Trends in Phosphorus Generated by Broilers Based Upon Data Submitted by the Poultry Litter Subcommittee

Presentation to the Agricultural Workgroup, 05012014

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All data courtesy of Chesapeake Bay Program's Poultry Litter Subcommitte

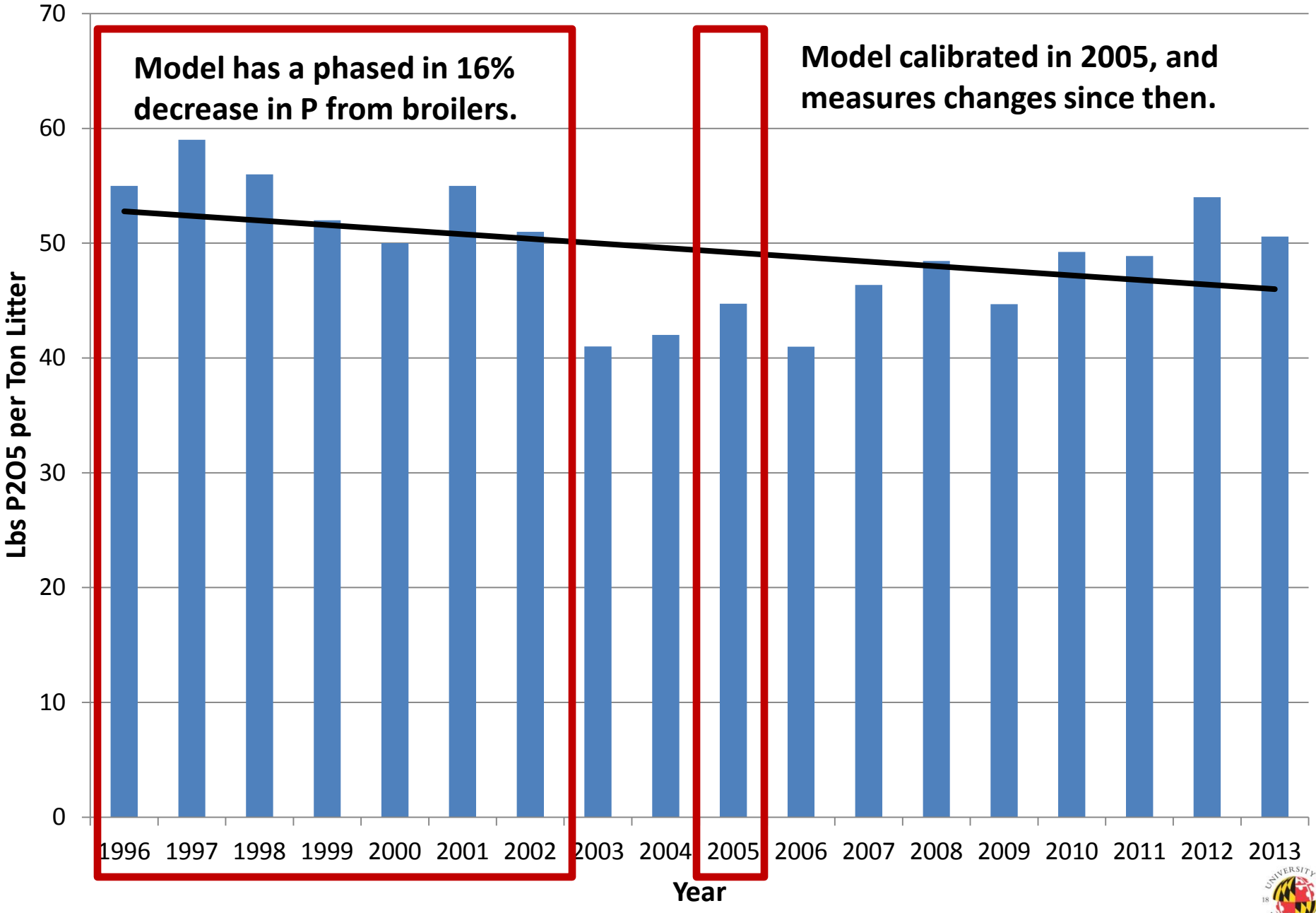
Request of Modeling Team

- Poultry Litter Subcommittee (PLS) collected the following for broilers, turkeys, layers and pullets (not all parameters were available for each animal type in each state):
  - Population data
  - Litter volume data
  - Litter nutrient concentration data
- PLS requested an analysis of the following:
  - Trends in each parameter; and
  - How these trends would impact phosphorus generation estimates in the Phase 5.3.2 modeling tools if approved.

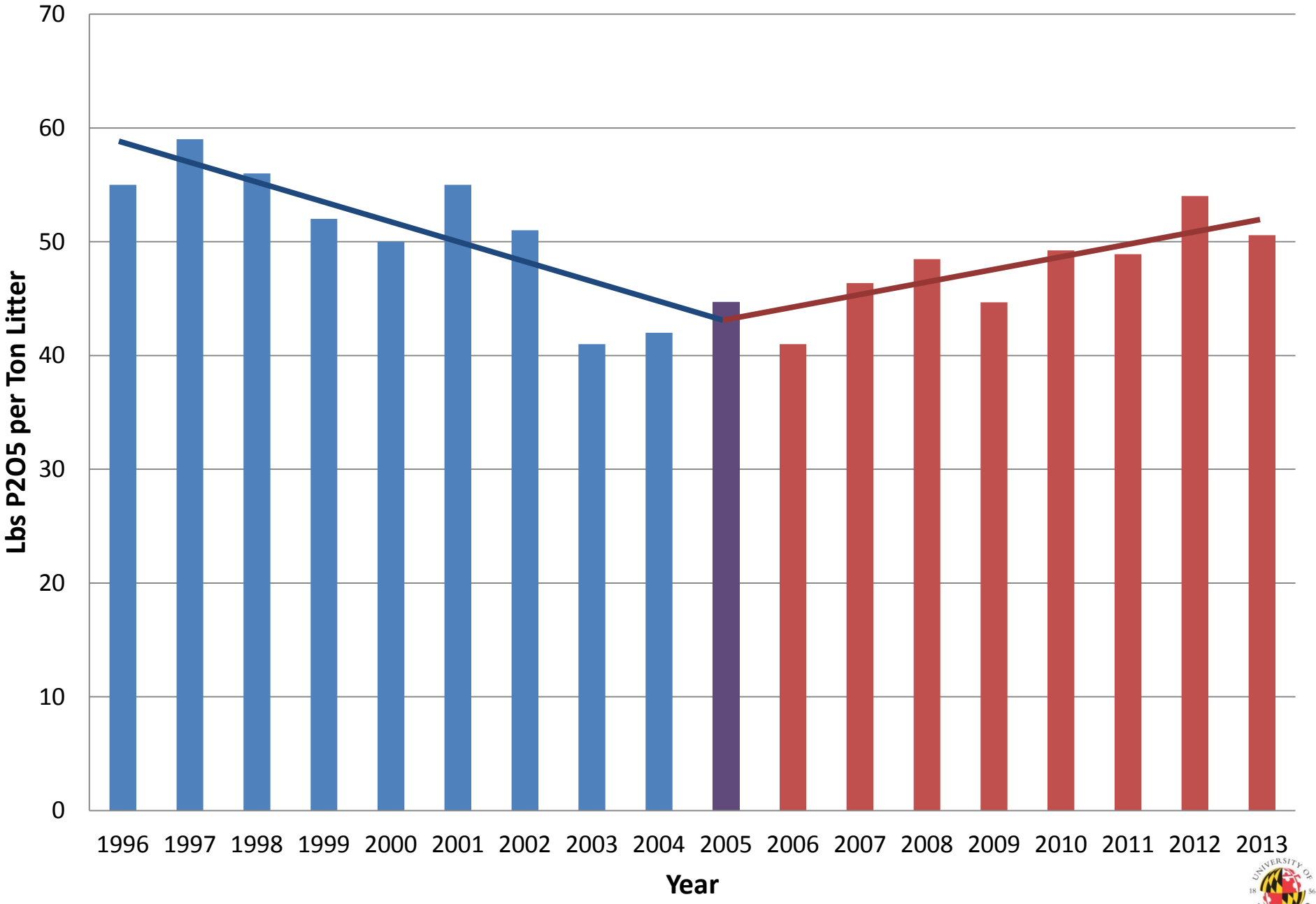
Methods

- **Populations:** Change Inventory based on slope from annual NASS Production (post-2007)
- **Volumes:** Change Lbs of Litter Generated based on slopes from State Templates (post-2005)
  - Baywide average used for PA and WV.
- **P2O5 Concentrations:** Change Lbs of P Generated based on slopes from State Templates (post-2005)
  - Baywide average used for PA.
- All trends were applied to 2014 estimates of phosphorus generated by broilers.

Long-Term Broiler Litter P2O5 Trend in DE



Short-Term Broiler Litter P2O5 Trends in DE



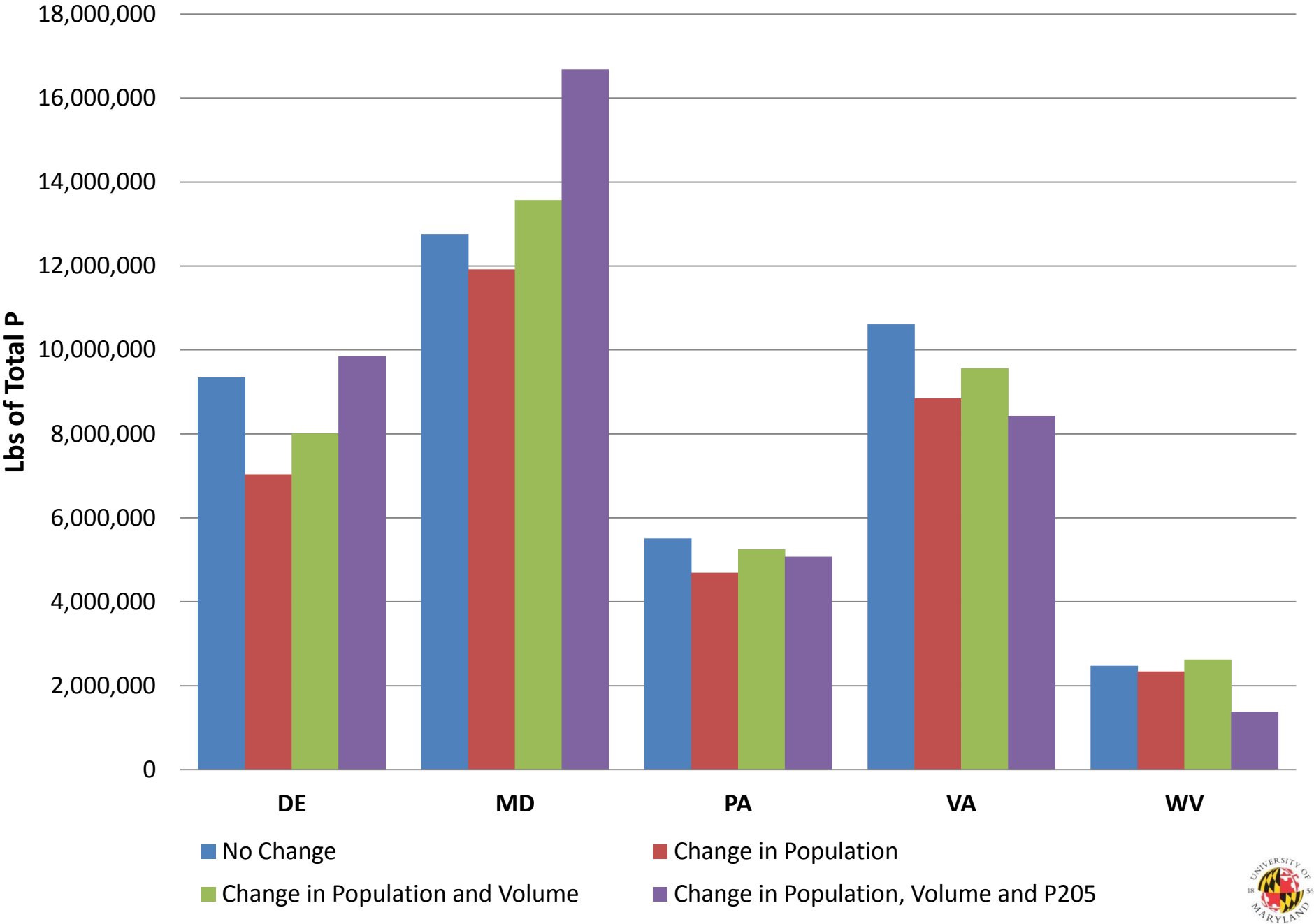
Trends in Broiler Data

State	Population Change (since 2007)	Litter Volume Change (since 2005)	P205 Change (since 2005)
DE	-24.74%	13.84%	22.91%
MD	-6.54%	13.84%	22.91%
PA	-14.91%	11.94%	-3.35%
VA	-16.65%	8.14%	-11.89%
WV	-5.29%	11.94%	-47.33%

Red indicates Bay-wide trends were used because states did not report data.

- All states show decreases in population.
- DE/MD and VA were the only states to provide volume information.
- Broiler weights increased in DE/MD by 19% since 2005, but increased only 5% in VA. This MAY indicate why litter volumes increased.
- Changes in dry weight P205 concentrations vary dramatically from year-to-year. Why?

Estimated Lbs of P Applied to Cropland in 2014



Cumulative Changes in Total P Available from Broilers in 2014

State	Due to Population	Due to Population and Volume	Due to Population Volume and P205
DE	-24.74%	-14.32%	5.31%
MD	-6.54%	6.40%	30.78%
PA	-14.91%	-4.75%	-7.93%
VA	-16.65%	-9.86%	-20.58%
WV	-5.29%	6.02%	-44.16%

Red indicates Bay-wide trends were used because states did not report data.

- DE and MD see increases in total P, while VA and WV see decreases.
- PA did not provide enough data for trends, so their results are entirely dependant upon Bay-wide averages for volume and P2O5.

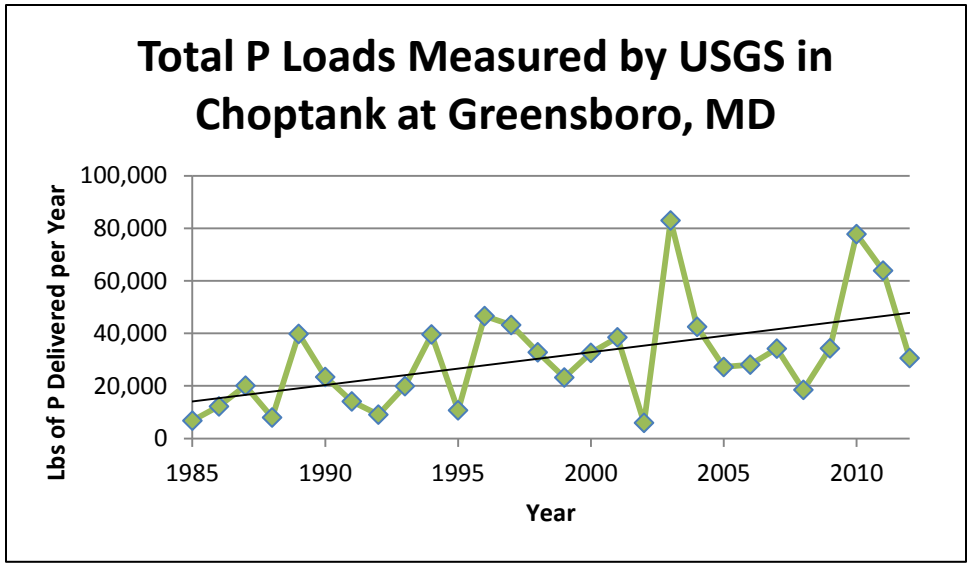
PLS Concerns

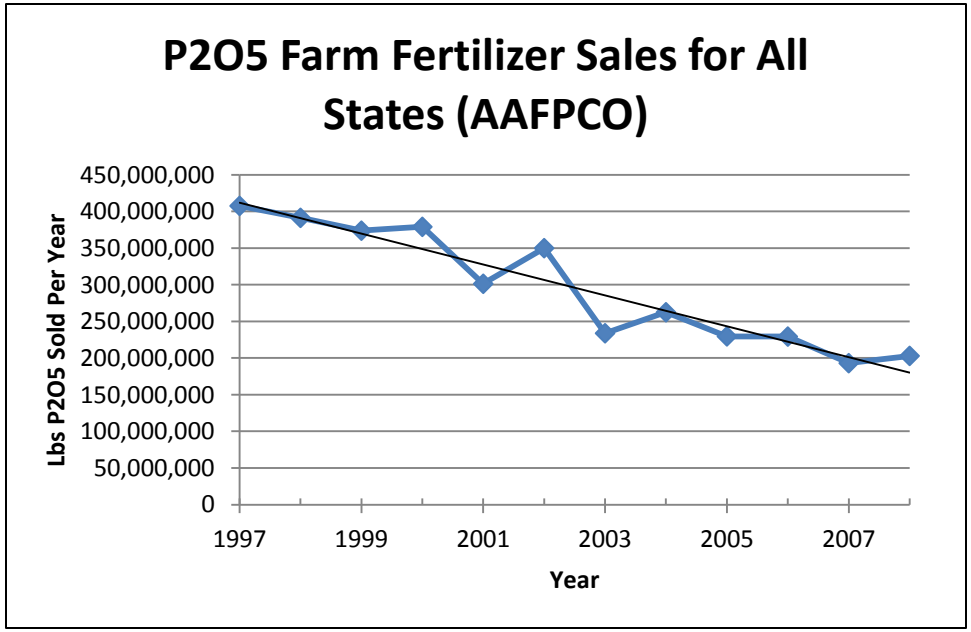
- Ag Census population data do not illustrate the year-to-year variability and short-term trends seen in the annual NASS population data.
- Impacts of trends on nutrient estimates do not match what PLS expects nutrient estimates to be in the Phase 6 Model.
- Data gaps exist for a number of parameters in a number of states.
- Some parameters for some states are highly variable.

Questions to Answer

- What is causing the variability in data, specifically in P2O5 concentrations?
- What changes have been made to feed, phytase levels, cleanout frequencies, bedding materials and litter amendments?
- How will additional data be collected to reduce data gaps prior to Phase 6?
- What defaults should be used if a state is unable to collect data for a particular parameter?

Other Trends the Workgroup Might Consider





- Total P Loads in the Choptank River at Greensboro, MD have increased over the past three decades. (http://cbrim.er.usgs.gov/loads_query.html)
- USGS found that trends in TP concentrations in the Choptank have increased since 1985 (long-term) and since 2003 (short-term). (http://cbrim.er.usgs.gov/maps.html)
- AAFPCO farm fertilizer sales data indicates a dramatic drop in P2O5 fertilizer sales from 1997 through 2008 across all states.
- It's essential to characterize the nutrient loads from each source with the best available data for modeling purposes.
- Once characterized, managers can assess how trends in sources are influencing trends in water quality.