Urban Fertilizer Application Rates

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Urban Stormwater Workgroup Meeting
June 21, 2016

Turfgrass Application Rates
Phase 5

- Phase 5 models
  - Phosphorus applications are now 70% lower in states with legislation and 60% lower in states without legislation.
  - By 2016, states must show fertilizer sales/use statistics that substantiate these reductions in phosphorus applications.
  - Needed prior to 2017 Progress assessment in Dec., 2016

Turfgrass Application Rates
Phase 6

- Phase 6 models
  - Need final nutrient applications to turfgrass for model calibration (1985-2013) no later than mid-Sept., 2016
    - Variable through time?
    - Variable across states?
  - How do we forecast application rates for progress scenarios and for planning scenarios, e.g., 2025 WIPs?

Turfgrass Application Rates
Phase 6

- Two components
  - Fertilizer mass data
    - Association of American Plant Food Control Officials (AAPFCO)
      - Last USWG meeting, demonstrated fertilizer use/consumption using USGS methods for National Water-Quality Assessment program for period 1987-2006
      - Now demonstrating sales for farm and non-farm use 1985-2012
  - Pervious urban area data = turfgrass acres
    - Current data and methods
    - High-resolution land cover w/ USGS's Landsat processing center's backcasting methodology for land cover change 1984-2015 annual by end of August, 2016
- Non-farm fertilizer mass ÷ turfgrass acres = turfgrass application rate

Turfgrass Application Rates

Proposed Method for Fertilizer Mass

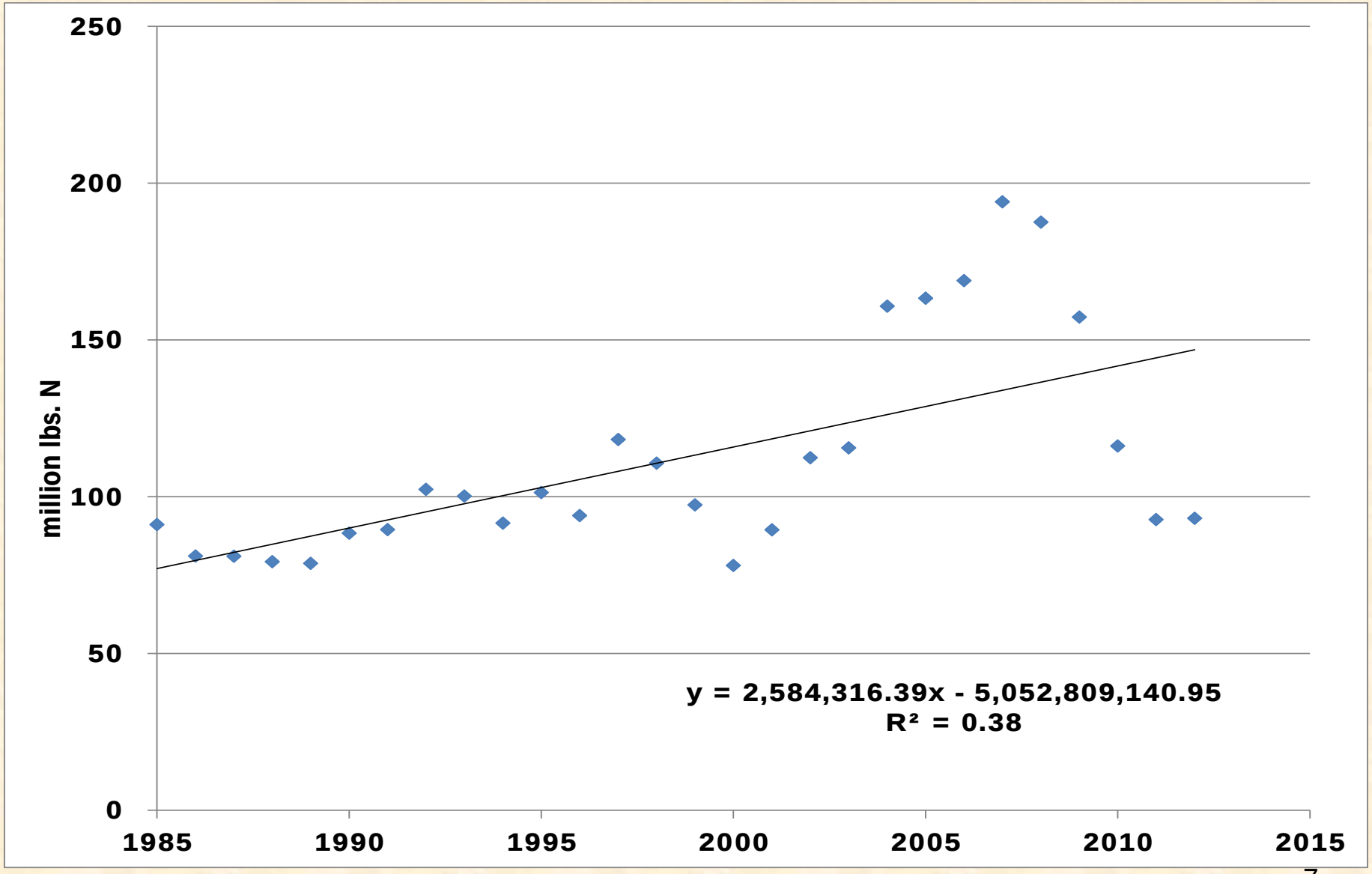
- Sum Farm, Non-Farm and Unknown for 6 states for each year (1985 through 2012)
- Replace outliers and interpolate missing years
- Calculate fraction of Farm vs. Total for 6 states for each year (1985 through 2012)
- Calculate 3-Year Rolling Average of Farm vs. Total for 6 states for each year (1985 through 2012)
- Estimate Farm Total for 6 states for each year by multiplying Total by 3-Year Rolling Average Farm
- Assume Non-Farm = Total – Farm
- Currently no way to estimate amount used within the watershed vs. outside

Nitrogen
Fertilizer Sales

Chesapeake Bay Watershed States
1985-2012

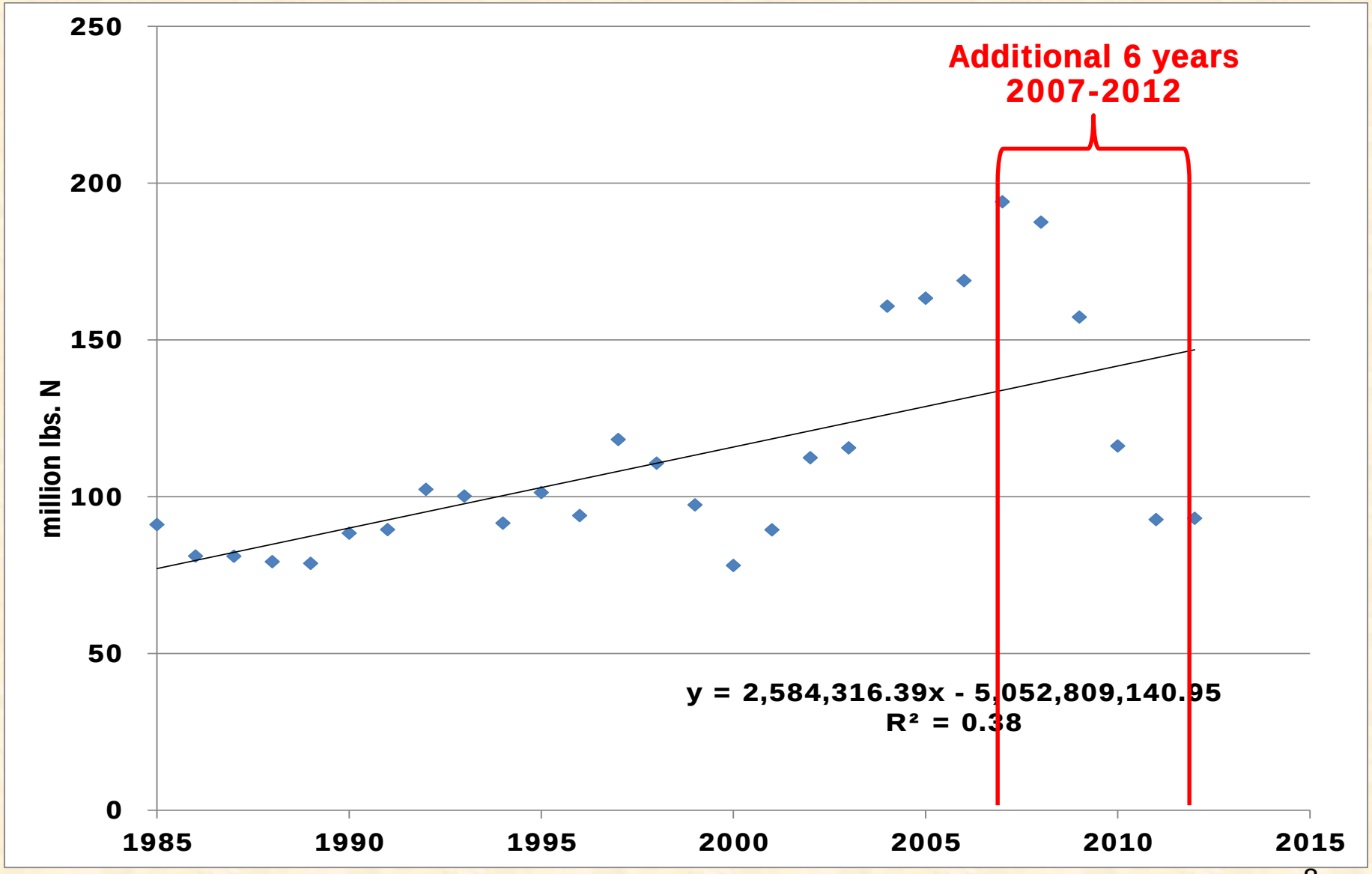
Nitrogen Fertilizer Sales

Pounds Annually for CB Watershed



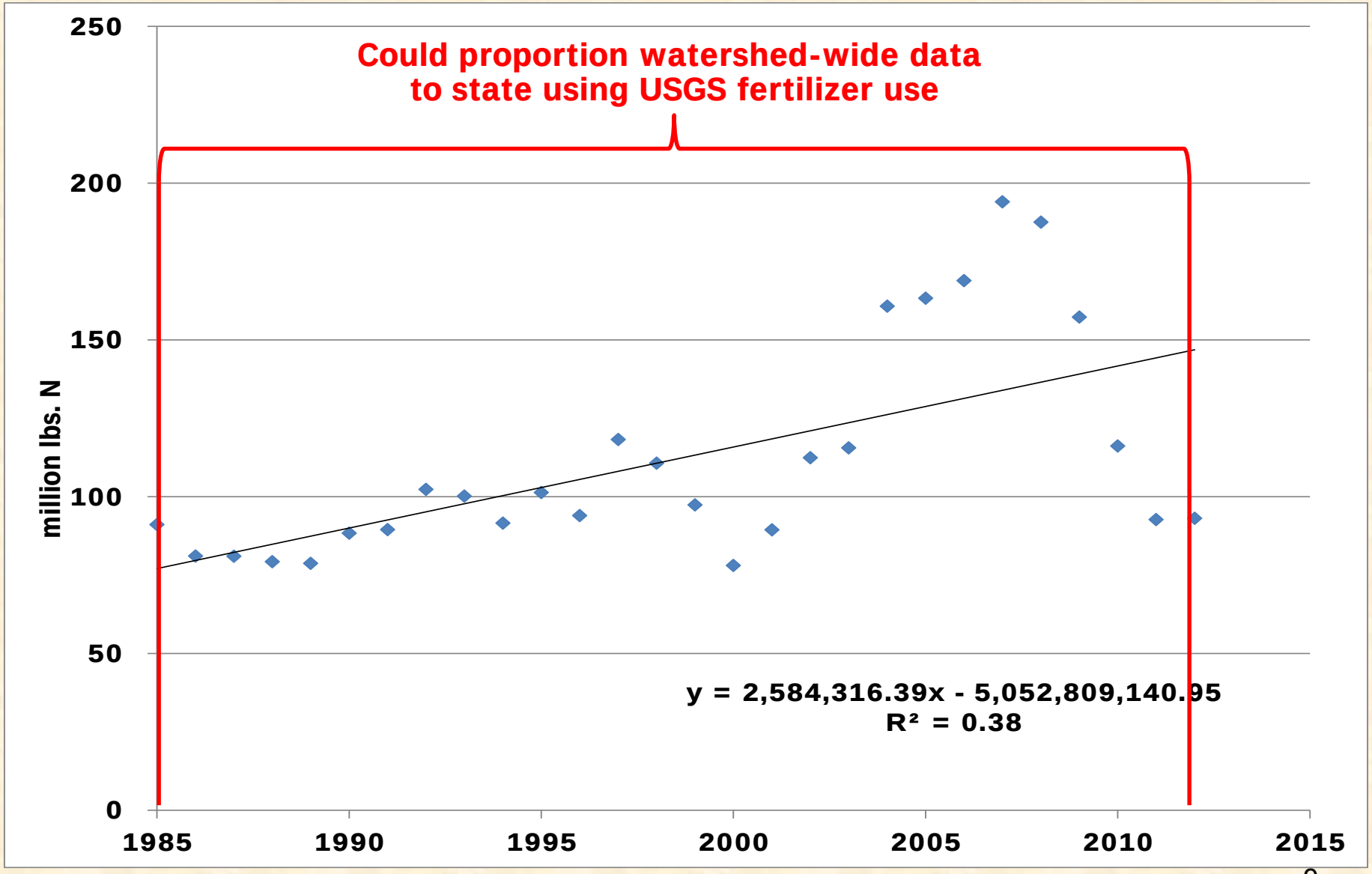
Nitrogen Fertilizer Sales

Pounds Annually for CB Watershed



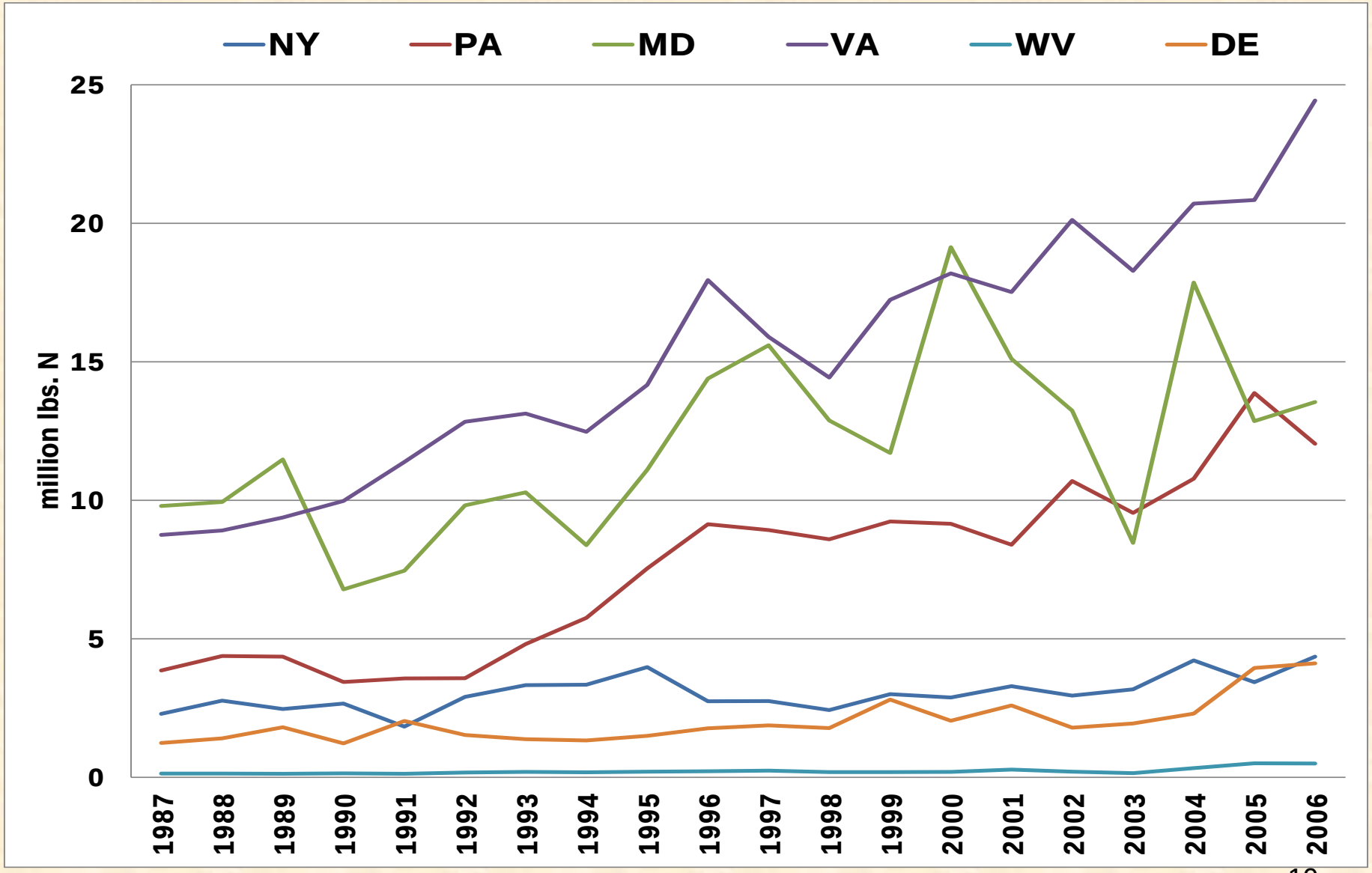
Nitrogen Fertilizer Sales

Pounds Annually for CB Watershed



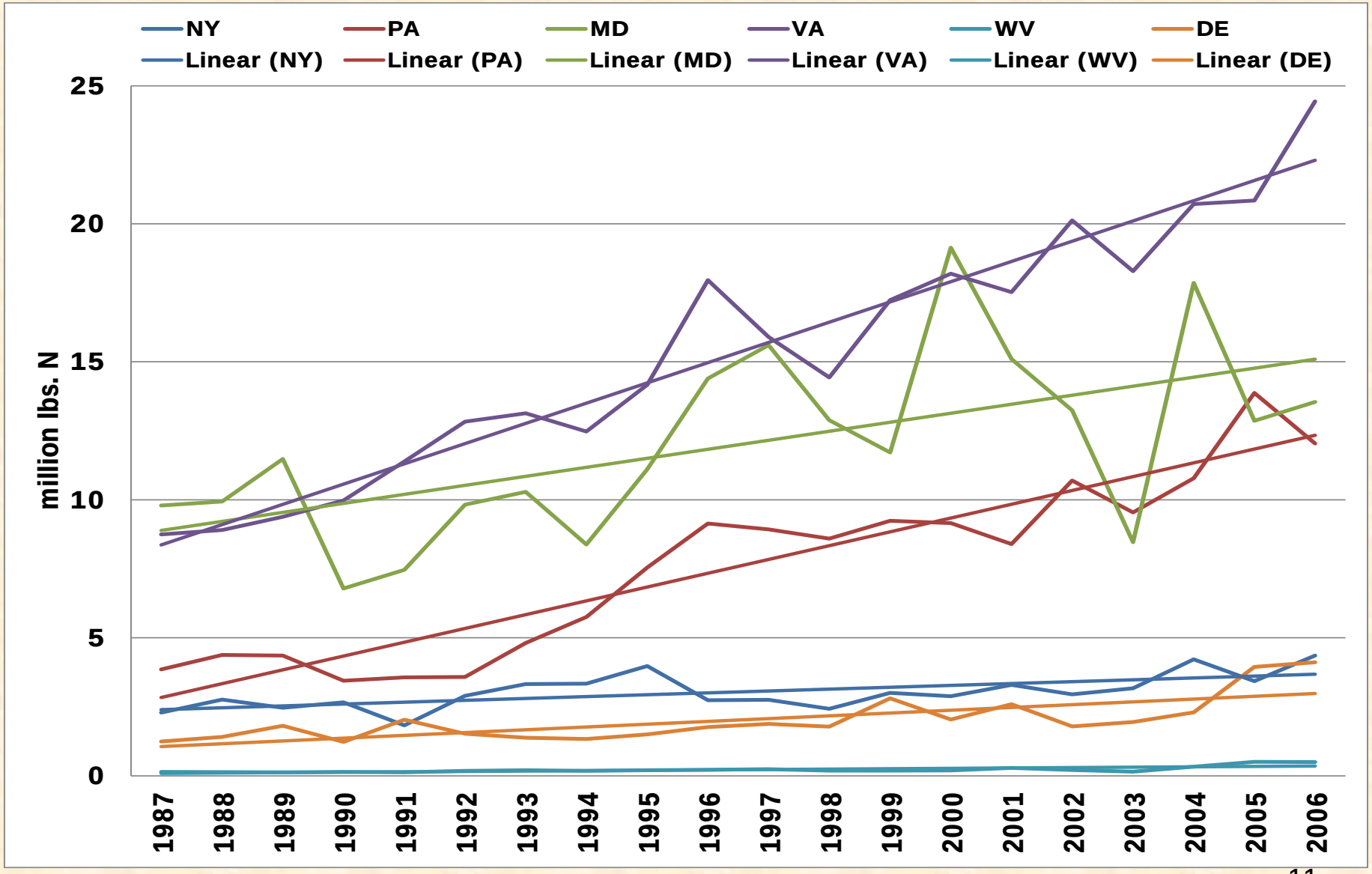
Nitrogen Fertilizer Use

Pounds Annually by State

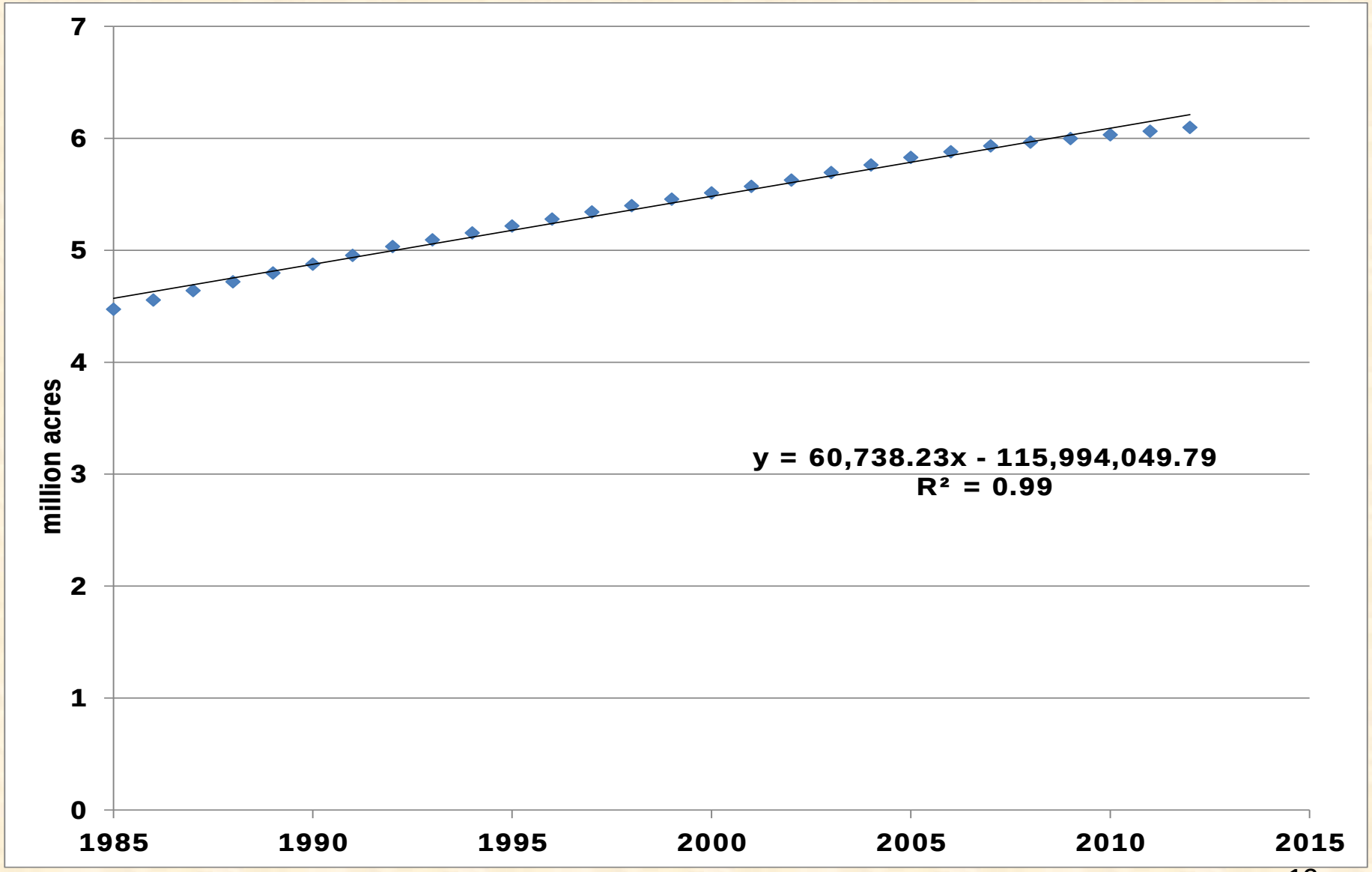


Nitrogen Fertilizer Use

Pounds Annually by State

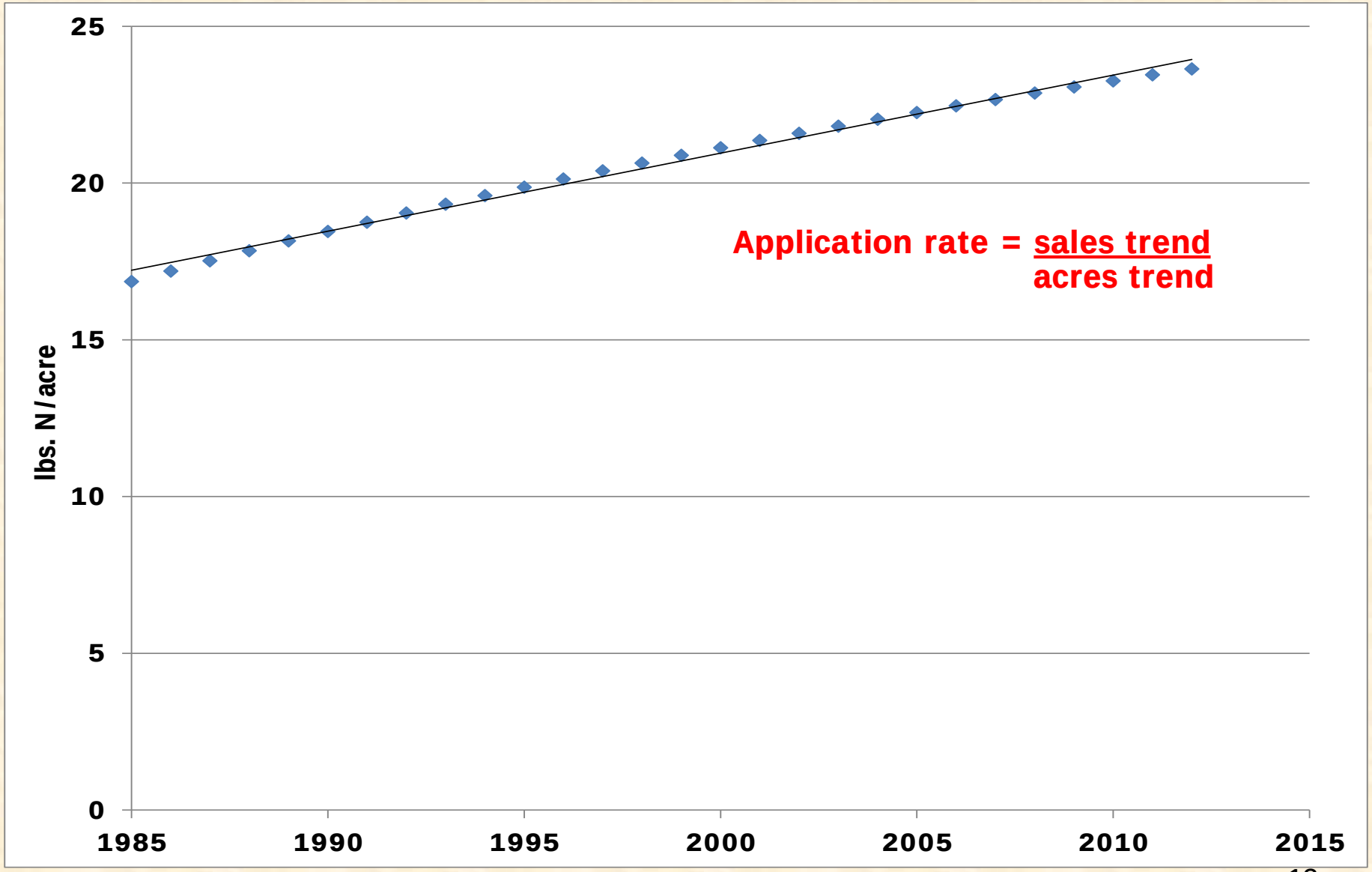


Turfgrass Acres
CB Watershed



Nitrogen Fertilizer Application Rate

CB Watershed



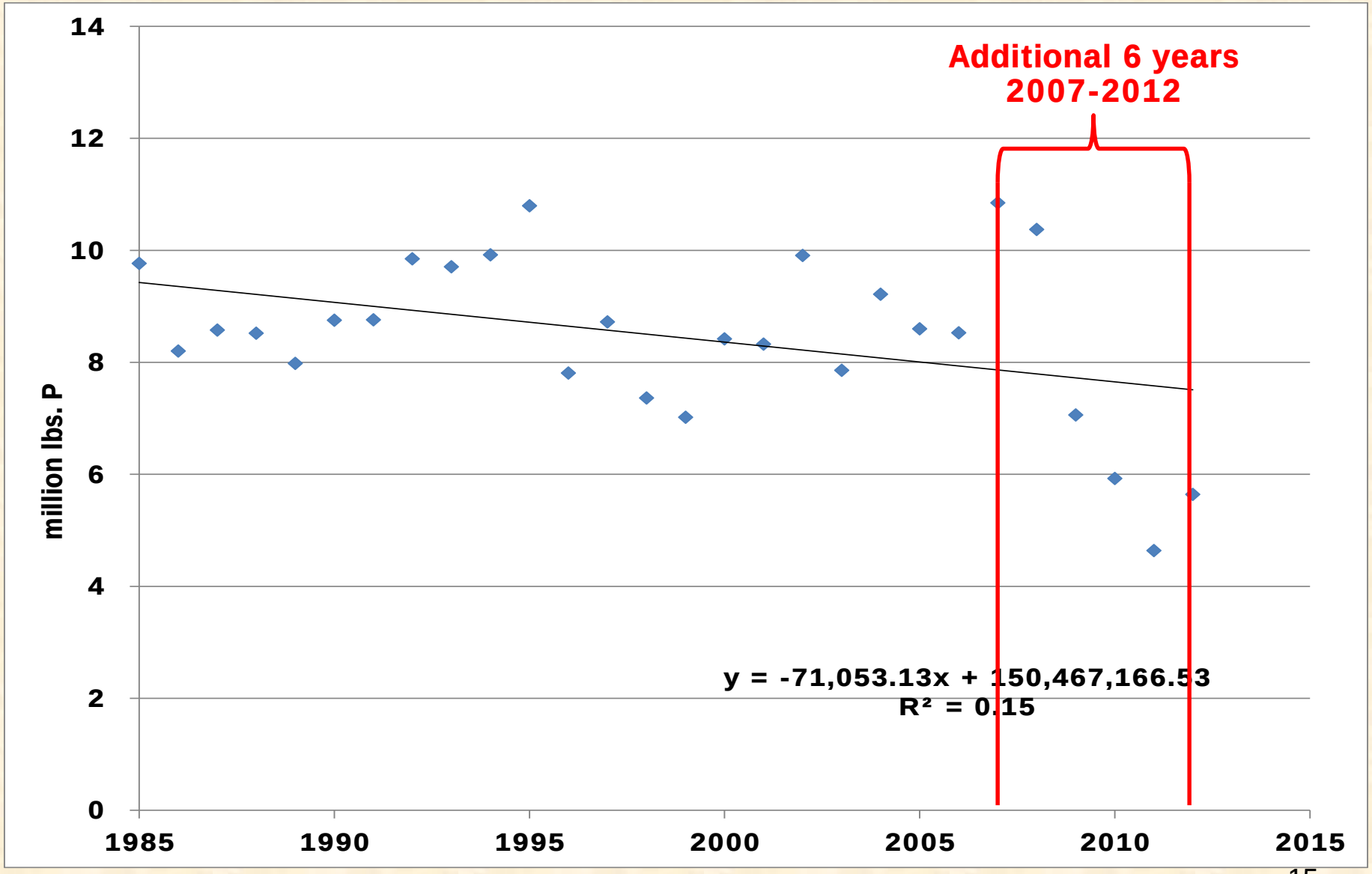
Phosphorus
Fertilizer Sales

Chesapeake Bay Watershed States

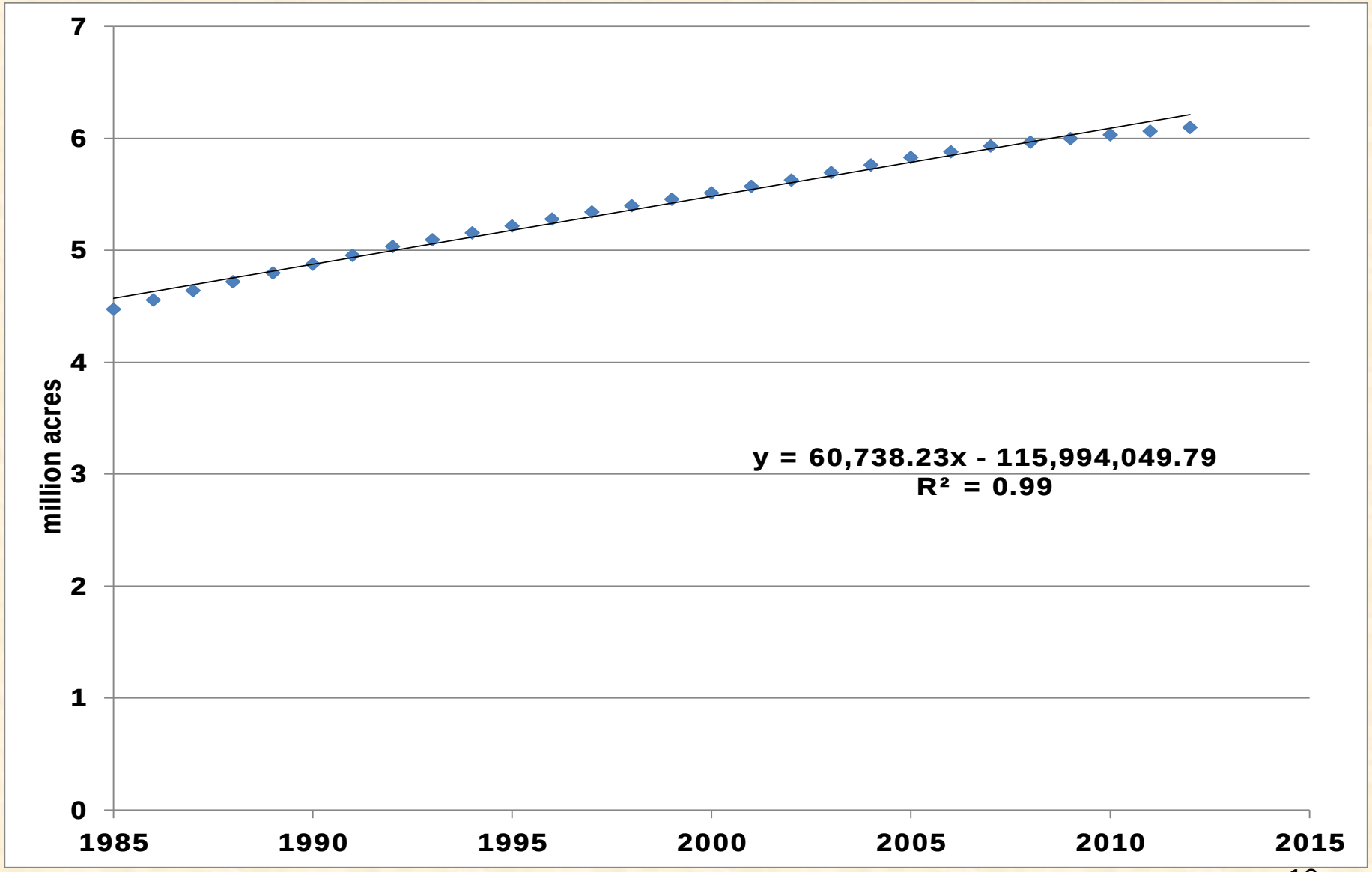
1985-2012

Phosphorus Fertilizer Sales

Pounds Annually for CB Watershed

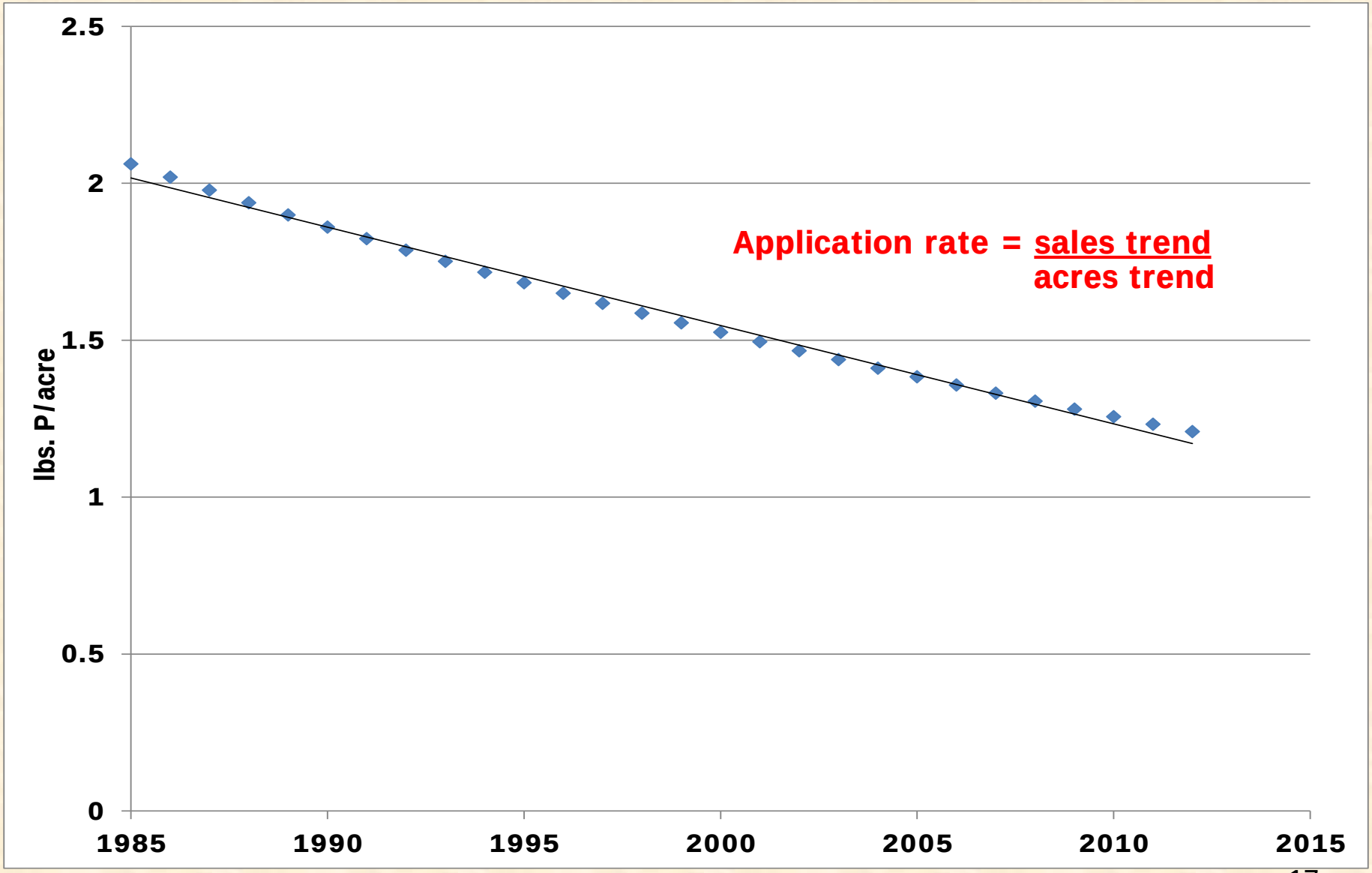


Turfgrass Acres
CB Watershed



Phosphorus Fertilizer Application Rate

CB Watershed



Turfgrass Application Rates

Proposed Data + Methods for Phase 6 Calibration

- For mass of N and P
  - Use sales data or, when available, USGS fertilizer use data
  - Assume non-farm mass = total – farm, where CB watershed total follows Agriculture Workgroup data and methods
- Proportion CB watershed-wide mass among states according to relative use (USGS) for each year (trend line) and projections of use.
- Turfgrass acres for each year for each jurisdiction from Landuse Workgroup data and methods

Turfgrass Application Rates

Proposed Data + Methods for Phase 6 Calibration

Pros

- Connected to database of fertilizer nutrient mass used for both farm and non-farm
- Variability through time and among states is refinement from Phase 5
  - Captures variability among states for rural versus suburban
- Volatility of sales data reduced with USGS fertilizer use
- Volatility of sales and use data reduced by using trends rather than absolute numbers.
  - What's more important for TMDL purposes is trend over time rather than snapshot in time.
- May be able to use some of these concepts for Phase5 2016 Progress to substantiate P application reductions

Cons

- Can take many years for degrading trends to reverse

Turfgrass Application Rates

Proposed Data + Methods for Phase 6 Calibration

Cons

- Can take many years for degrading trends to reverse – but the same is true for improving trends

Turfgrass Application Rates

- Jurisdictions should continue collecting urban fertilizer data from their sources if available
- Findings may not align with what's expected or hoped for

Questions and Comments?

Dissolved Oxygen Attainment