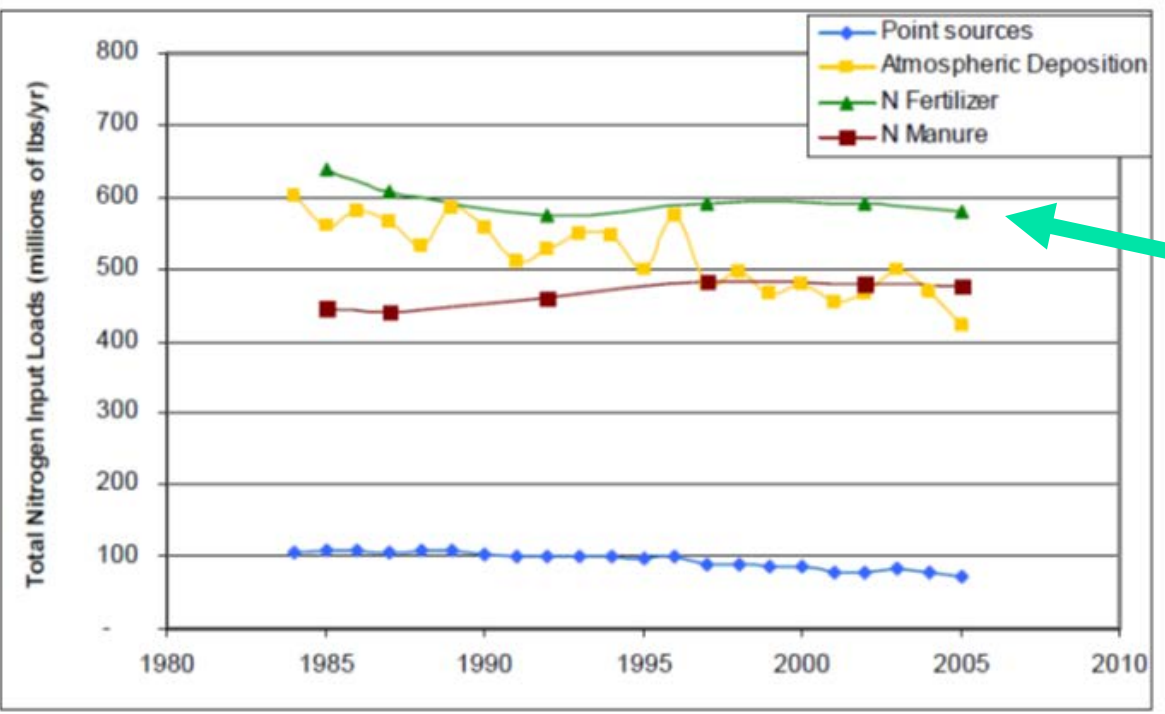




Initial Set of Phase 6 Model Scenarios

Big Changes from Phase 5 to Phase 6

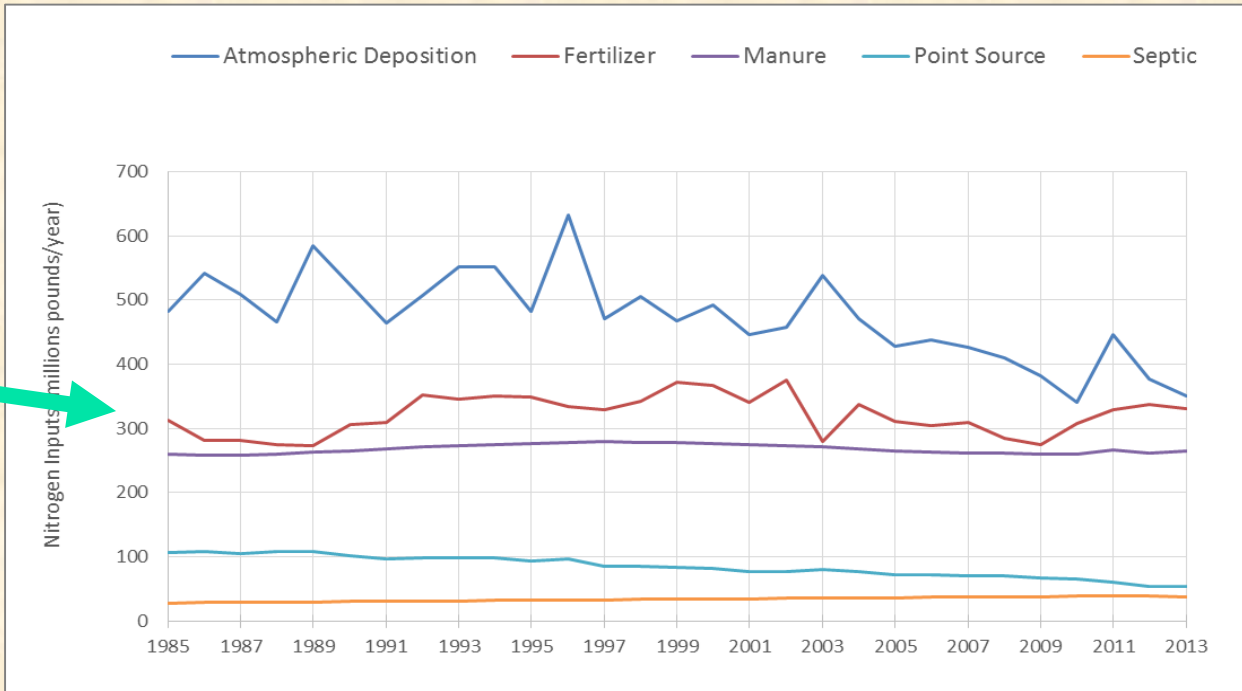
- **Inputs, inputs, inputs matter!**
- High resolution land use
- Nitrogen simulation simplified using multiple model approach
- Sediment simulation enhanced using NRCS RUSLE2 model
- Phosphorus simulation tied to soil P
- Regional factors removed
- Calibration improved!



Phase 5

Figure 5-1. Time series of atmospheric, fertilizer, manure, and point source total nitrogen input loads to the Chesapeake Bay Watershed Model (Phase 5.3 calibration).

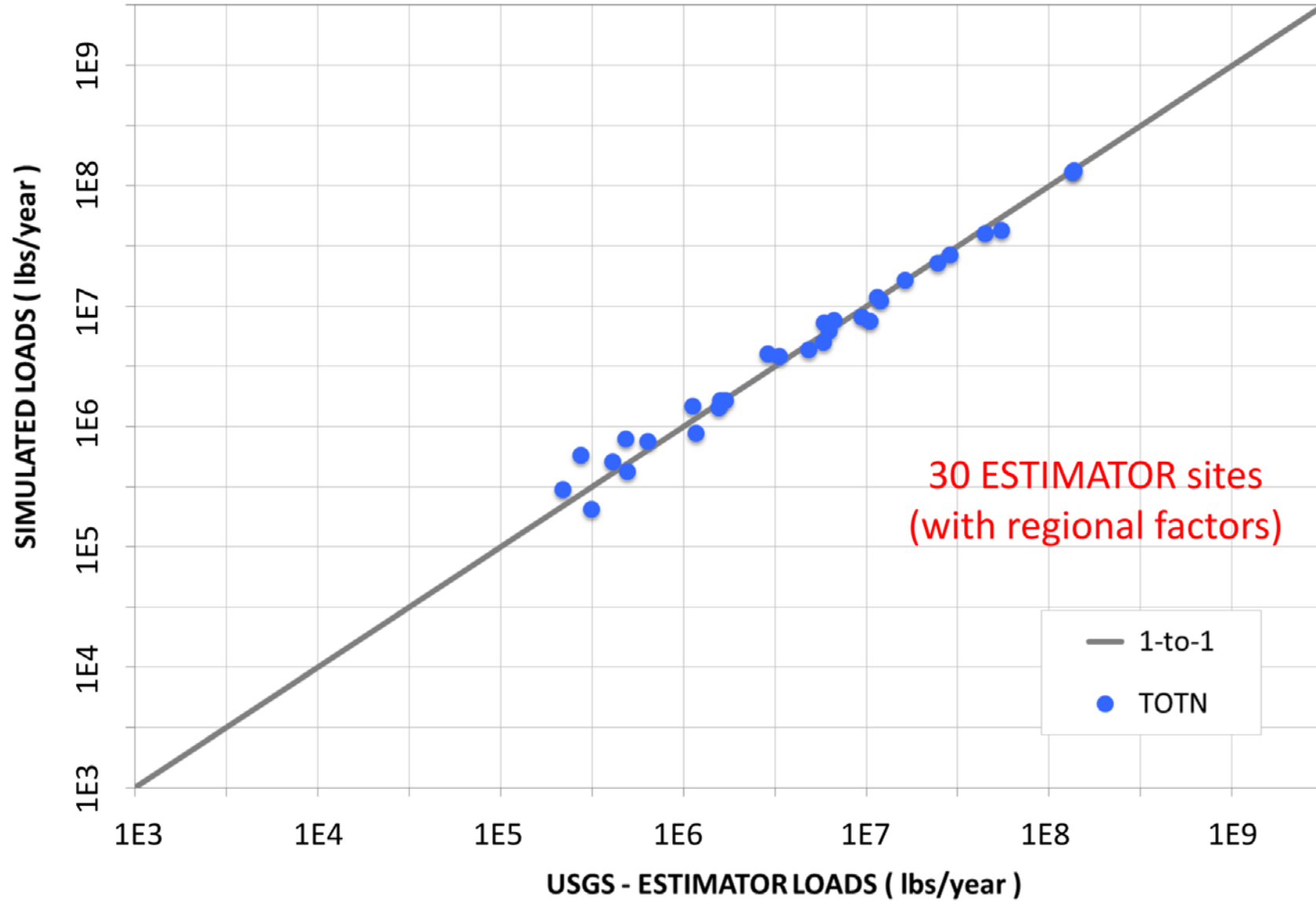
Phase 6

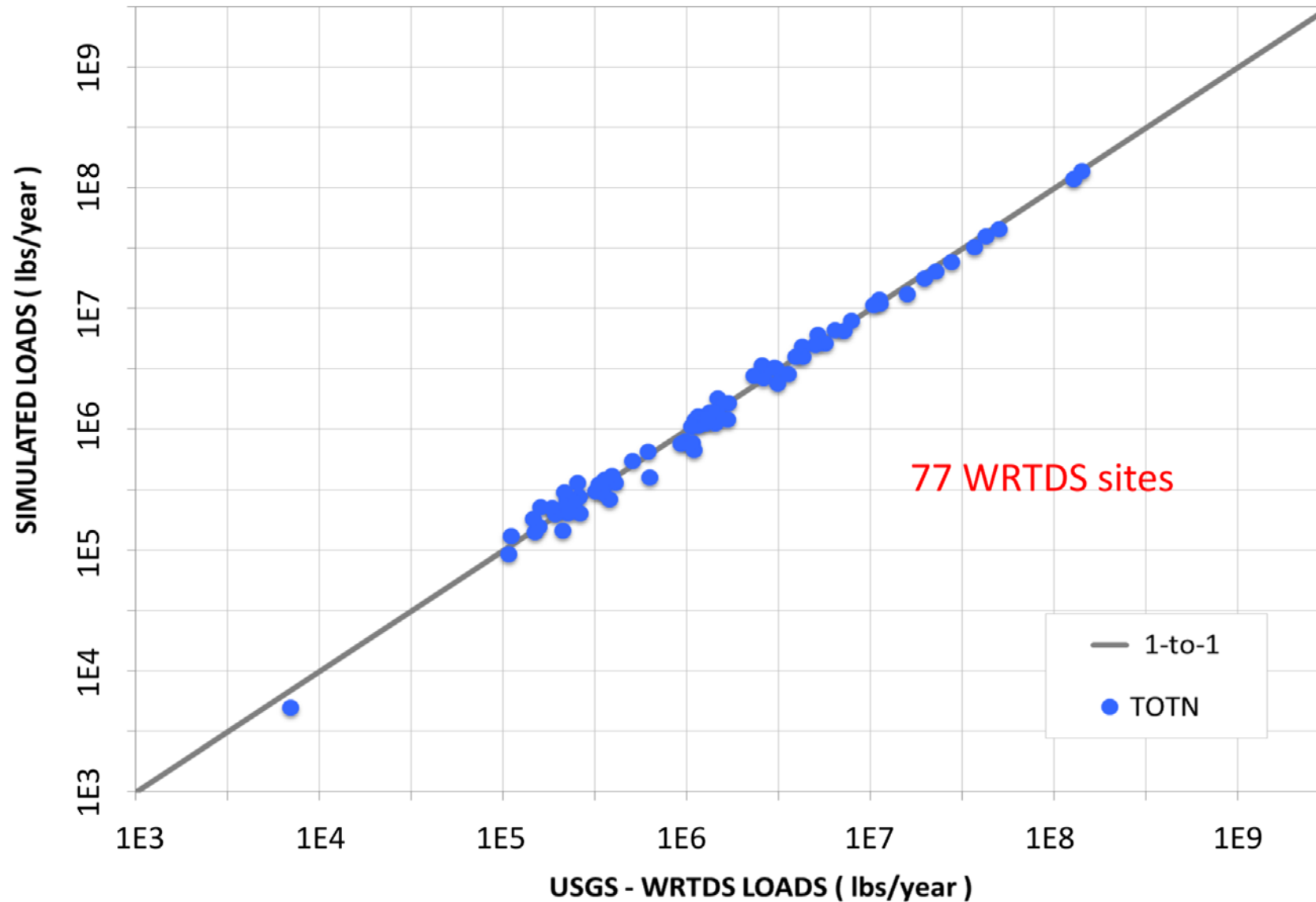




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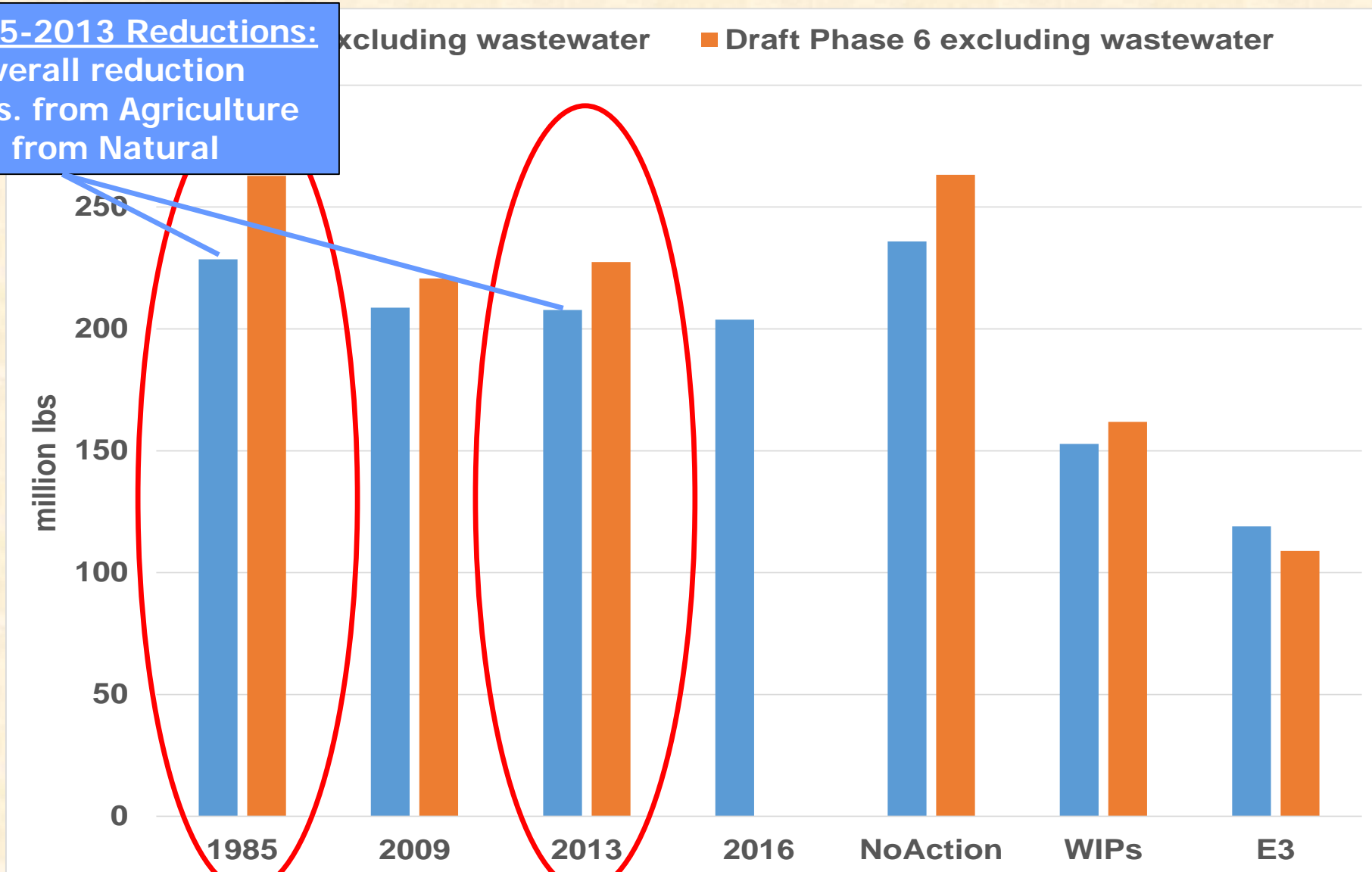
Phase 5 and Phase 6

Nitrogen Loads, CB Watershed-wide (excludes wastewater)

Phase 5 1985-2013 Reductions:

20.8 M lb. overall reduction

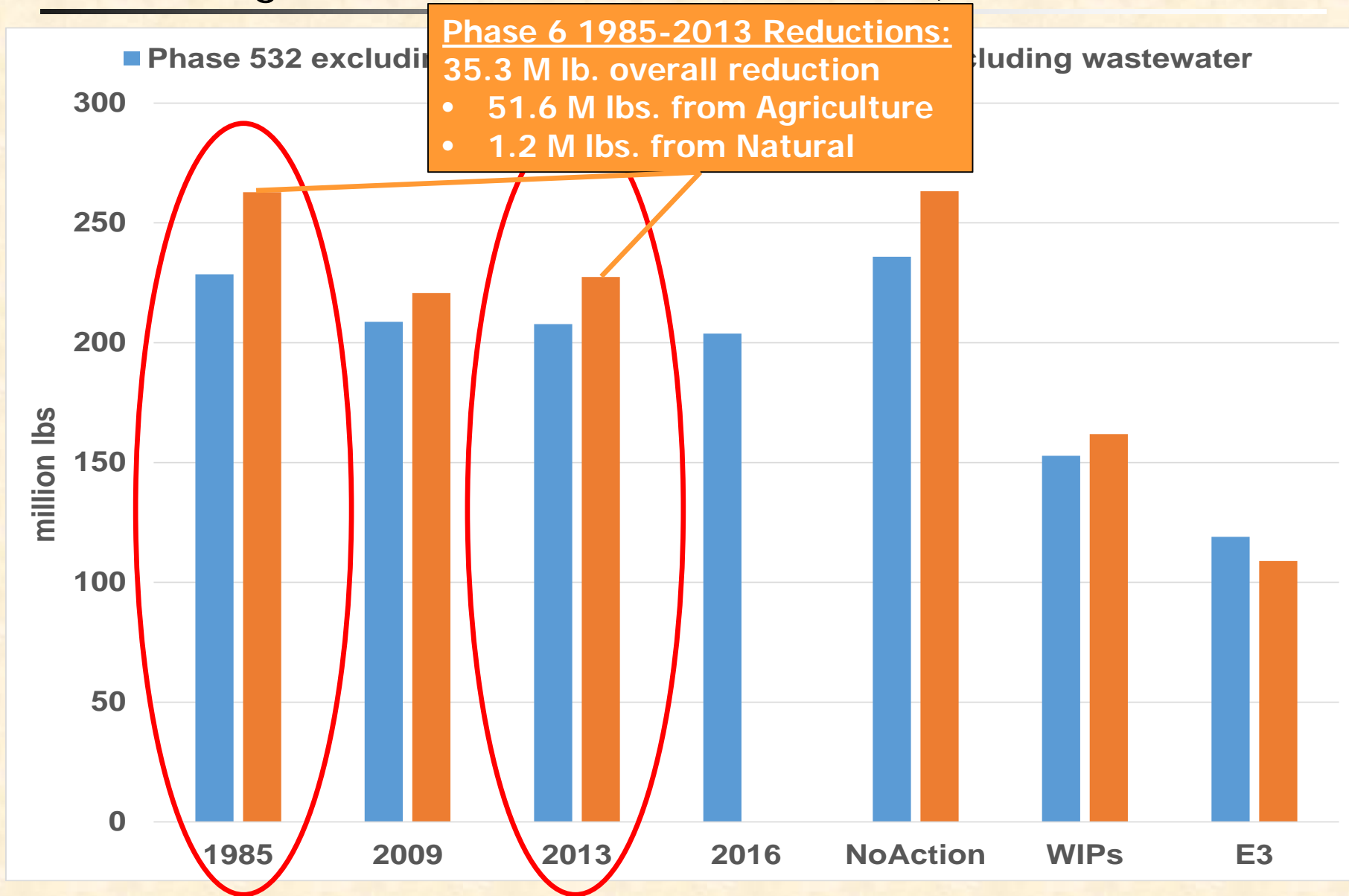
- 29.8 M lbs. from Agriculture
- 1.3 M lbs. from Natural





Phase 5 and Phase 6

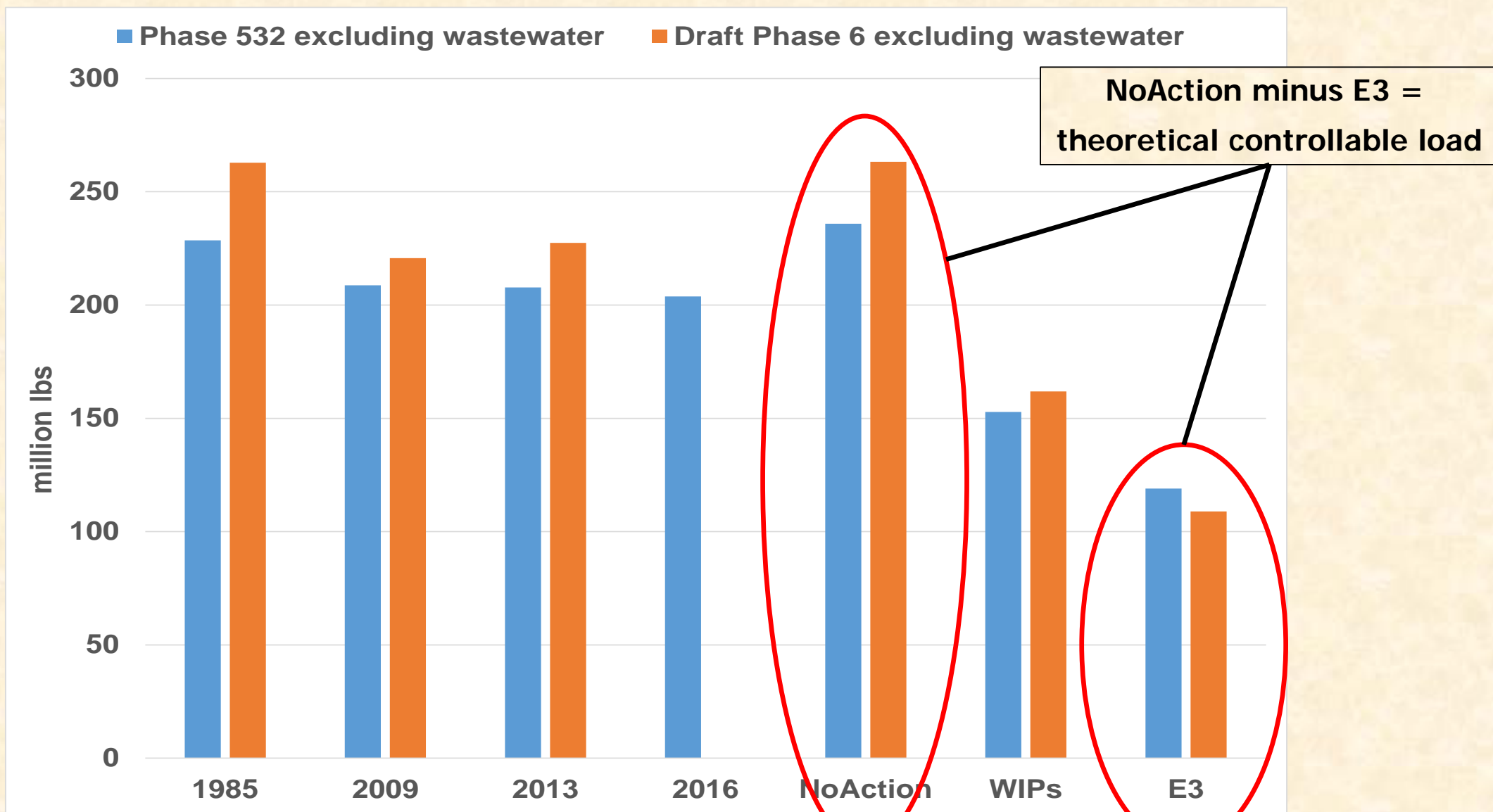
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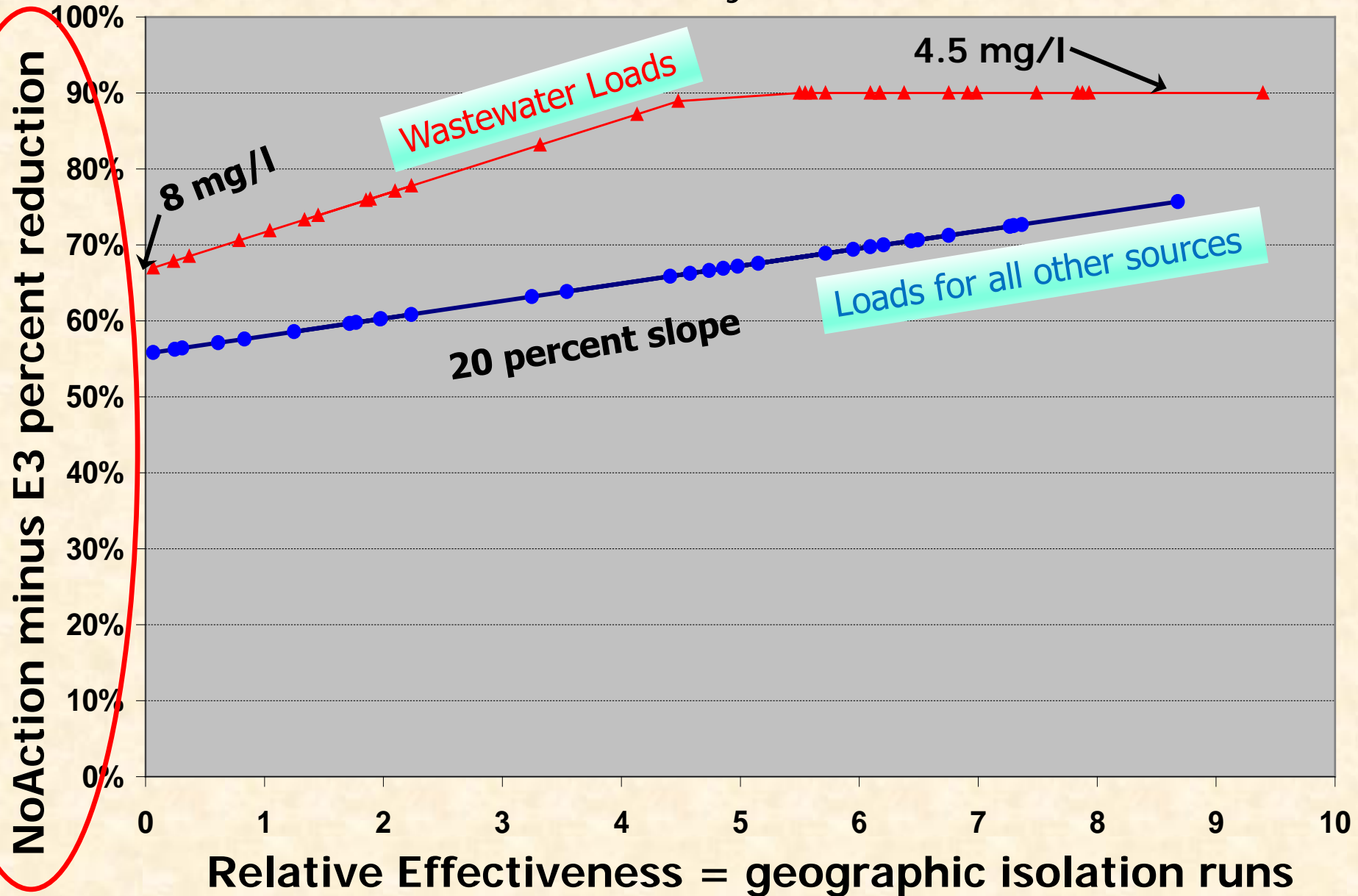


Phase 5 and Phase 6

Nitrogen Loads, CB Watershed-wide (excludes wastewater)



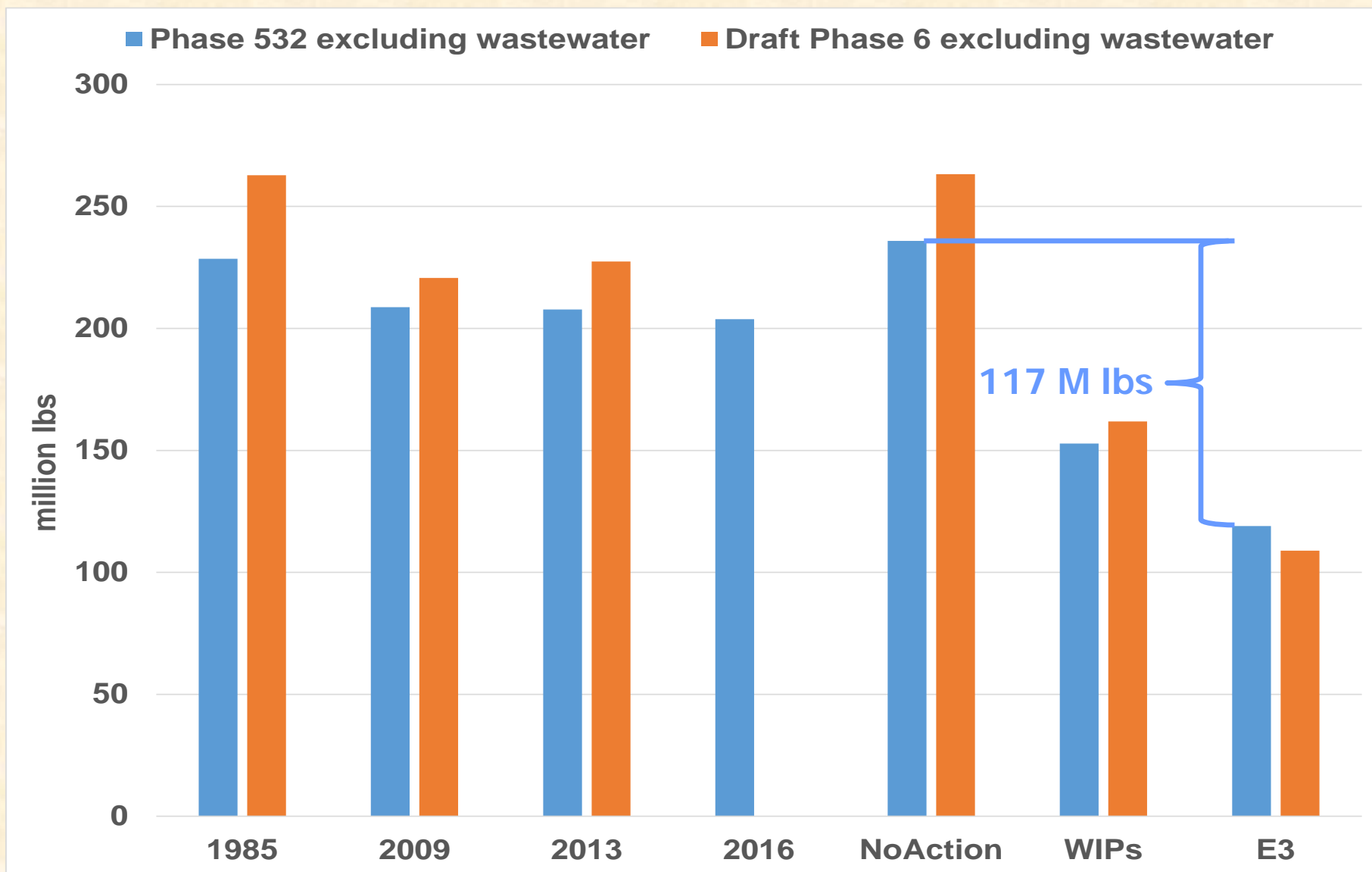
Phase 5 Planning Target Methodology "Hockey Stick"





Initial Set of Phase 6 Model Scenarios

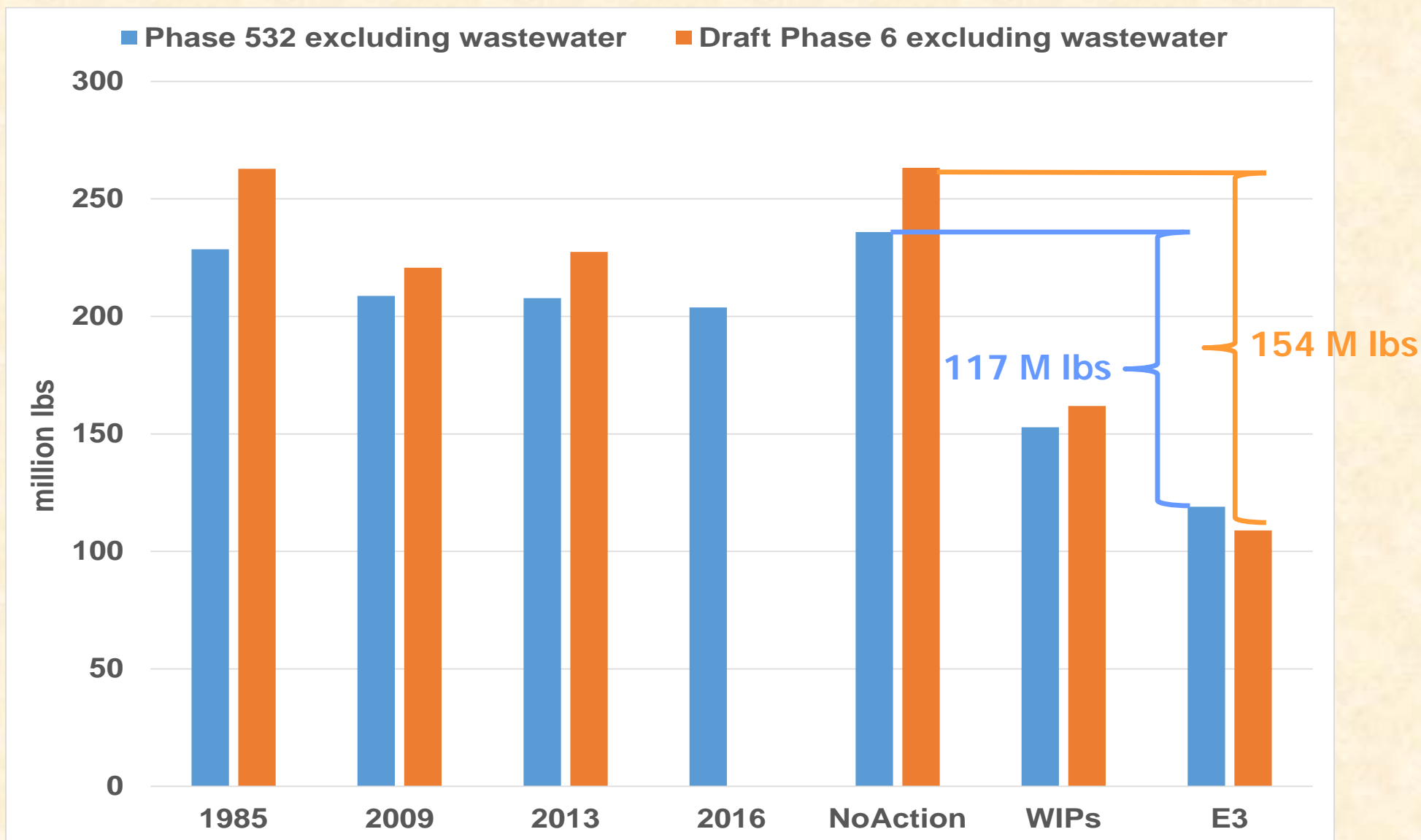
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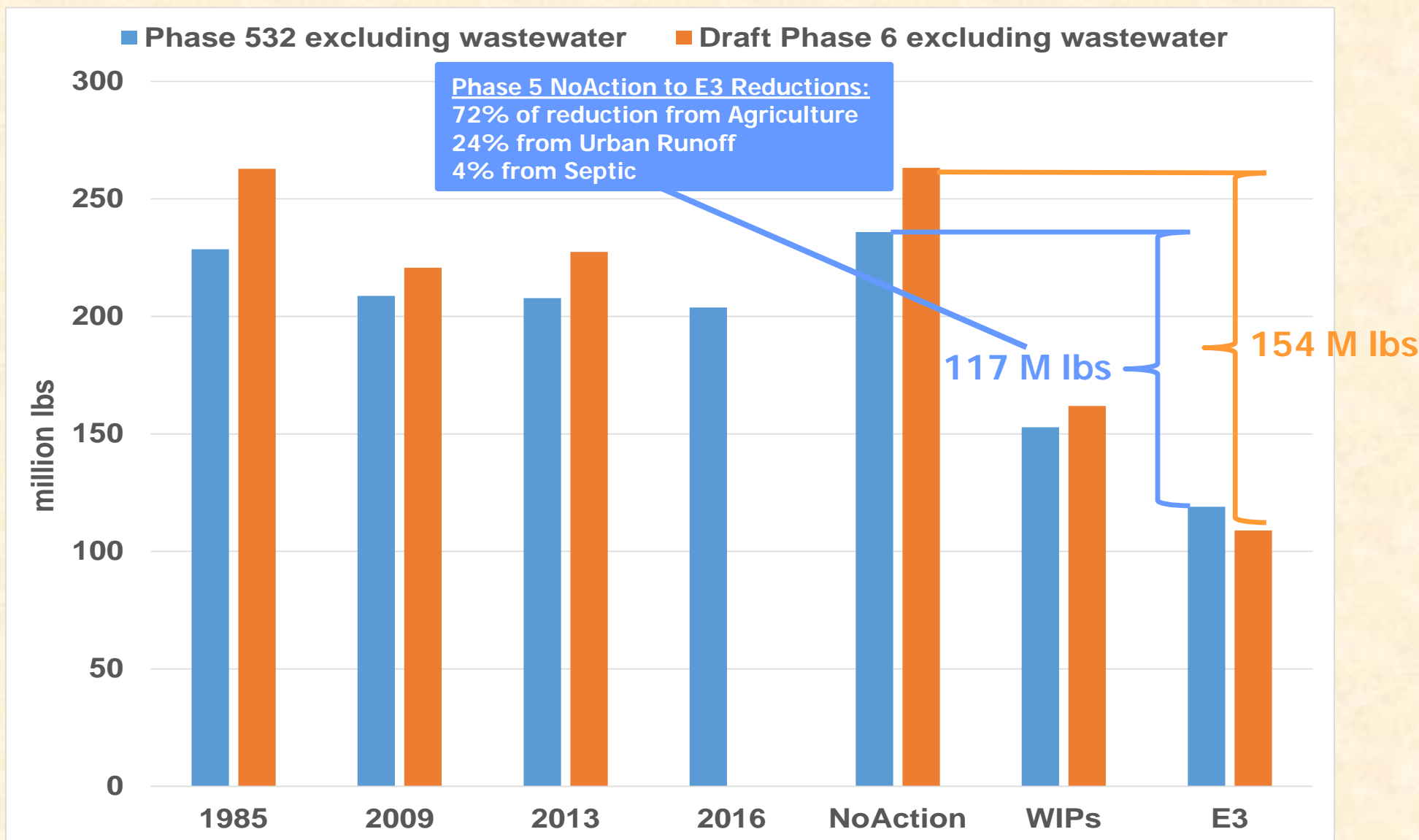
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Initial Set of Phase 6 Model Scenarios

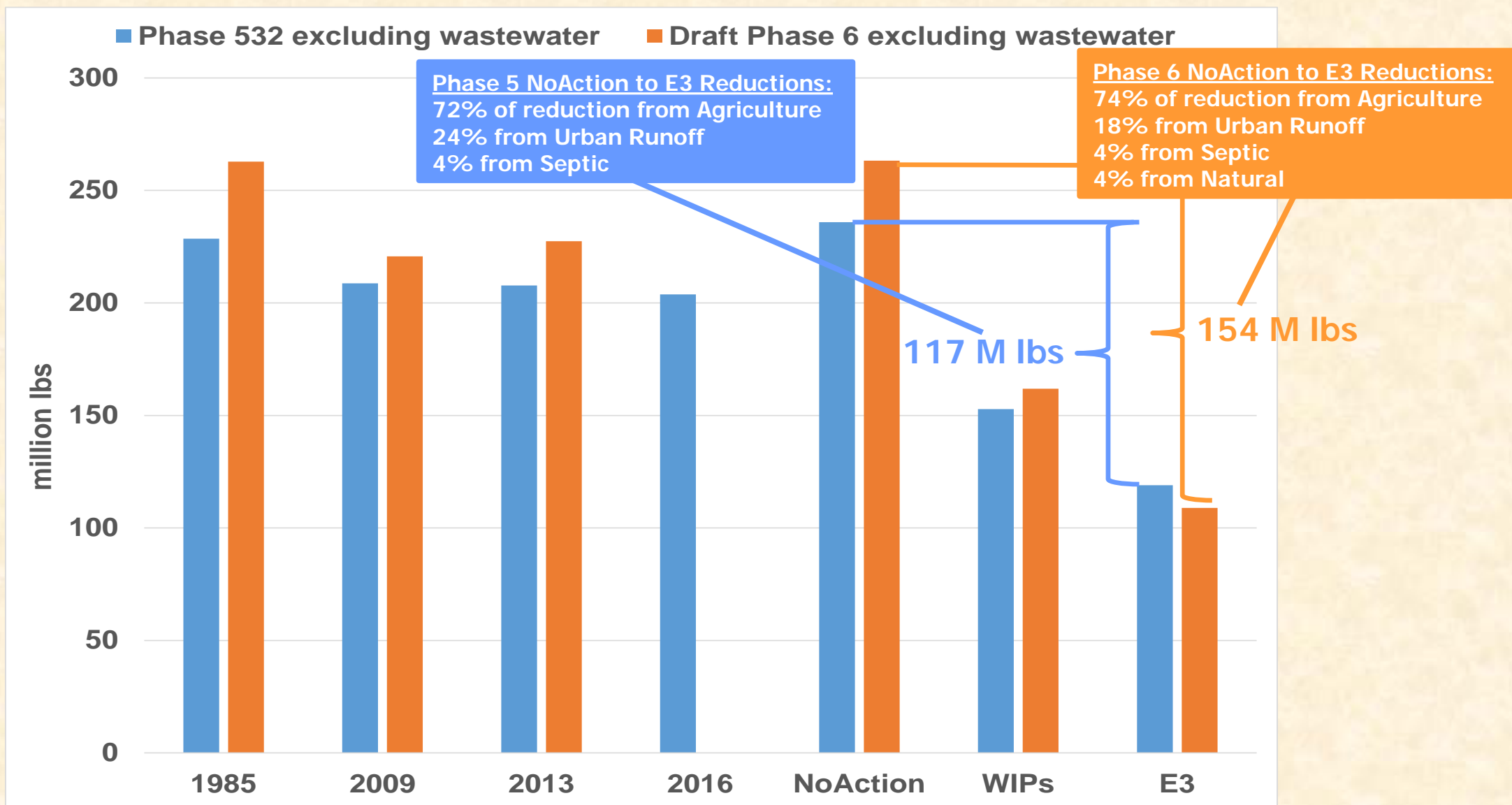
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Initial Set of Phase 6 Model Scenarios

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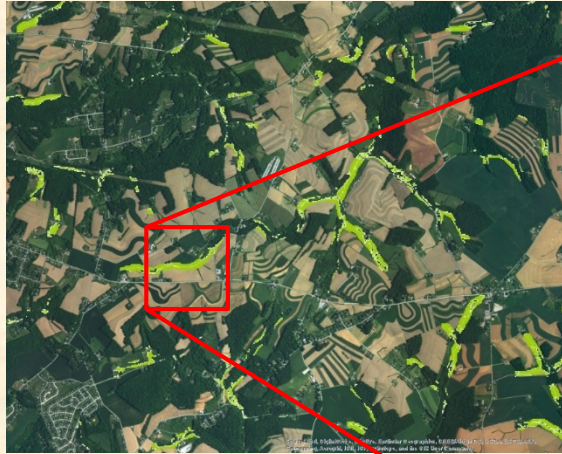


Phase 6 E3 Scenario Agriculture BMPs

Phase 6 BMP	Implementation Level
Nutrient Management Core N, Nutrient Management Core P	100%
NM Supplemental: N and P Placement, N and P Rate, N and P Timing	100%
Tillage Management-High Residue/Minimal Soil Disturbance	100% of row crops (excluding corn silage and soybeans), and low input speciality crops
Tillage Management-Conservation Tillage	100% of select row crops including corn silage and soybeans, and high input speciality crops; excludes mushrooms, greenhouse and container nursery
Tillage Management-Low Residue Tillage	100% of select high input speciality crops including potatoes, peanuts, tobacco; excludes mushrooms, greenhouse and container nursery
Cover Crop	81% of row crops; not associated with small-grain production and high input specialty (excludes mushroom, greenhouse and container nursery; early, drilled, w heat)
Commodity Cover Crop	19% of row crops; associated with small-grain production; early, drilled, w heat
Cover Crop Composite	100% of row crops and high input speciality crops; excludes mushroom, greenhouse, and container nursery
Off Stream Watering Without Fencing	100%
Prescribed Grazing	100%; includes PIRG acres
Stream Access Control with Fencing	100%
Pasture Management Composite	100%
Forest Buffers	40% of cropland Crop land within 30m of all streams and rivers that's unbuffered - from high-resolution land cover
Forest Buffer-Streamside with Exclusion Fencing	5% of pasture Pasture land within 30m of all streams and rivers that's unbuffered - from high-resolution land cover
Wetland Restoration	1% of available crops and pasture
Land Retirement to Ag Open Space and to Pasture	7%
Tree Planting	3%
Alternative Crops	1% of row crop
Soil Conservation and Water Quality Plans	100%
Manure Injection	100%
Crop Irrigation Management	100%
Non-Ubran Stream Restoration	Added since Oct, 2016 version
Livestock Waste Management Systems	100%
Poultry Waste Management Systems	100%
Animal Waste Management Systems	100%
Livestock Mortality Composting	100%
Poultry Mortality Composting	100%
Mortality Composting	100%
Barnyard Runoff Control	100%
Loafing Lot Management	100%
Animal Feed Operations	100%
Dairy Precision Feeding and/or Forage Management N	100% of Dairy @ TN = 24% reduction
Dairy Precision Feeding and/or Forage Management P	100% of Dairy @ TP = 28% reduction
Biofilters and Lagoon Covers	100% of Dairy and Swine, excludes manure storage for dry manure/stackable manure



Phase 6 E3 Scenario Forest Buffers



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Aero, Schuppert, AeroGRID, IGN, IEP, swisstopo, and the GIS User Community



Phase 6 E3 Scenario

Agriculture Changes Since Oct, 2016 Version

Phase 6 BMP	Implementation Level
Poultry Litter N and P Trends	100%, based on PLS Report Nutrient Trends; Removed this from Oct, 2016 version
Swine Manure N and P Trends	100%, based on Swine Manure Nutrient Characterization Project; Removed this from Oct, 2016 version
NonUrban Shoreline Erosion Control	Potential addition
Manure Transport	Will be added based on excess of crop goal
Manure Treatment Low/High Heat Gasification	May consider this if domain can be established and approved



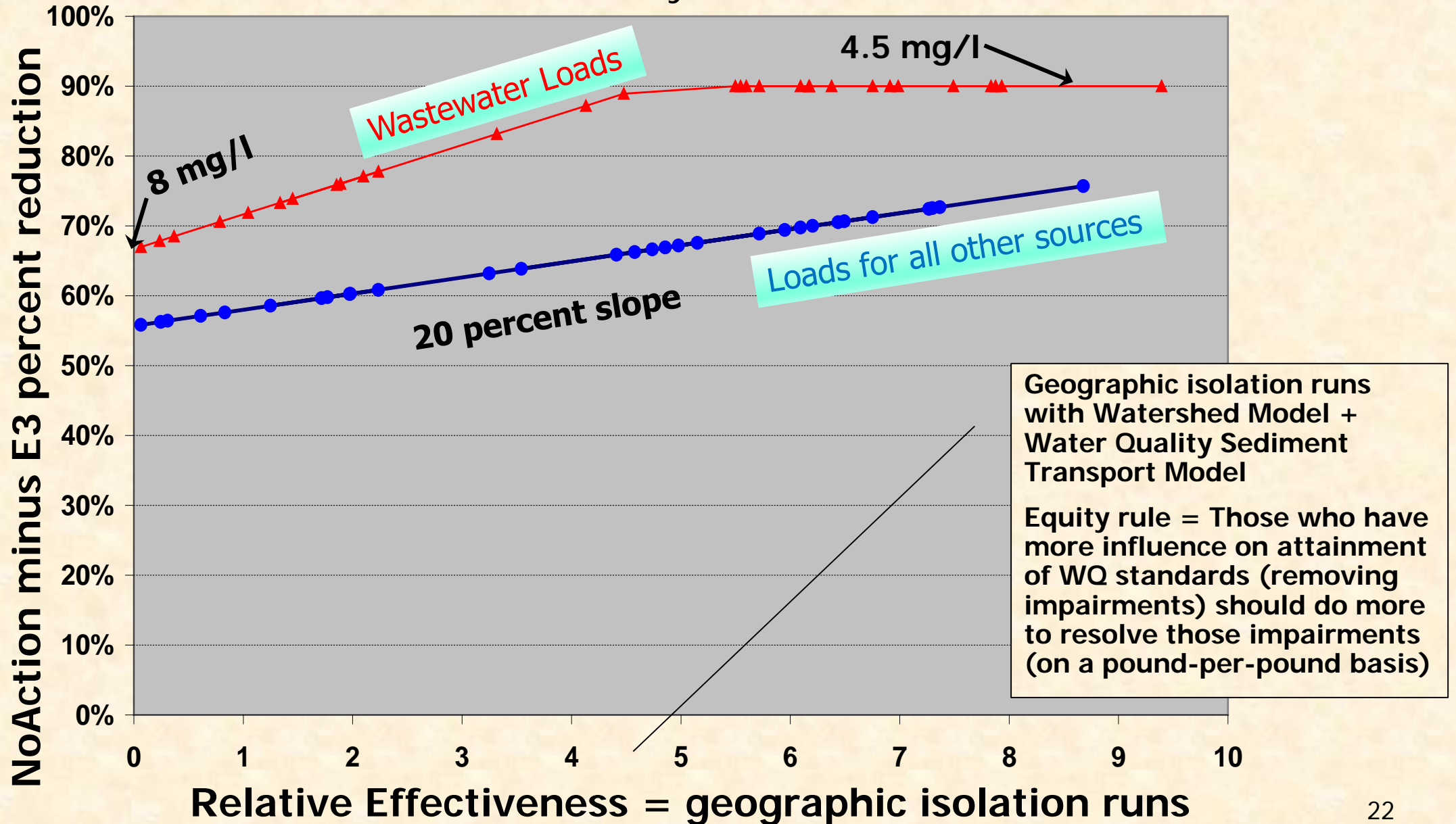
Phase 6 E3 Scenario

Urban and Resource BMPs

Phase 6 BMP	Implementation Level
Stormwater Management - New Development	All new development has Runoff Reduction BMPs sized for 1.5 inch IA
Stormwater Management - Retrofits	Runoff Reduction Retrofits sized to treat 1.0 inch IA for 75% of each each urban land use type
Street Cleaning	100% of Transport Impervious Cover swept using SCP-1
Urban Nutrient Management	All eligible Pervious Cover has UNM Plan implementation which is split 20% High Risk and 80% Low Risk
Advanced Grey Infrastructure Nutrient Discovery Program & Storm Drain Clean Outs	5% of Urban N and P load removed due to both credits
Urban Stream Restoration	15% of urban stream miles in the RBS are restored @ twice the default SR value
Erosion & Sediment Control	100% of construction sites are treated to ESC Level 3 and have high risk UNM plans
<i>Riparian Forest Buffers</i>	<i>Turfgrass (no canopy) within 30m of all streams and rivers that's unbuffered - from high-resolution land cover</i>
Septic Connections	10%
Septic Denitrification Enhanced	100%
Forest Harvesting BMP	100%
<i>DiploidOysters3</i>	<i>MD = 112 M oysters; VA = 280 M oysters</i>
Shoreline Erosion Control	Potential addition
Dirt & Gravel Road Erosion & Sediment Control	Driving Surface Aggregate + Raising the Roadbed; with Outlets will be included if domain determined and approved

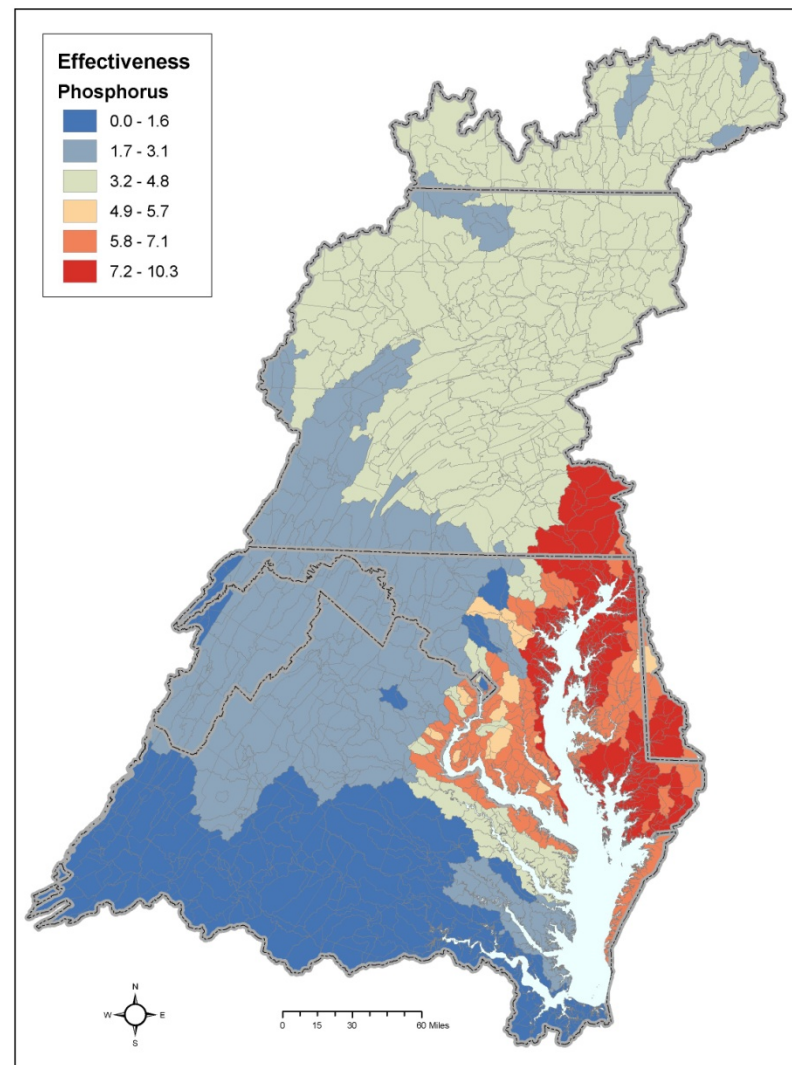
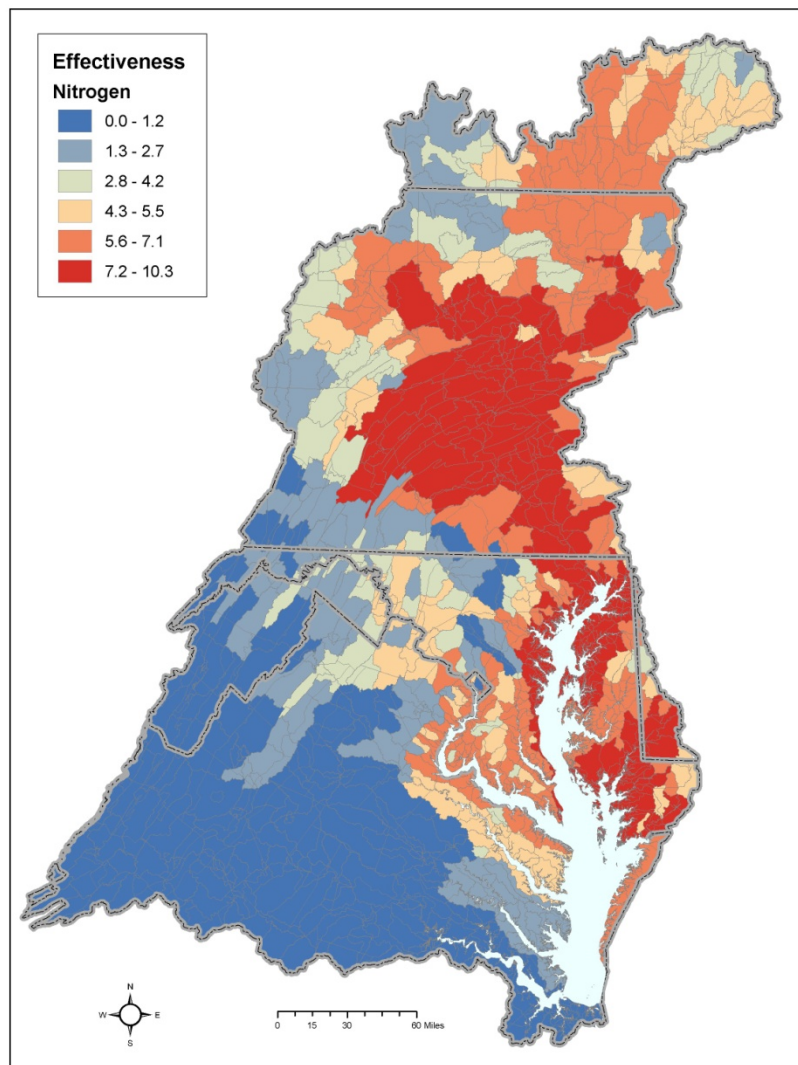
Phase 5 Planning Target Methodology

"Hockey Stick"



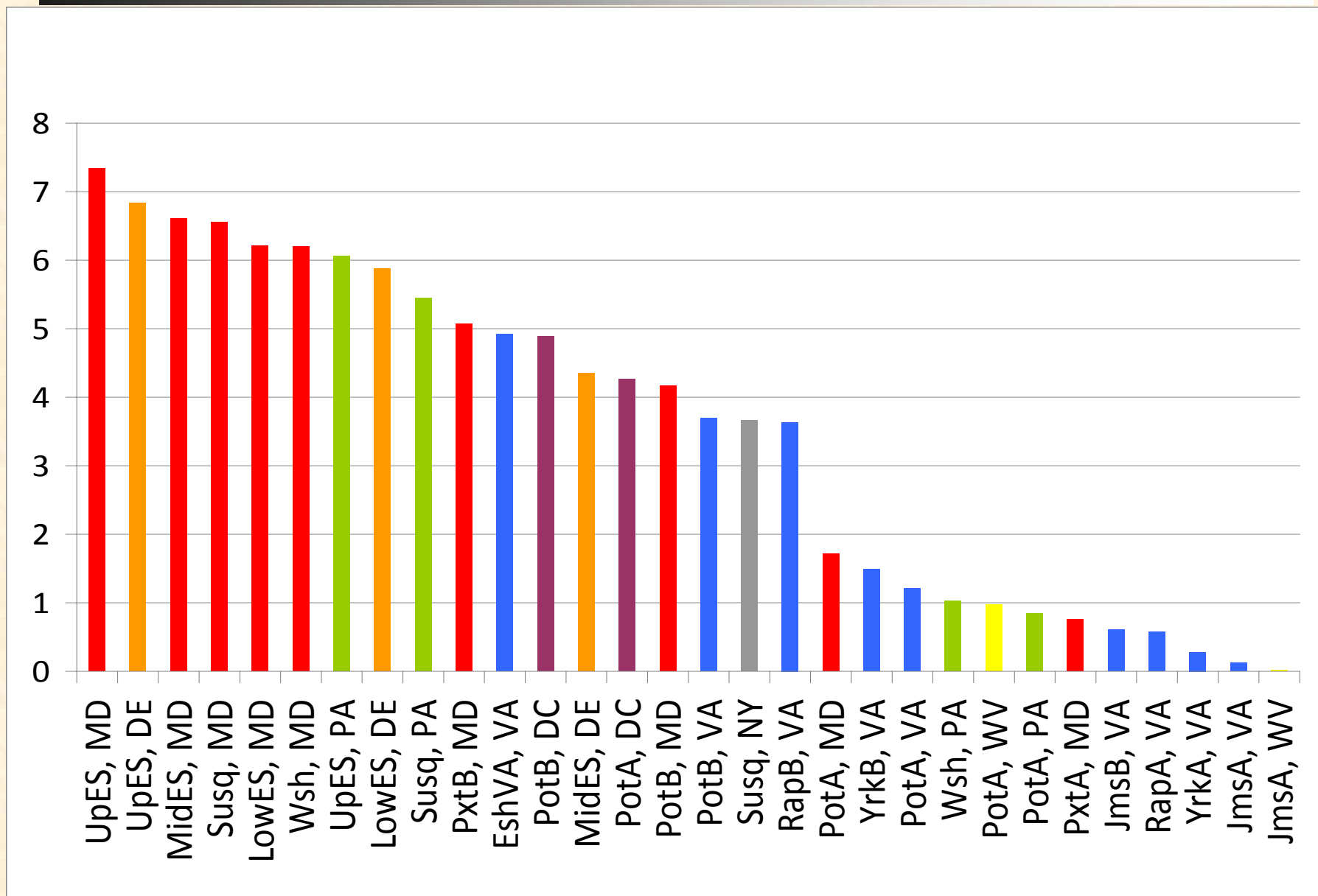


Relative Effect of a Pound of Pollution on Bay Water Quality



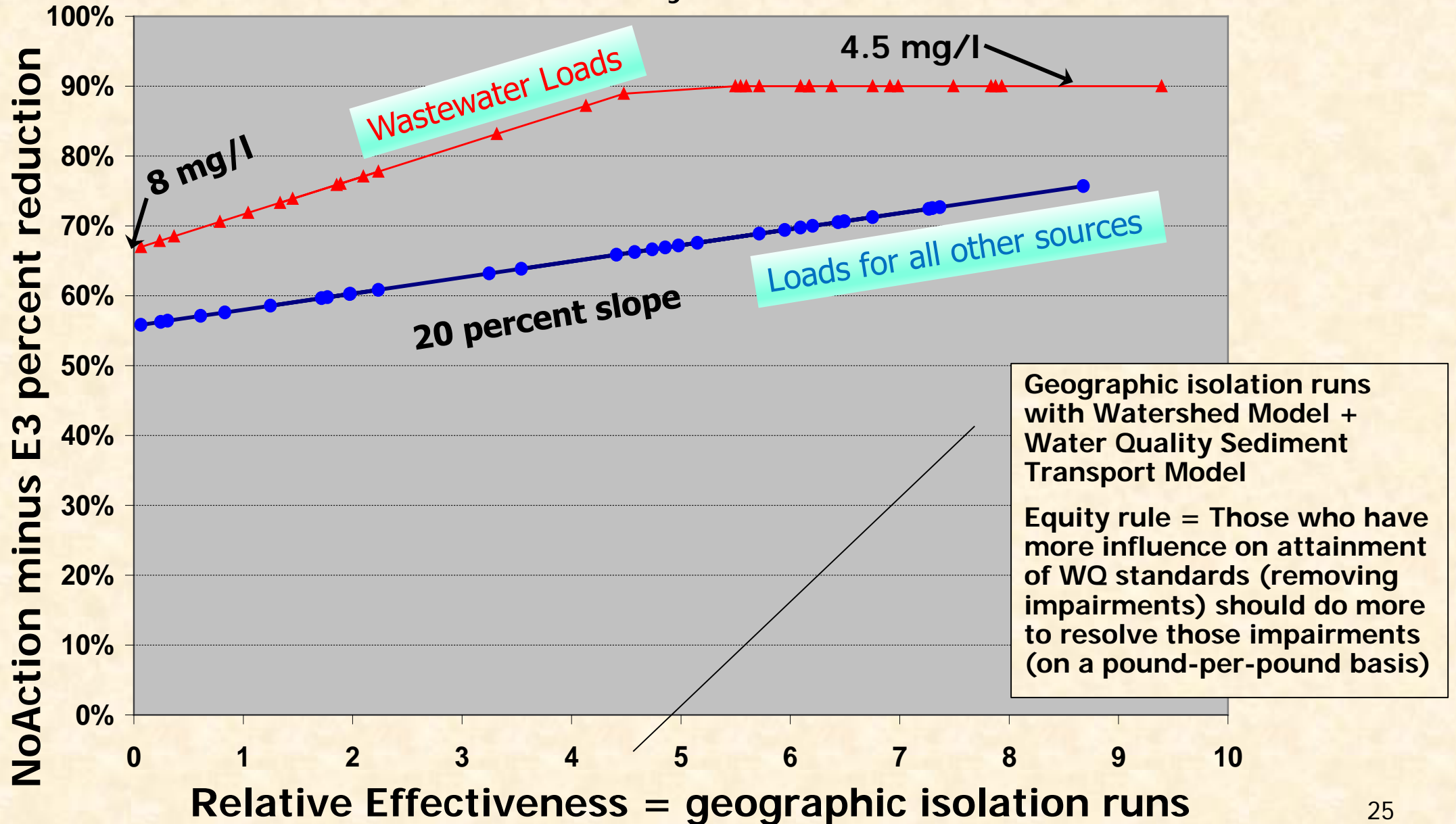


Major River Basin by Jurisdiction Relative Impact on Bay Water Quality



Phase 5 Planning Target Methodology

"Hockey Stick"



Phase 6 Model Scenarios

For final versions of Phase 6 scenarios and development of Planning Targets, we need:

- Decision on what year to use for No-Action and E3 scenarios – after assessing options
 - Initial scenarios are 2010 background conditions
- Workgroups can review model results of No-Action, E3, Phase II WIPs with Phase 6 model, etc.
- Geographic isolation runs
- Approved model – after fatal flaw review by partnership; September, 2017



Phase 6 Model Scenarios and Planning Target Development

Schedule

- Partnership's fatal flaw review of the Beta 6 modeling tools; through July 31, 2017



Phase 6 Model Scenarios and Planning Target Development

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- Partnership's fatal flaw review of the Beta 6 modeling tools; through July 31, 2017
- Fatal flaw issue resolution occurs in August, 2017
- WQGIT revisits midpoint assessment schedule based on Beta 6 fatal flaw review period; August 14, 2017 WQGIT call
- Partnership approval of Phase 6 modeling tools; September, 2017



Phase 6 Model Scenarios and Planning Target Development

Schedule

- Draft Phase III WIP planning target development; August 1 – September 30, 2017
 - No-Action, E3 + geo-isolation runs, etc.
- Release of draft Phase III WIP planning targets; October 31, 2017 - February 28, 2018 partnership review
- PSC approval of final Phase III WIP planning targets with special cases and release; March, 2018