Estimating Poultry Populations, Litter Nutrient Content, and Generation

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Motivation

- EPA is using the 2003 ASAE Standard to estimate Nitrogen and Phosphorous generation from animal agriculture.
- The Standard is based on data from the late 1980's and early 1990's.
- The Agriculture Workgroup (AgWG) created the Poultry Litter Sub-Committee in 2011.
- Sub-Committee Charge:
  - Collect data that better reflects modern (and historical) N and P concentrations in poultry litter.
  - Develop N and P generation quantities, both modern and historic .
  - Develop alternate methods to estimate poultry population numbers across the watershed and compare to current methods used in the model.

Committee Membership

Jim Glancey	UD
Mark Dubin	UM
Emma Giese	CBPO
Mark Davis	DDA
Tom Basden	WVU
Bill Brown	UD
Glenn Carpenter	USDA NRCS
Frank Coale	UM
Jason Dalrymple	WVDA
Doug Goodlander	PA DEP
Matt Johnston	CBPO
Bobby Long	VA DCR

Jen Nelson	USDA NRCS
Jerry Ours	WVDA
Paul Patterson	Penn State
Jim Pease	VT
Royden Powell	MDA
Tim Sexton	VA DCR
Kelly Shenk	EPA
Trish Steinhilber	UM
Jeff Sweeney	EPA
Jennifer Timmons	UM
Jennifer Weld	PSU
Hank Zygumnt	Keith Campbell

Our Interest

How much N and P is being generated within the Bay watershed from the poultry industry?

Pounds of N = (lbs N/lb litter) x (lbs/bird) x (#birds)

(*concentration) (generation) (population)*

DDA Lab Analysis of Poultry Manure

2005 through 2011

	No.	Total N		Phosphate (P2O5)		Total P	
Year	Samples	%	lbs/ton	%P2O5	lbs P2O5/ton	% P	lbs P/ton
2005	462	2.93	58.6	2.23	44.7	0.98	19.5
2006	589	2.77	55.4	2.05	41.1	0.90	17.9
2007	522	2.86	57.2	2.36	46.4	1.03	20.2
2008	472	2.83	56.6	2.35	48.5	1.02	21.1
2009	721	2.77	55.5	2.24	44.7	0.98	19.5
2010	649	2.88	57.5	2.46	49.2	1.07	21.5
2011	743	3.02	60.3	2.45	48.9	1.07	21.3
	4158 (total No. of samples)	2.86	57.3	2.31	46.2	1.01	20.2

averages

Summary of Poultry Data Sets Across the Watershed

- Delmarva
  - Chickens
  - Data Sets: 1996-1999, 2000-2005, 2006-2011
- Virginia:
  - Chickens, Turkeys
  - Data Sets: 2001-2005, 2006-2012
- West Virginia
  - Chickens, Layers, Pullets, Turkeys
  - Data Sets: 1996-1999, 2000-2005, 2006-2012
- Overall
  - 21 data sets summarizing over 8000 data points within the watershed.

Typical Data Set - Delmarva

Nutrient Content and Volume Generated - Chickens

Parameter	Value
Time Range	2006 to 2011
No. of Data	3696
Avg. TN Concentration	57.1 lbs/ton
TN Range*	55.4 to 60.3 lbs/ton
Avg. TP Concentration	20.1 lbs/ton
TP Range*	17.9 to 21.3 lbs/ton
Moisture Content	30.1 % w.b.
Moisture Content Range*	28.0 to 32.1 % w.b.
Manure Generation	1.5 tons/1000 birds
Manure Generation Range	0.5 to 4.6 tons/1000 birds

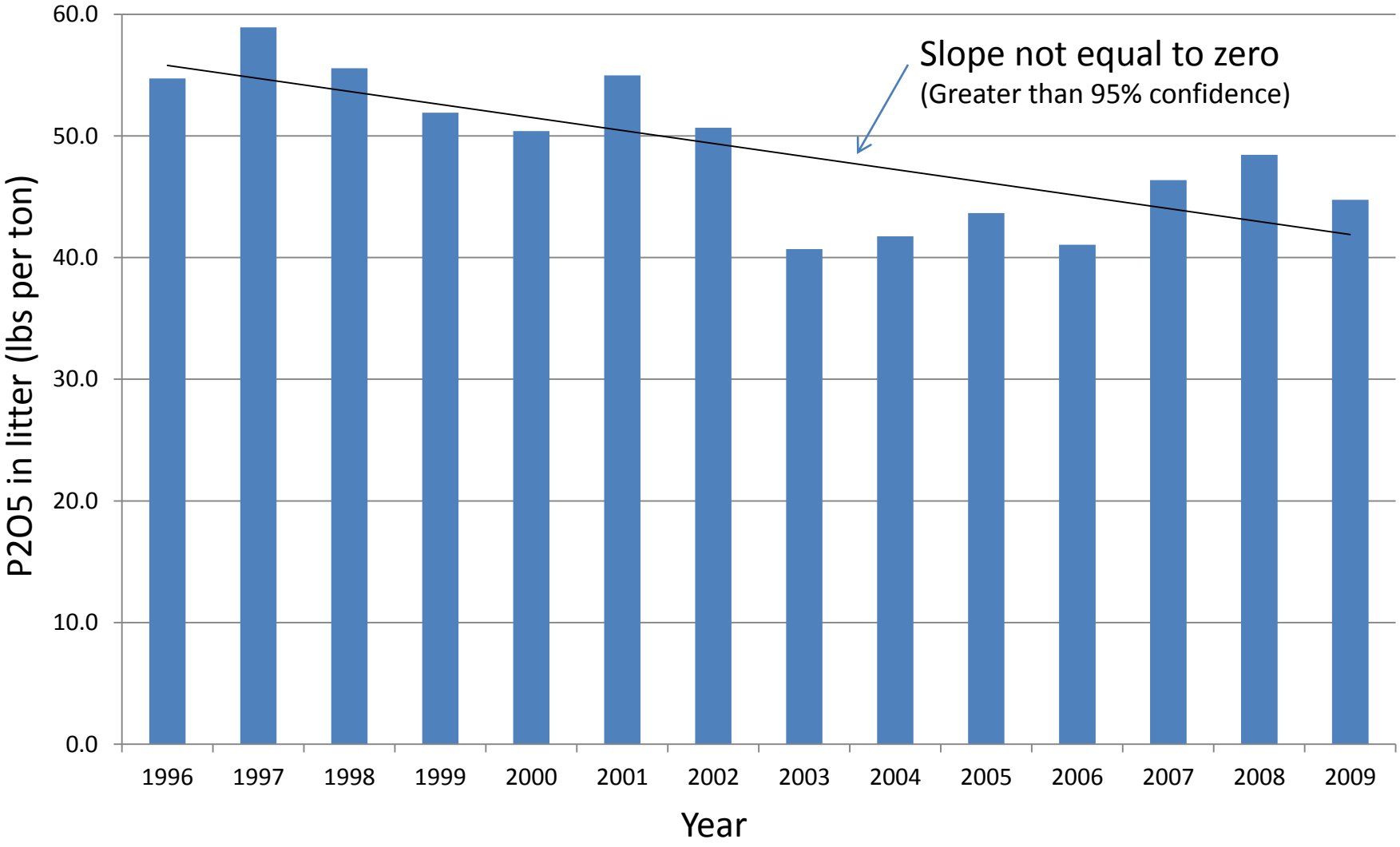
* Based on annual averages

Comments

- All manure samples analyzed by the DDA laboratory.
- Bird sizes: 60% roasters, 40% broilers
- Average bird weight = 7.1 lbs
- Manure generation based on a total of 702 poultry house cleanouts or crustouts
- Average NH3-N = 10.6 lbs/ton (Range: 8.0 to 12.4 lbs/ton)
- 2012 data still being summarized by DDA

Phosphorous Concentration Trend

Delmarva



Implications and Observations

- Genetics, feed technologies and improved growing environments have reduced waste produced from the poultry industry.

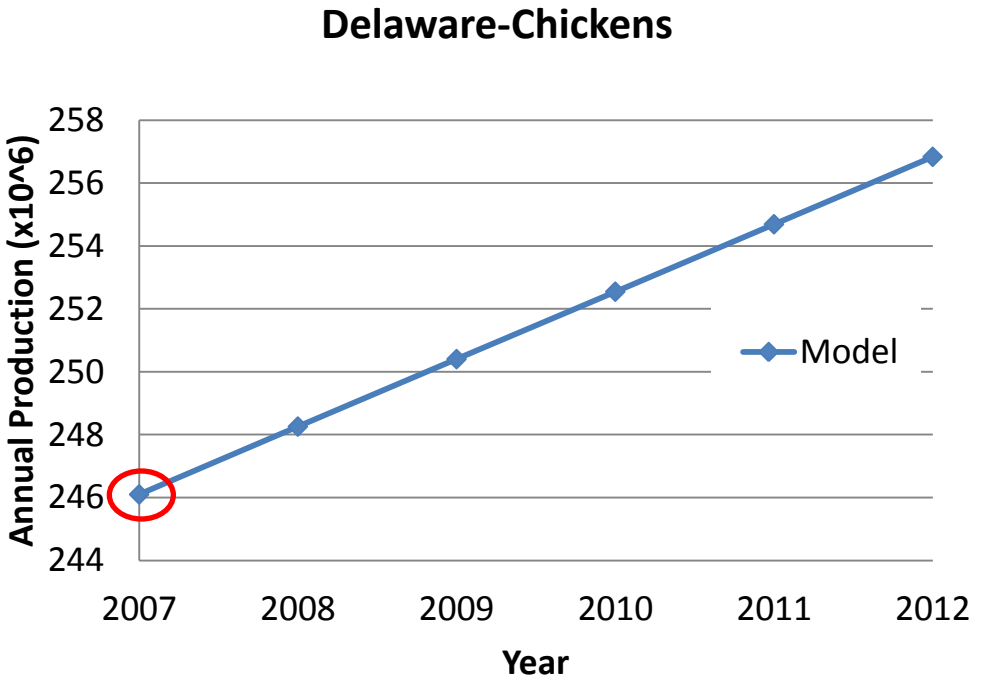
- Phosphorous Concentrations
  - Trending lower over time (statistically significant reduction from 1996 to today on Delmarva)

- Nitrogen Concentrations
  - No change on Delmarva
  - Increasing in Virginia and West Virginia

Population Estimates

Current Method to Model Poultry Populations within the Watershed

- Based on the 5 year Ag Census data.
- Most recent census in 2007.
- For 2007, the population is the census number.
- Future population estimates after 2007 based on an extrapolation from previous census trends.



Potential Data Sources for Population Estimates

(Birds per year)

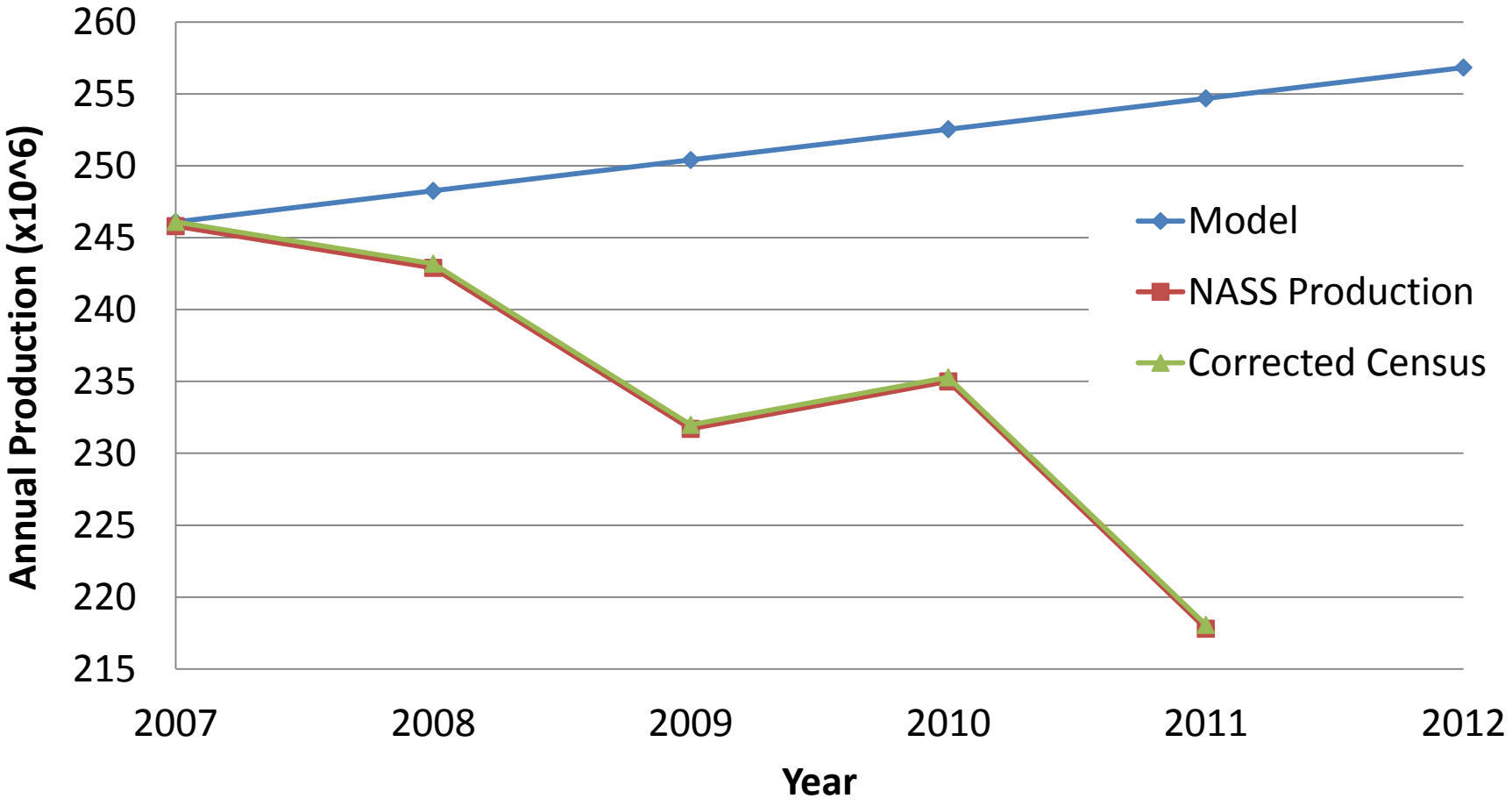
Delaware

Year	Census	NASS Placements*	NASS Production	NASS Slaughter
2012	?	215,987,000	Not Yet	309,147,000
2011	?	223,589,000	217,800,000	302,305,000
2010	?	243,035,000	235,000,000	304,471,000
2009	?	243,572,000	231,700,000	296,595,000
2008	?	245,505,000	242,900,000	304,657,000
2007	246,098,878	257,973,000	245,800,000	306,875,000

* Includes an early mortality factor

- NASS has recommended using the *Production* data.

Delaware-Chickens



Status

- PLS and AgWg reviewing estimation methods and make recommendations for improvements.
- Feedback from others encouraged and appreciated.
- Conference call for the PLS being scheduled for the week of Aug 19th.
  - Review/approve final population estimate method.
  - Confirm final recommendations from the PLS.
  - Submit report as part of the phase 5 plan.

Questions?

Comments?