

Applying environmental economics to policy

Taxes, Fees, Cap & Trade

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Why do we need environmental regulation?

Economist's answer

- Market failures
- Individual incentives do not lead to a desirable outcome for the group



Negative externality

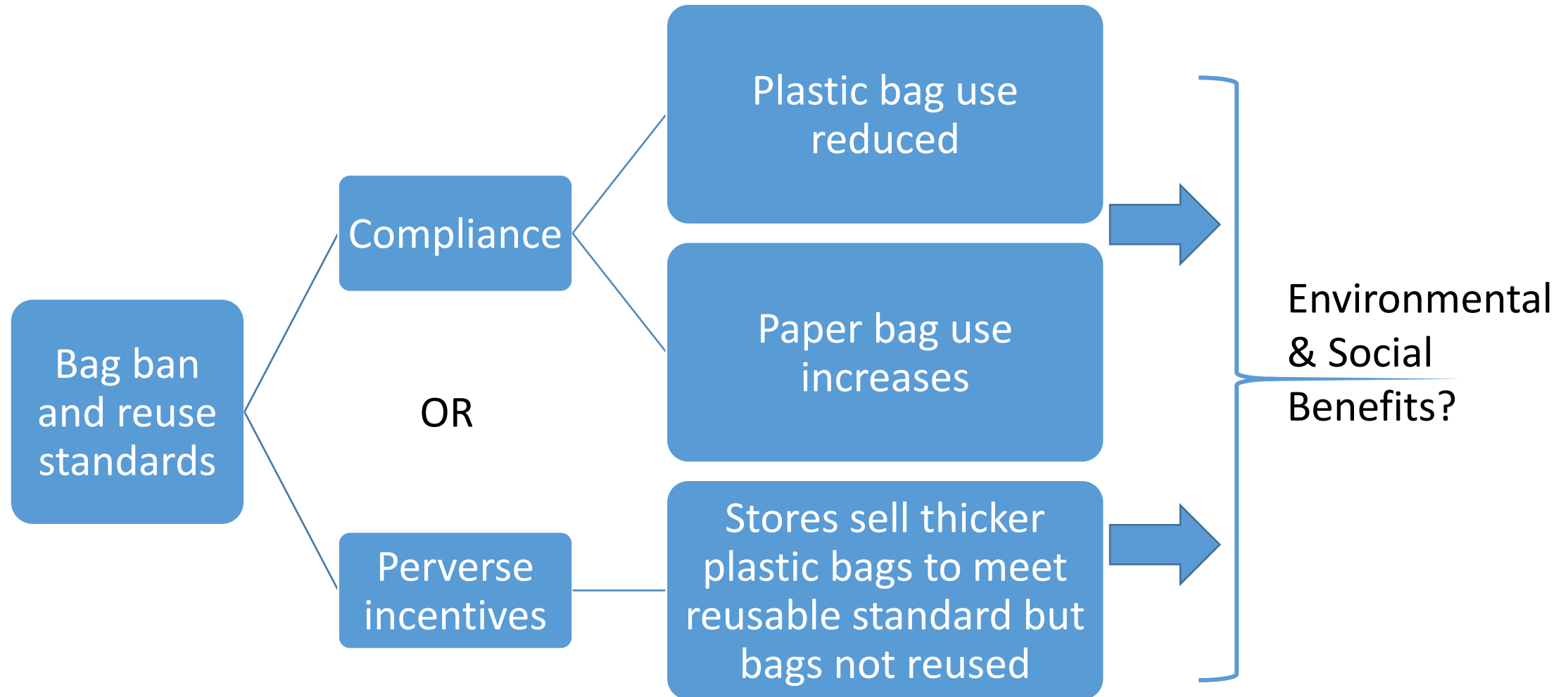
Addressing Market Failures

Tools in the toolbox

1. Legal - regulatory-driven
2. Economic - market-driven
3. Social - peer-driven / individual nudges



Using Legal/Regulatory options (and why incentives still matter)



Using market forces to correct market failures

- **Pigouvian Taxes**

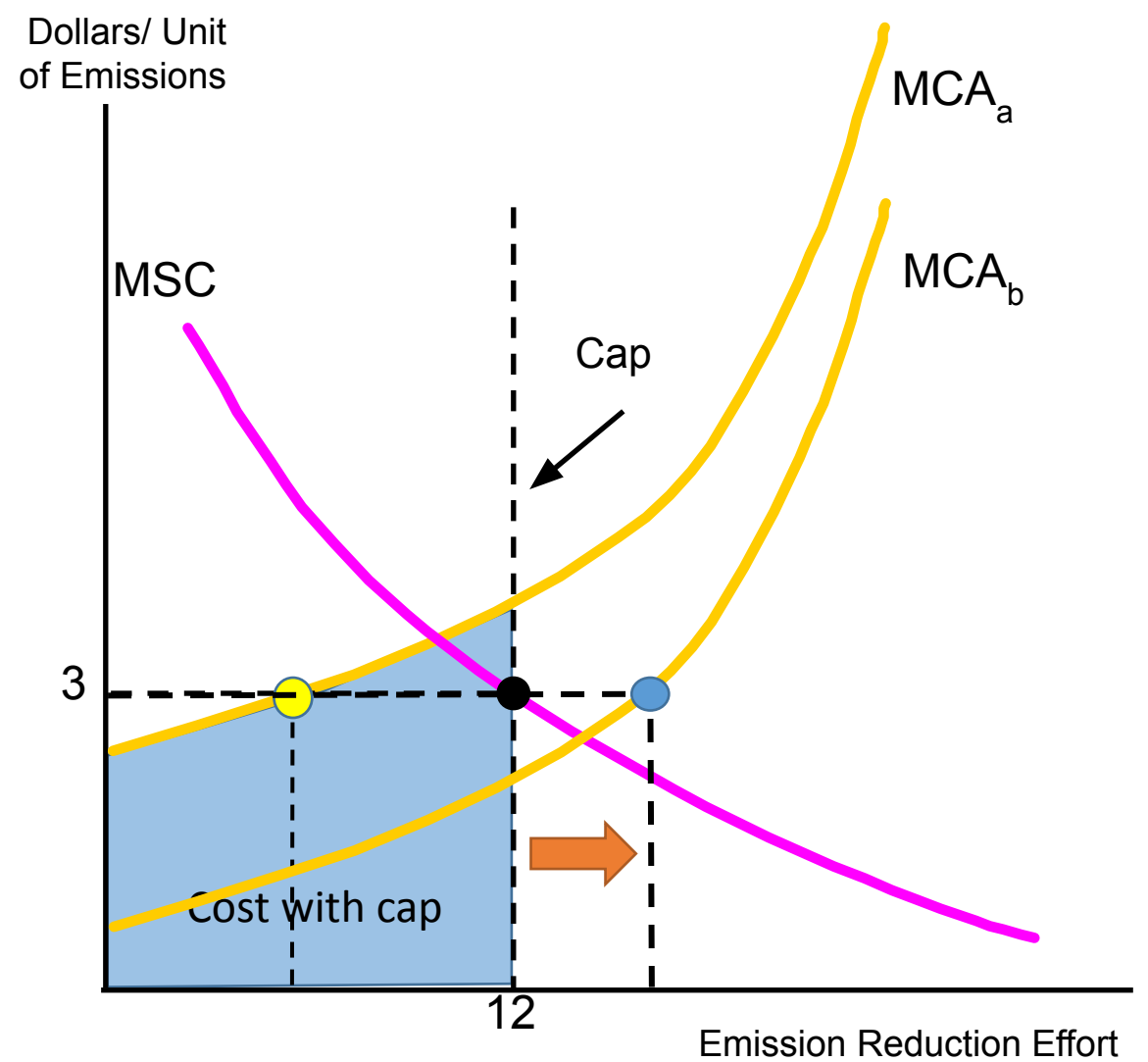
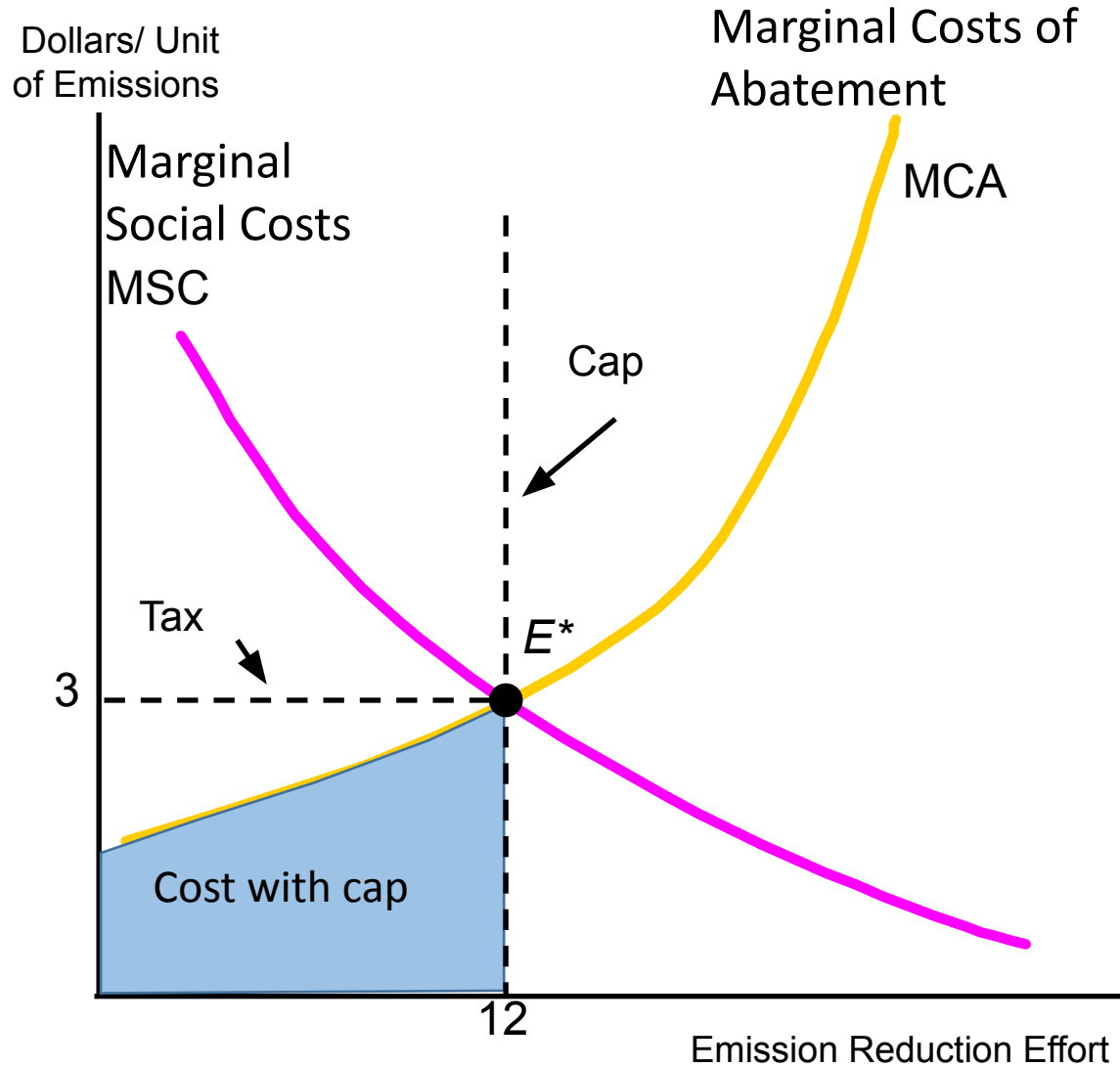
If *levels of pollution* are harmful, then make *polluting* more expensive

- **Other policies**

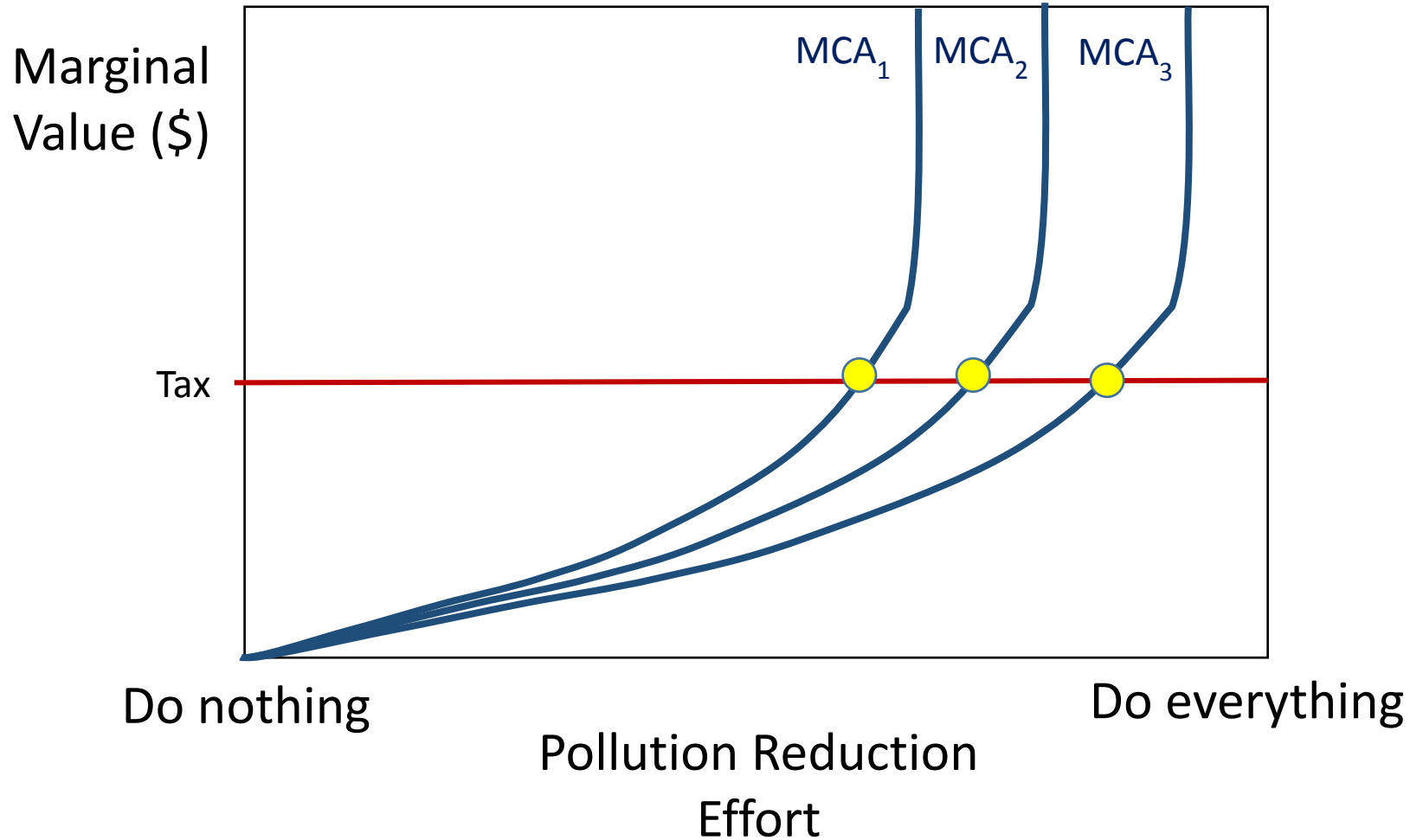
- Caps & emission standards
- Fees + rebates
- Green Certification / Product Differentiation



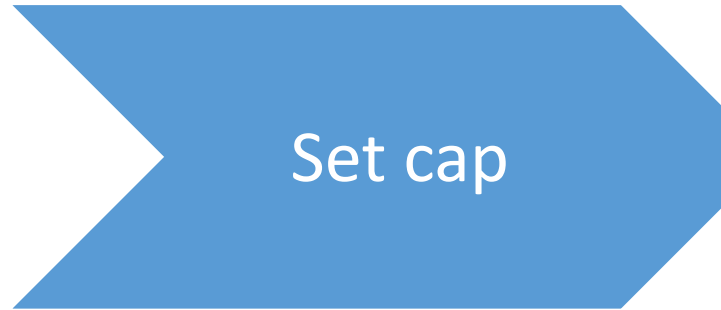
Economics in Setting Taxes and Caps



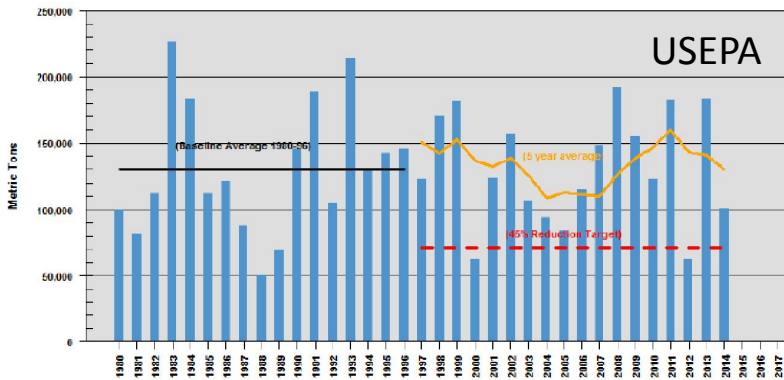
Policies that shift effort from high cost to low cost abaters will lower costs of achieving goals



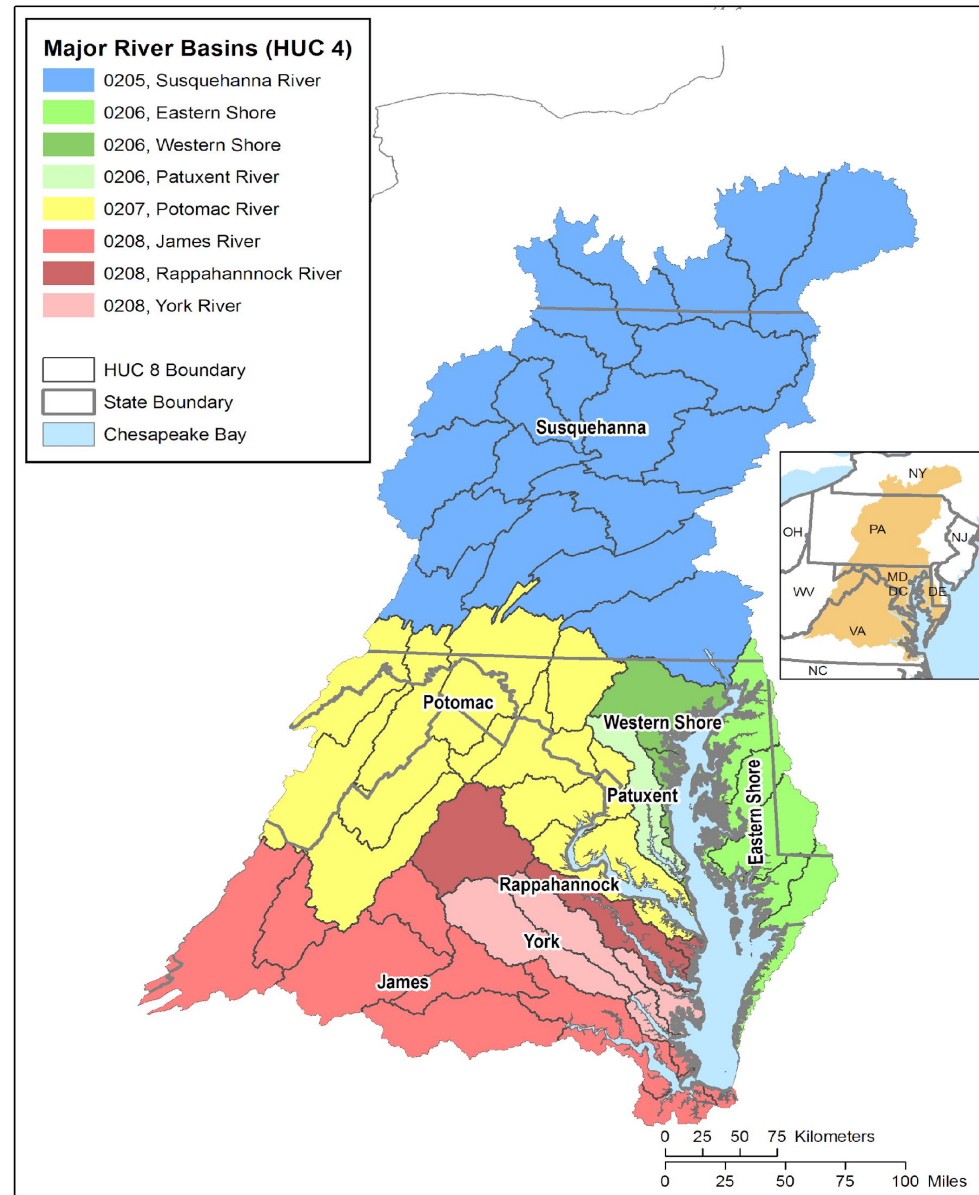
Cap and trade can overcome uncertainties of marginal costs of abatement



- Allowable pollution



Cap and Trade in the Chesapeake Bay watershed

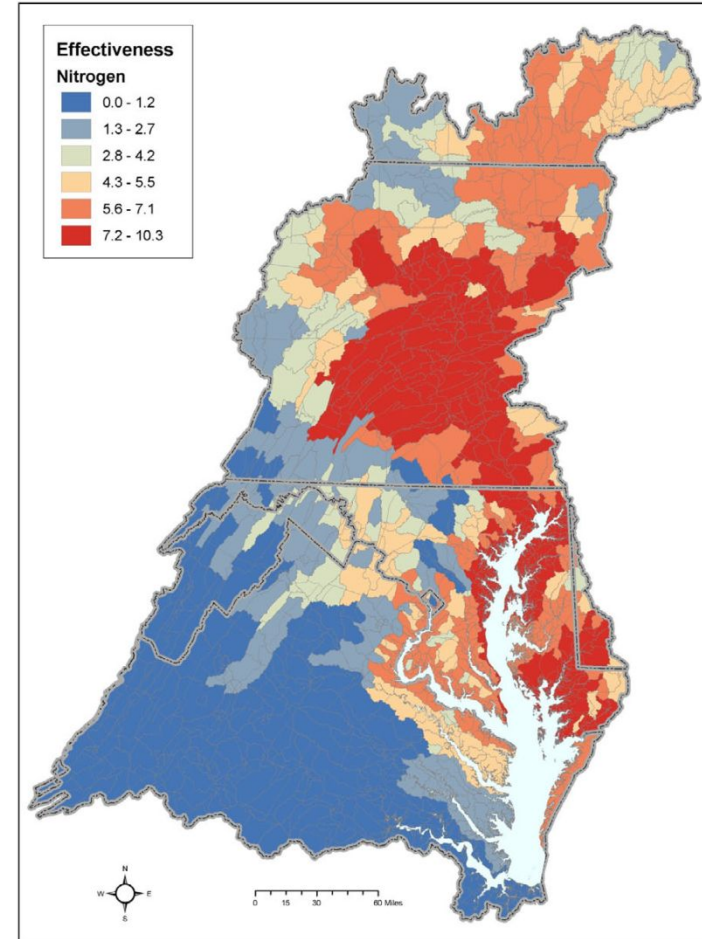


Chesapeake Bay Total Maximum Daily Load (TMDL) or *pollution diet*

- Goal: restore *aquatic habitat* in estuary
- Cap: Roughly 20-25% reduction in nitrogen, phosphorus & sediment from 2010 loads

Cost-Effectiveness of BMPs Varies by Location

Nitrogen runoff effect
on Bay mainstem
habitat quality by
watershed



Source: TMDL Executive Summary

How might trading work?

INDUSTRY

High costs

Power plants, industrial factories, wastewater treatment plants can buy credits

FARM

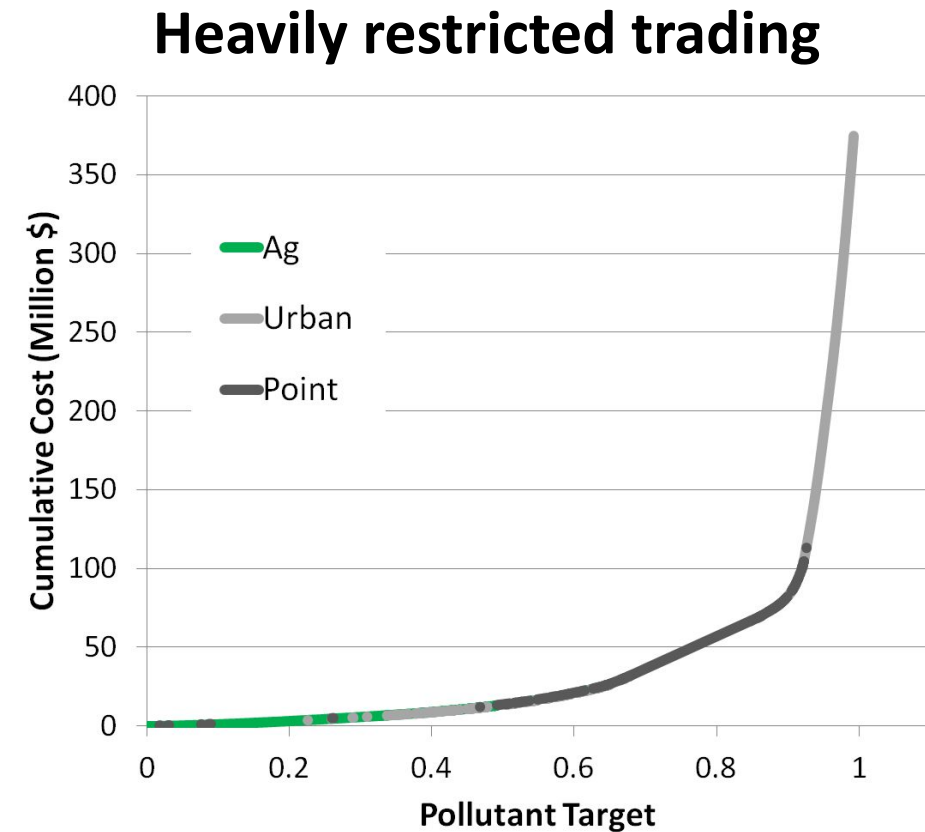
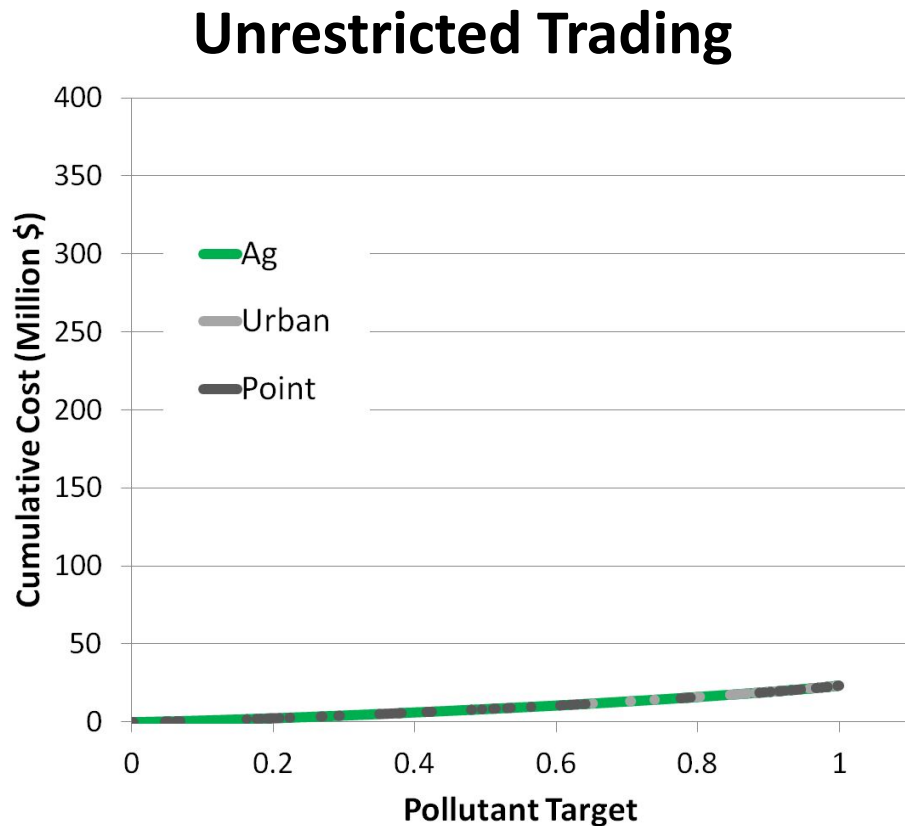
Low costs

Farmers use money from credits for projects to reduce nutrient runoff



The potential for trading to lower costs of meeting a TMDL

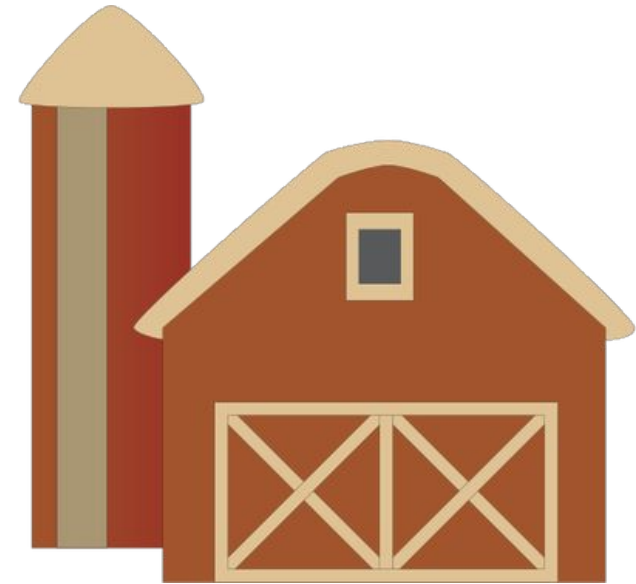
Potomac Basin Case Study



Potential market killers

Legal risks

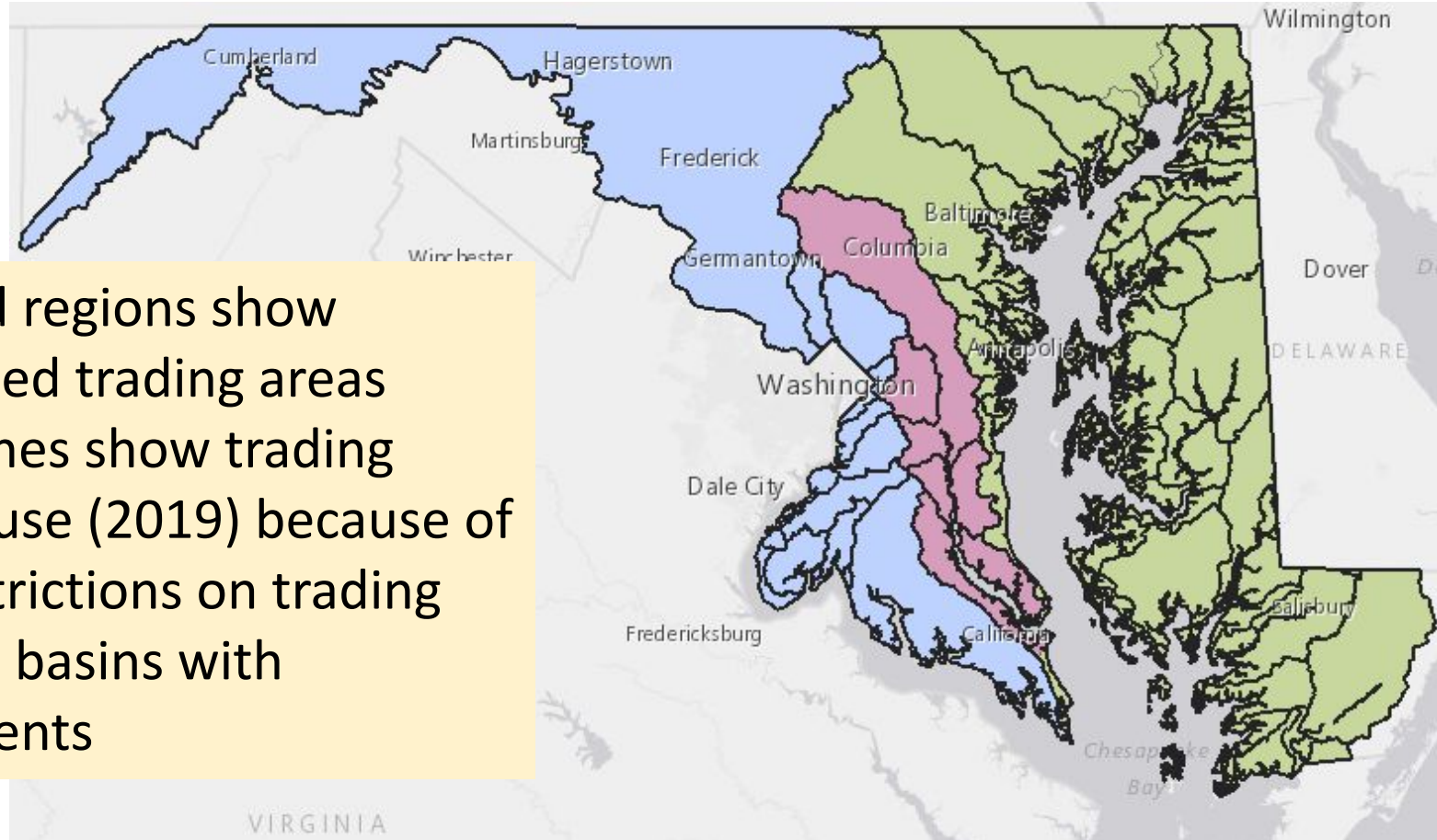
- Buyer concern - Legal liability for pollution reduction does not transfer
- Sellers concern - Risk exposure via credit verification activities



Potential efficiency killers

Credit price depends on supply and demand by trading area

- Colored regions show established trading areas
- Black lines show trading areas in use (2019) because of legal restrictions on trading between basins with impairments



If market is well-designed - trading lower costs of achieving a cap

Total Costs with Trading

Total Costs without Trading



Pay those with low costs of reductions to offset high cost reductions



Conclusions about economics application to policy tools

- Economic analysis can be used to assess which approach to addressing a market failure is likely to work best
 - Examining economic incentives, behavioral biases, market conditions
- Policies are efficient when you aren't paying more than you have to
 - Not imposing unnecessary costs on businesses and individuals
 - Not paying for things that people would have done anyway



Image: Getty