

REDEFINITION OF POULTRY LITTER NUTRIENT GENERATION, LITTER VOLUME GENERATION AND POULTRY POPULATION DATASETS

Status of the Recommendations of the Poultry Litter Sub-Committee for Use in Phase 5.3.2 of the Chesapeake Bay Program Watershed Model

30 April 2014

Background

This update summarizes the status of recommendations from the Poultry Litter Sub-Committee (PLS) of the Agriculture Workgroup (AgWG) for new methodologies and model input data for commercial poultry production. Data being collected and reported include bird population estimates, litter nutrient concentrations, and litter mass generation for expected use in the Phase 5.3.2 version of the Chesapeake Bay Program Watershed Model. Data requested by the CBP includes annual historic (as well as current) bird production and litter information starting in 1996. States have provided to the Chesapeake Bay Program (CBP) state-specific data sets that include, where available, information for several poultry species including broilers, layers, pullets, layer breeders, and turkeys. Note that New York opted not to report any poultry production data and other states do not have production of some poultry species. There are significant data gaps from both federal and jurisdictional sources and consequently, the subcommittee has concluded that additional sources of publically available production data are required to enable the partnership to better represent commercial poultry in the Chesapeake Bay watershed. Based on the data reported to date, the PLS has recommended a new approach for modeling Nitrogen (N) and Phosphorous (P) generation using state-specific data, rather than the current method of using watershed-wide values for these parameters taken from the 2003 ASAE Standard. The PLS approved these recommendations for inclusion in the Chesapeake Bay Program Watershed Model (CBPWM) pending approval by the Agricultural Workgroup (AgWG) of the Chesapeake Bay Program.

Status of State-Specific Data for Input to the Phase 5.3.2 Model

To estimate Nitrogen (N) and Phosphorous (P) generation from the poultry industry within the watershed, three parameters are required: nutrient (N and P) concentration in the litter, litter mass generation, and bird populations. The PLS has focused on quantifying values and developing credible annual estimates for concentration, generation, and population for each poultry type. Based on early comparisons of those parameters across the watershed, the AgWG reviewed and endorsed a proposal from the PLS to acquire all available data and to adopt a new approach for modeling N and P generation based on state-specific data, rather than the current method of using watershed-wide values for these parameters. The following sections provide an overview of the methods used to quantify or estimate nutrient concentration, litter generation, and bird population.

Concentration Estimates

Current and historical litter N and P concentrations for each state were estimated by analyzing litter samples using certified state and private laboratories. Data for each state is summarized and will be supplied as part of standardized templates that provide annual estimates over time for both N and P as well as several other litter attributes. The PLS is continuing to identify current and historical sources of nutrient concentration data for certain states and certain poultry species where data currently does not exist.

Generation Estimates

Recommendations for broilers as well as other poultry types are based on state-based research and current state recommendations. Again, this annual data will be provided as part of the state-specific data templates. Given the limited state-specific generation data and/or lack of data available back to 1996 for some species, the PLS will continue to pursue additional sources of information and collected data to fill these data gaps.

Bird Population Estimates

USDA-NASS currently collects and reports poultry animal inventories at a county level for each Agricultural Census year (i.e. every 5 years). While valuable, these county-level daily inventory estimates do not reflect all the changes in poultry production practices that occur periodically between census years. The PLS has concluded that impacts from manure generation by poultry are best estimated when production, bird weights and potentially flock grow-out periods are available for each bird type on an annual basis.

Currently, NASS bird production data is available for broilers in DE, MD, PA, VA and WV. Similar annual NASS data is currently available for turkeys in PA, VA and WV. NASS production data is released each April, and reflects bird production from December 1 through November 30 of the preceding 12-month period. For example, the April, 2013 NASS production data reflects broiler production from December 1, 2011 through November 30, 2012. This annual data provides the opportunity to better inform the Phase 5.3.2 model with information that better reflects national and international annual market trends and feed costs which affects the mass of litter generated annually that is available for application, transport, and/or alternative uses.

PLS Pending Recommendations for Implementation of New Data in the Phase 5.3.2 Model

After summarizing and presenting the state-specific bird population estimates, litter nutrient concentrations, and litter mass generation, the PLS was asked to develop recommendations for incorporating the data into the current Phase 5.3.2 model. After several discussions with representatives of the CBP modeling team, the PLS has identified limitations with the Phase 5.3.2 version of the CBPWM that prevent utilization of the PLS databases compiled over the last two years. The PLS has concluded that annual concentration, generation and bird production data cannot be incorporated into the model directly until the next version (i.e. Phase 6) of the Watershed Model is

developed. This is primarily due to the fact that the current calibrated model has always relied on: i) daily inventory populations from the Agricultural Census rather than annual production numbers from the census or NASS, and ii) 'static', bay-wide manure generation and nutrient concentration estimates based on the 2003 ASAE standard. Replacing these static bay-wide values with the state-specific PLS data that varies over time would alter the mass balance of the current Watershed Model and require a recalibration of that model to the proposed PLS data. This type of recalibration cannot be performed at this time and will not occur until 2017.

Based on input from the modeling team of the CBP, the PLS recommends that the annual litter generation and nutrient concentration data not be incorporated into the Phase 5.3.2 model. The modeling team has also suggested, and the PLS recommends, that annual bird production values from the census on record for all poultry species or from NASS for broiler and turkeys not be incorporated directly into the model at this time, but rather be used to inform the rate of change in daily inventory populations between census years from the previous Ag Census inventory on record. This approach should be implemented where NASS production data is available.

It should be noted that due to the limitations with the current model 5.3.2 that prevents direct incorporation any of the data, the PLS remains concerned with the accuracy of current model's characterization of N and P generated from poultry production within the watershed.

Path Forward

The PLS recognizes the data gaps that exist in the state-specific data sets, especially the historic data representing poultry production in the early 2000's and 1990's for all poultry species. As a result, the sub-committee recommends that state-based data sets not be utilized for current or future versions of the model until adequate data for a state or region within the watershed be compiled and submitted to the CBP.

The PLS will continue to identify additional data sources and collect data for the purposes of adequately completing the state-based data templates for use in the Phase 6 model. To accomplish this, the PLS will pursue potential arrangements with other organizations and agencies to obtain the data need for modeling N and P generation from poultry production within the bay watershed. Additionally, the PLS will continue to work with the modeling team to populate and configure state-based data sets and develop appropriate representations of the data (e.g. functional relationships that describe how N and P production parameters vary over time) for use in future versions of the CBPWM.