Market Solutions and Restoring the Chesapeake

The Economics of Nutrient Trading

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Chesapeake Bay Commission

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Chesapeake Bay Commission

Tri-State Legislative Commission

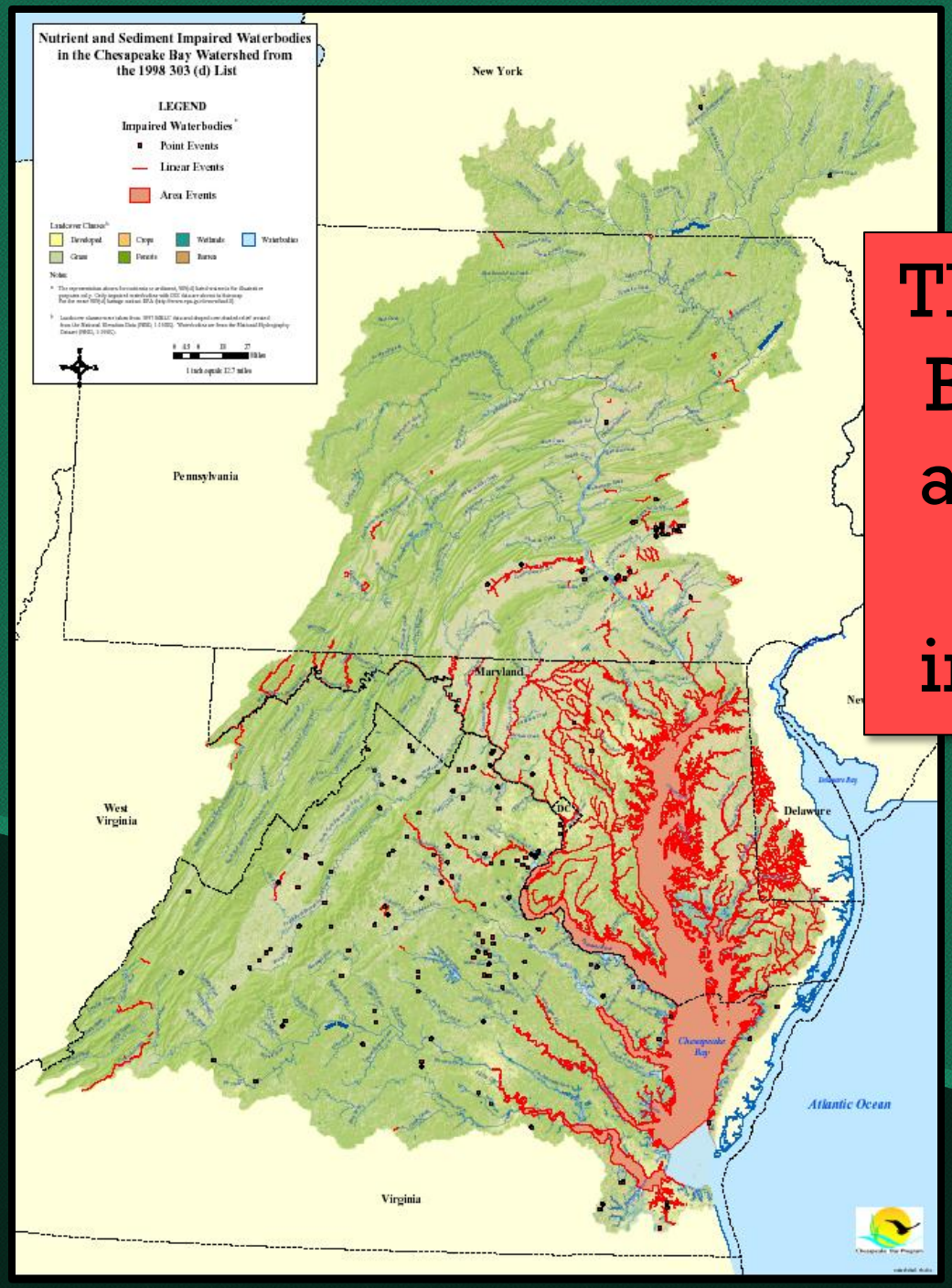
- PA, MD, VA

Legislative Partner of Chesapeake Bay Program

7 Members Each (21 total)

- 2 Senate
- 3 House
- Governor or Designee
- Citizen At-Large

32 years of *Policy for the Bay*



The Chesapeake Bay is impaired and subject to a federally imposed TMDL.

Nutrient Trading is One Possible Solution

In our region, 4 states have nutrient trading programs

- ✓ Pennsylvania
- ✓ Maryland
- ✓ Virginia
- ✓ West Virginia

Our Approach to the Task

- Project Development & Funding

Linden Trust for Conservation

- Economics Analysis, Modeling and Report Preparation

RTI INTERNATIONAL

- Project Management, Policy & Technical Expertise

HOPE IMPACTS
Hoagland Outcomes for the Preservation of our Environment

- Transparency, Accuracy & Applicability

Purpose of the Study

Is:

- ✓ To investigate the *POTENTIAL* cost savings
- ✓ To estimate how potential savings are affected by different trading scenarios

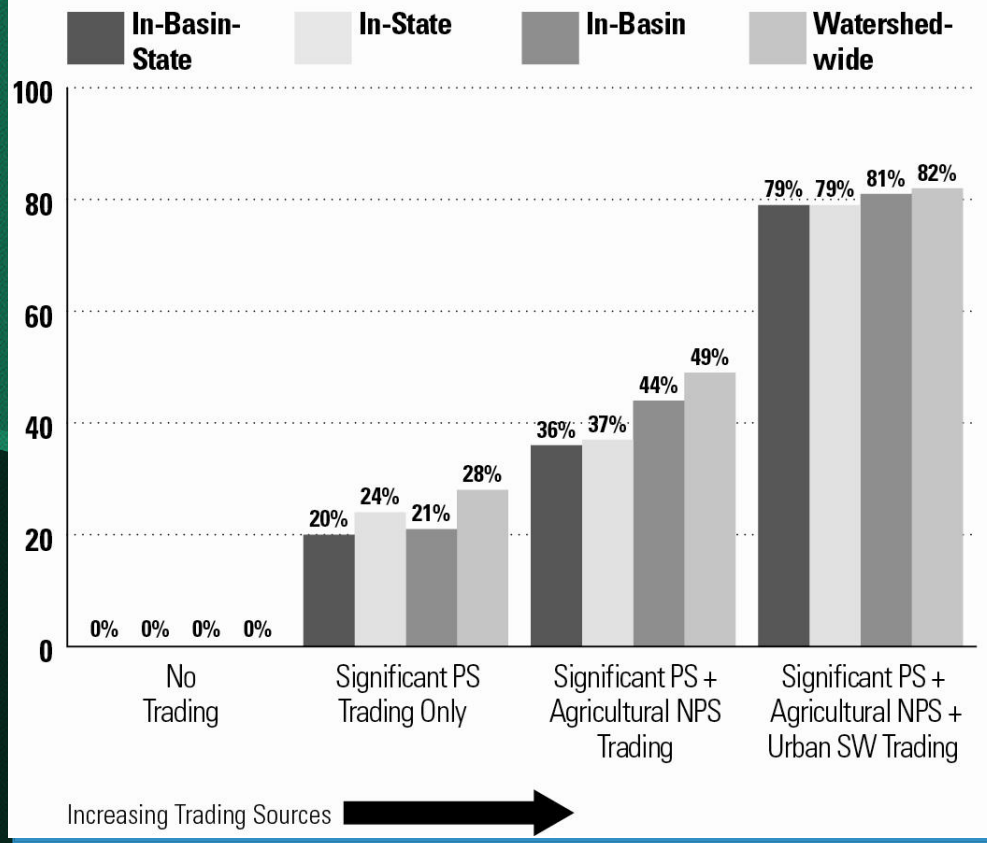
Is *NOT*:

- ✗ To model specific state programs
- ✗ To predict future trading levels

Summary of Findings

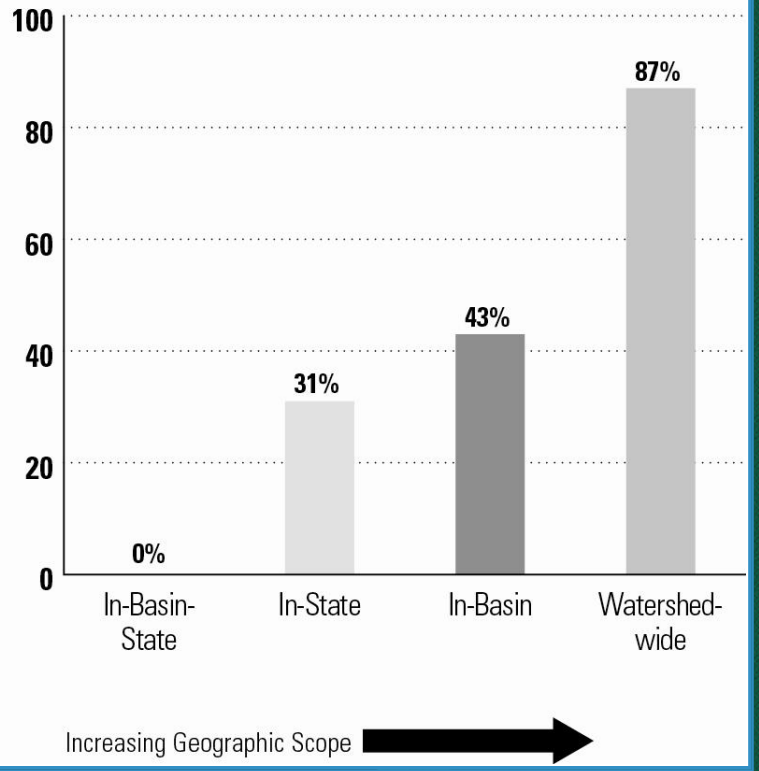
Potential Cost Savings (%) from Nutrient Credit Trading

Savings expressed as a percent of TMDL compliance costs for significant point sources with no trading, except for the last column, where the savings are expressed as the percent of TMDL compliance costs for significant point sources and urban stormwater sources *combined*.



Potential Cost Savings (%) from Trading to Offset New Loads

Savings expressed as a percent of costs due to additional treatment capacity at wastewater treatment plants. Does not include costs from land use changes.



Why *Potential* Cost Savings?

A *Market* Requires

- ✓ Defined Product
- ✓ Buyer
- ✓ Seller
- ✓ Voluntary Entry

A *Marketplace* Requires

- ✓ Rules and Boundaries
- ✓ Information
- ✓ Access

In Reality . . .

Markets Do Not Work Perfectly

Policymakers must consider factors other than cost

Market Restrictions

- ✓ **Baseline for Agriculture**
  - TMDL implementation
- ✓ **Baseline for Significant Point Sources**
  - TMDL WLA or 2010 load
- ✓ **Protection of Local Water Quality**
  - Trades limited to 9M lbs N; 200,000 lbs P
- ✓ **Trading Ratio**
  - 2:1
- ✓ **Transaction Costs**
  - 38%
- ✓ **Maintain Productive Farmland**
  - maximum 25% retirement

Nutrient Trading Scenarios

Geography

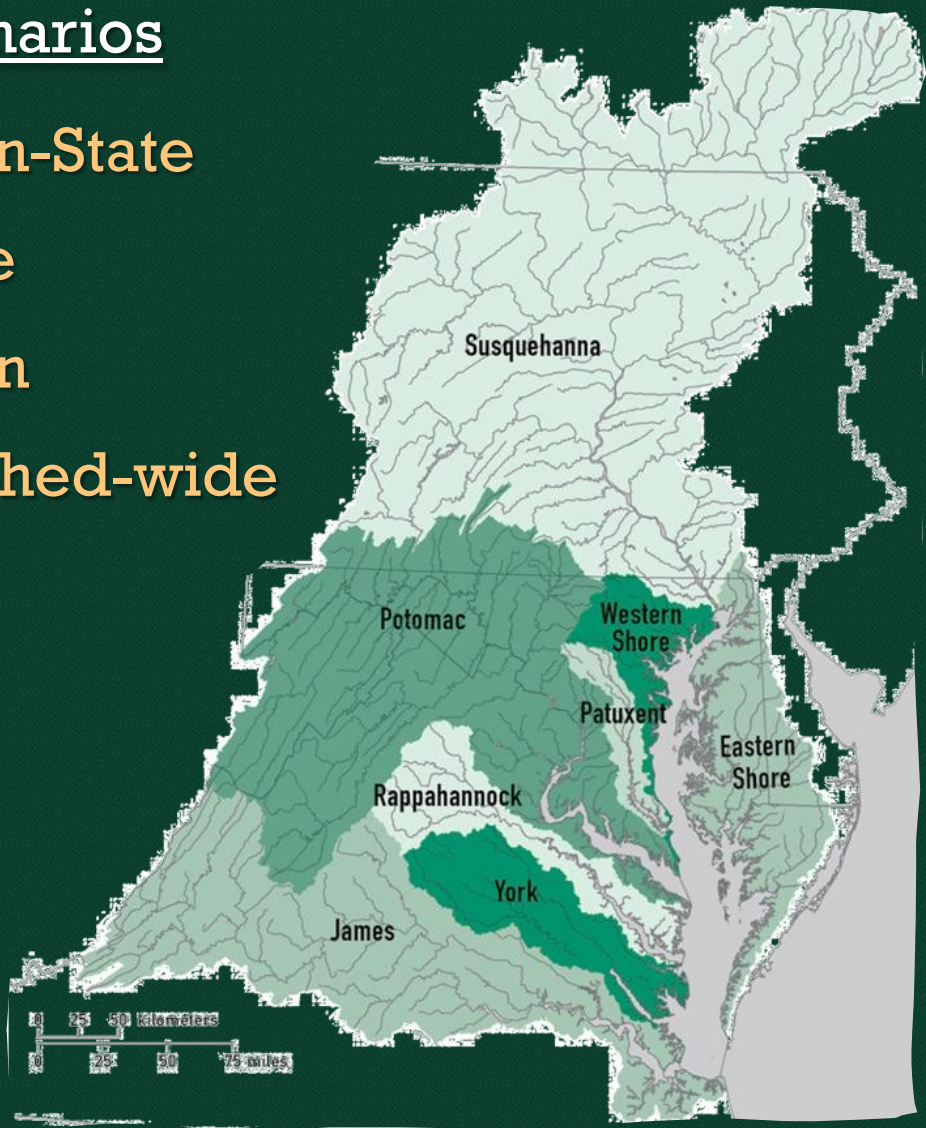
3 scenarios

In-Basin-State

In-State

In-Basin

Watershed-wide



Nutrient Trading Scenarios

Sources

3 short term scenarios

- SigPS-Only
- SigPS-AgrNPS
- SigPS-AgrNPS-Urban

1 long term scenario

- Offset-Only

Control Projects, Load Reductions and Annual Costs

Significant Point Sources (SigPS)

475 municipal and industrial facilities

- 16 tiers of treatment based on:
  - 8, 5 or 3 mg/L N
  - 1, 0.5 or 0.1 mg/L P
- Annualized costs (capital and O&M) based on EPA's ongoing cost analysis

Jane Thomas, ian.umces.edu/imagelibrary

Control Projects, Load Reductions and Annual Costs

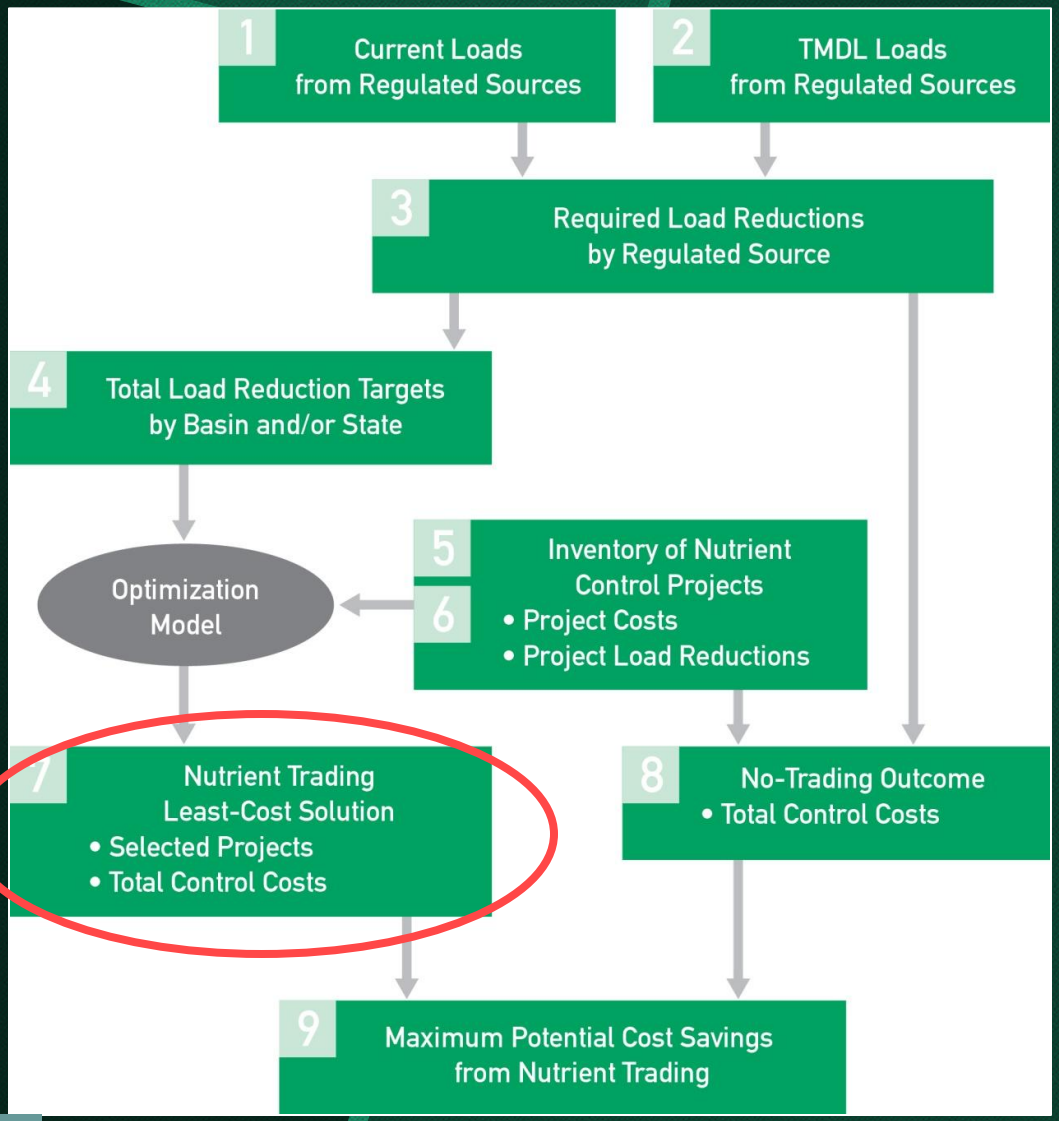
Agricultural and Urban Stormwater BMPs

- Annualized unit costs ($/ac/yr)
- Includes land, installation and O&M

Aligning Our Work

The Chesapeake Bay Program's *Watershed Model Phase 5.3.2* Provided Key Inputs

- Watershed network and segmentation
- Land use/land cover
- Delivered loads
- BMP nutrient removal rates
- Acres of BMP implementation



Analytical Framework

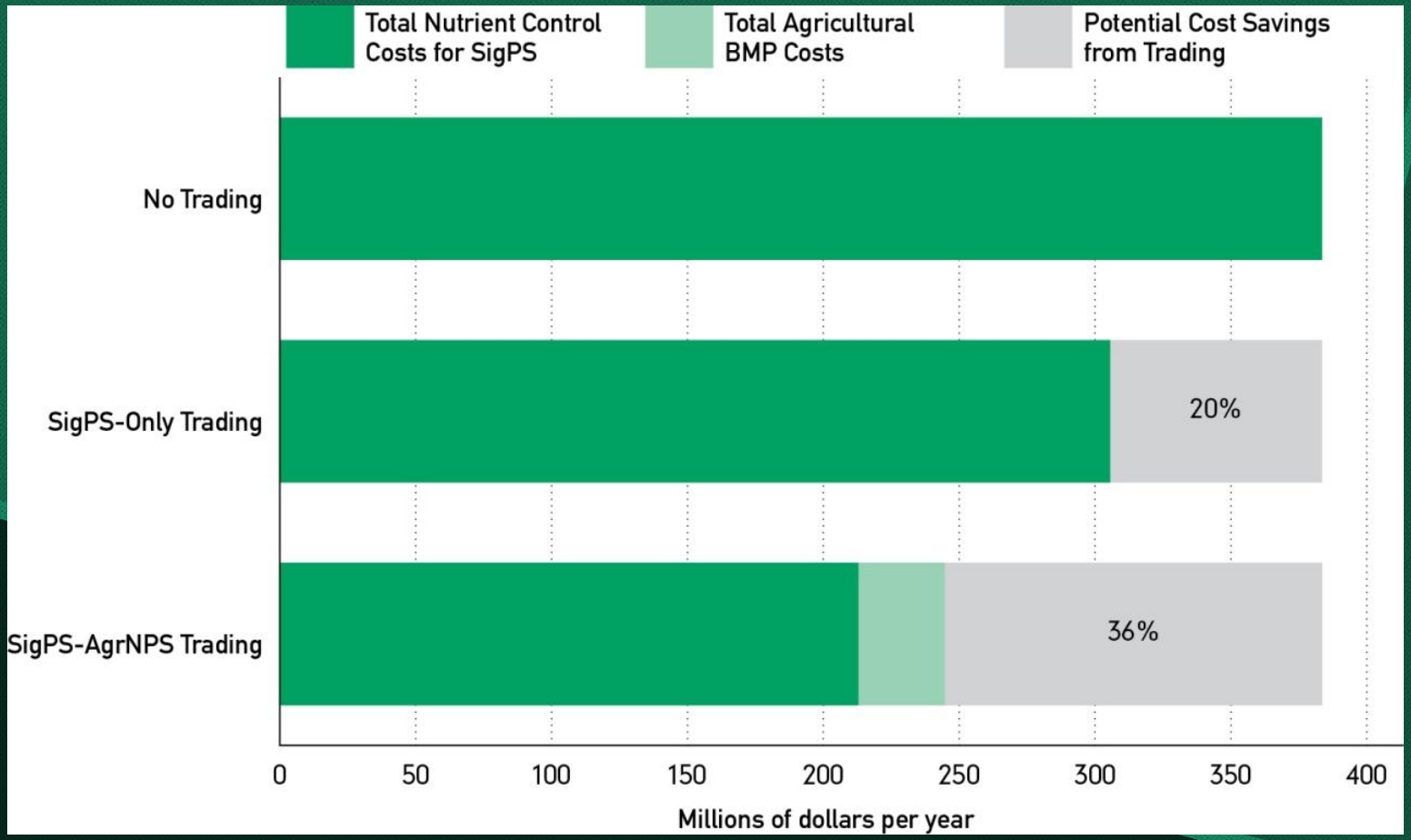
9 step process to identify the least-cost solution (representing the trading outcome)

Optimization model used always seeks least cost BMPs first as available within other constraints (basin, state, local water quality, etc.)

The Findings

Cost of Meeting SigPS Load Reduction Targets

No-Trading v. In-Basin-State Trading



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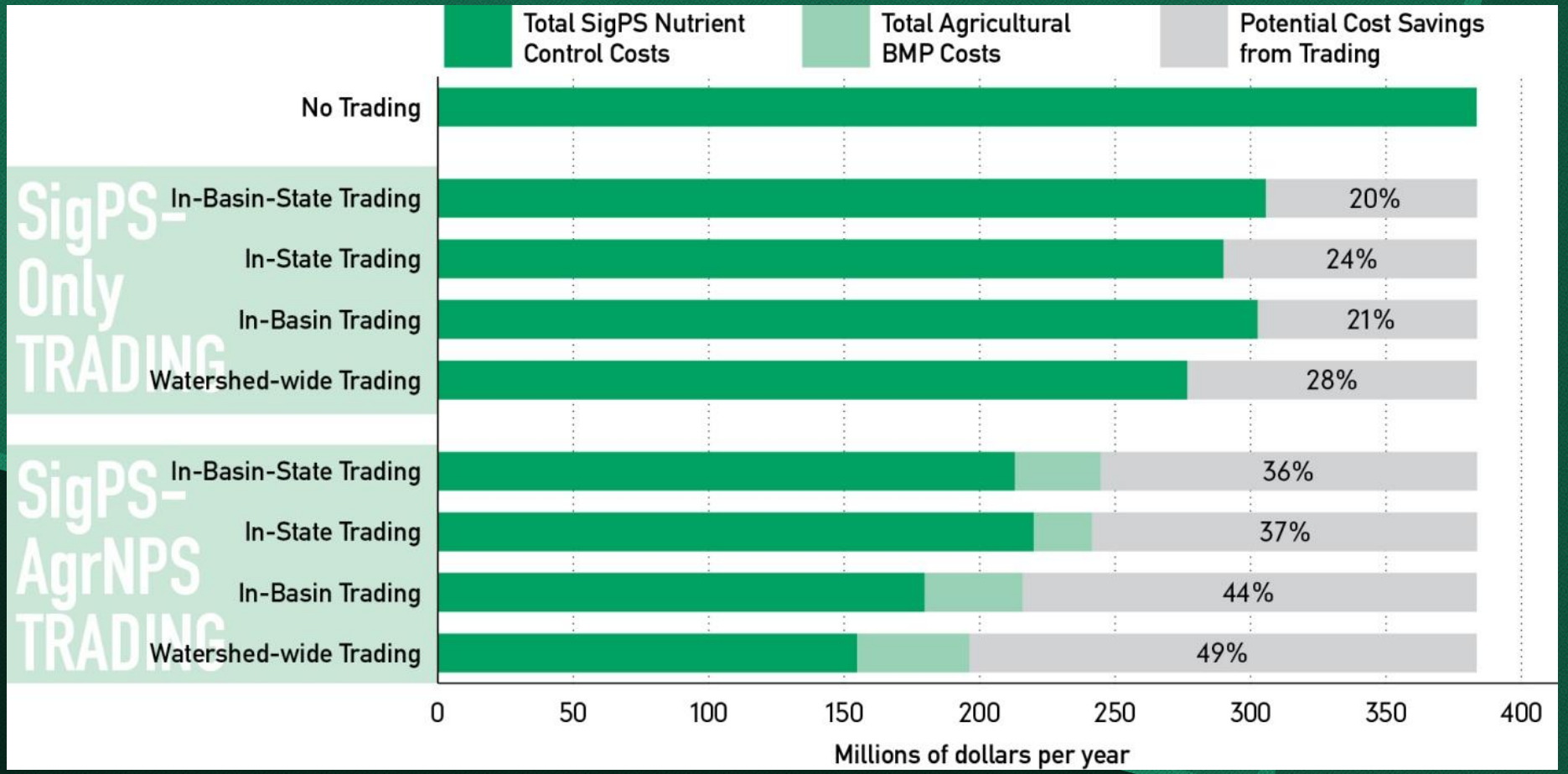
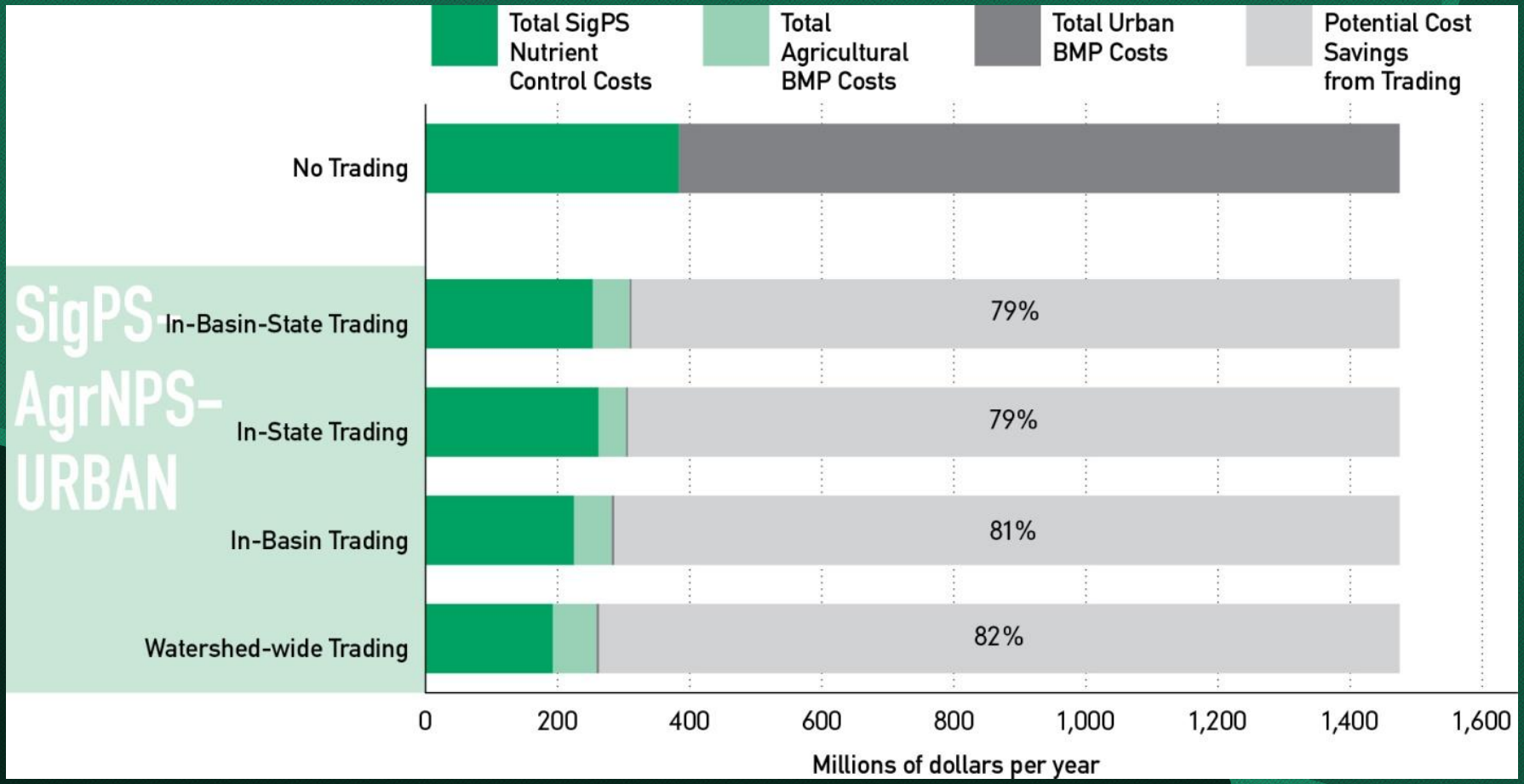
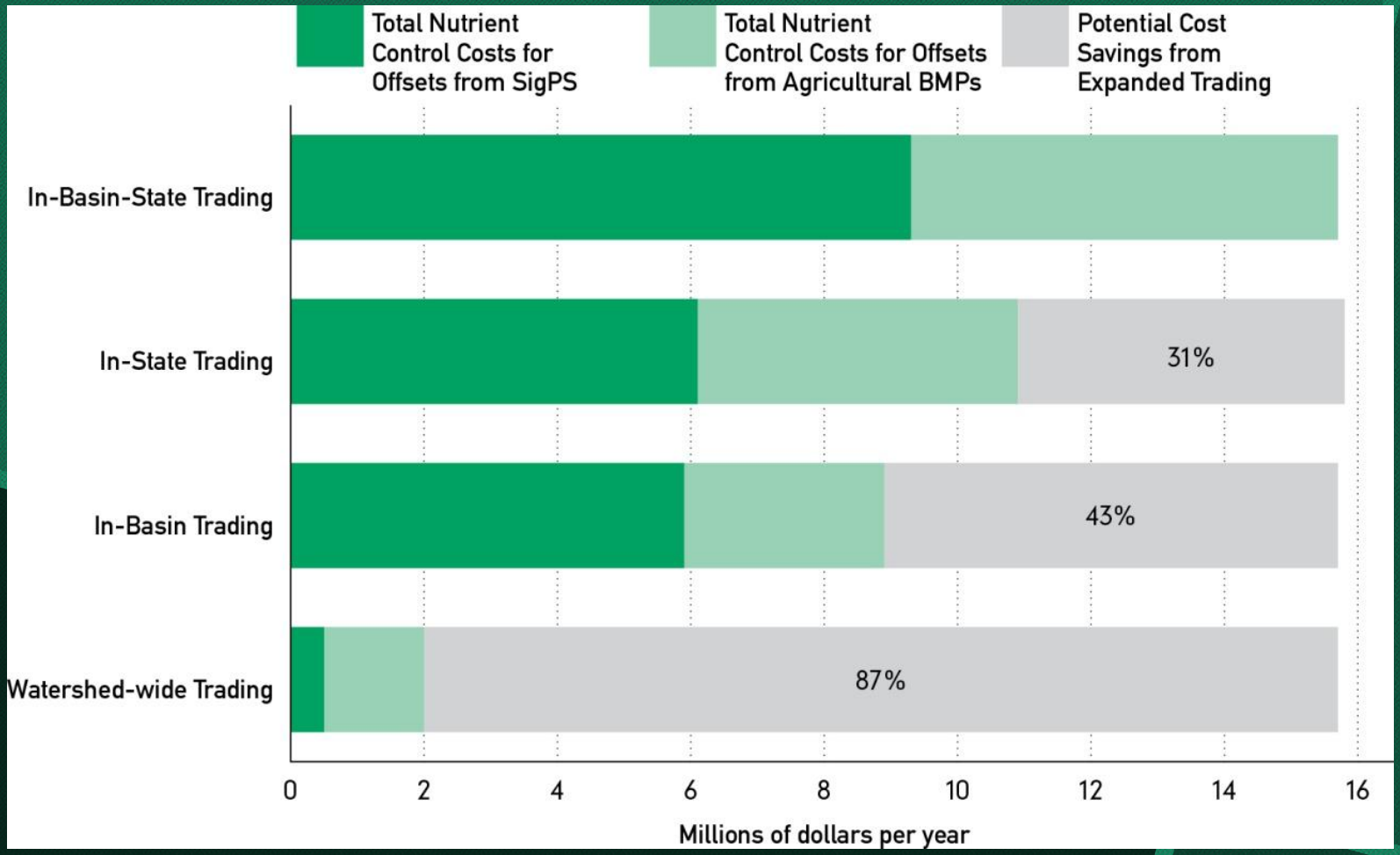


Cost of Meeting SigPS *AND* Regulated Urban Stormwater Load Reduction Targets



Cost of Offsets for Added Capacity at Municipal SigPS

Long Term Offset-Only Trading Scenarios



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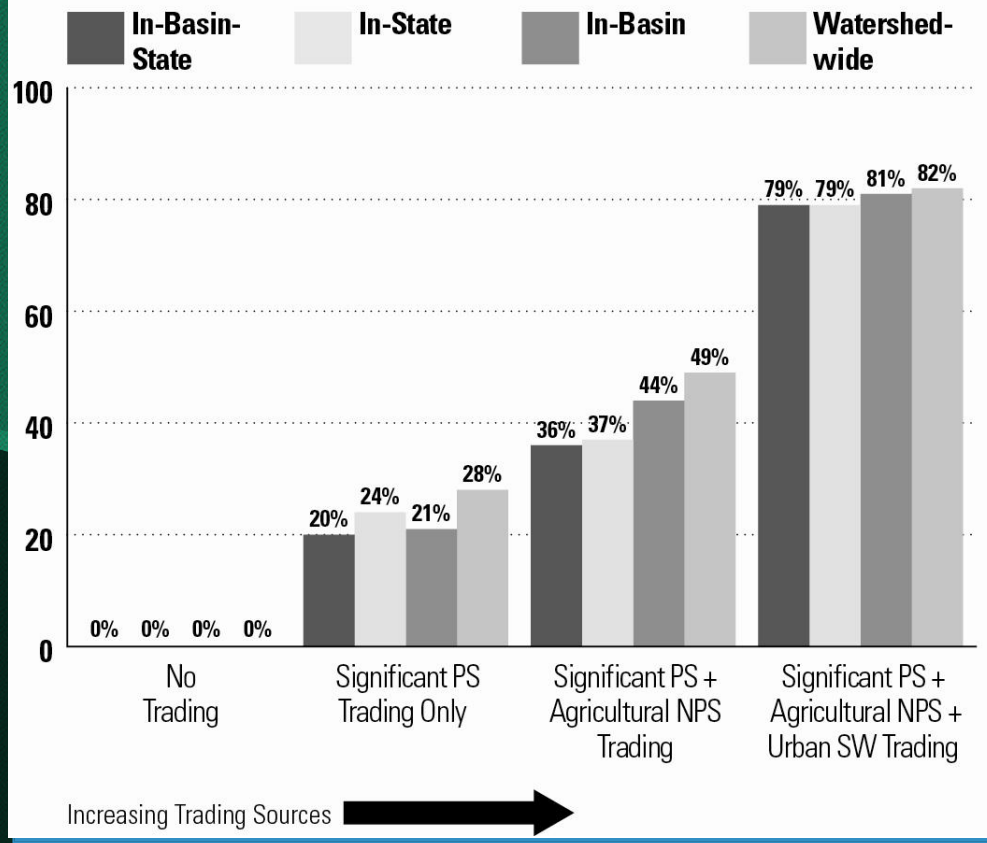

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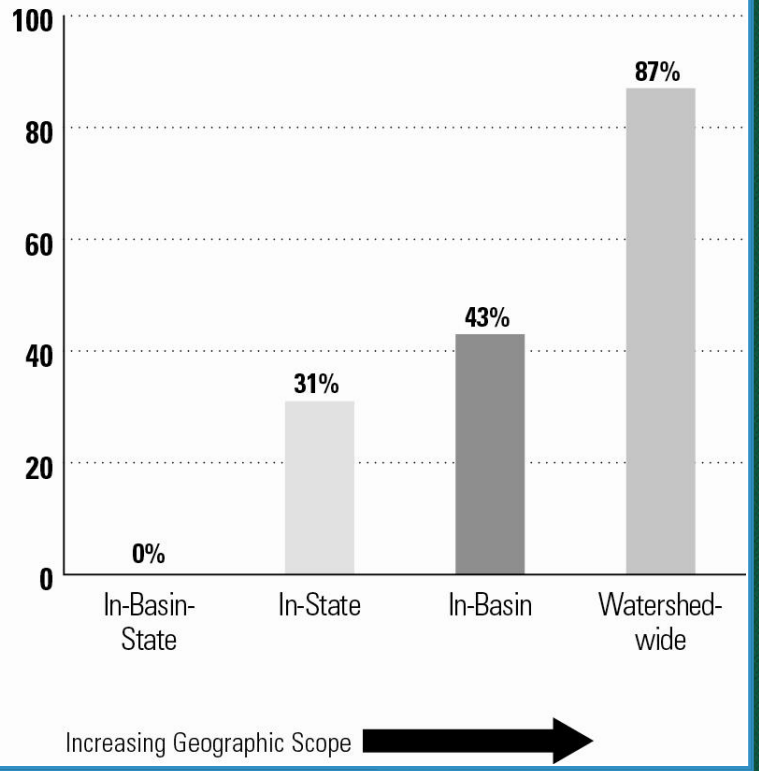

Keys to a Successful Trading Program

- Verification
- Local Water Quality Protection
- Measurable and Enforceable Cap

Questions?

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