Estimating Nutrient Generation from Turkeys and Swine in Phase 6 Model

Agriculture Workgroup

02162017

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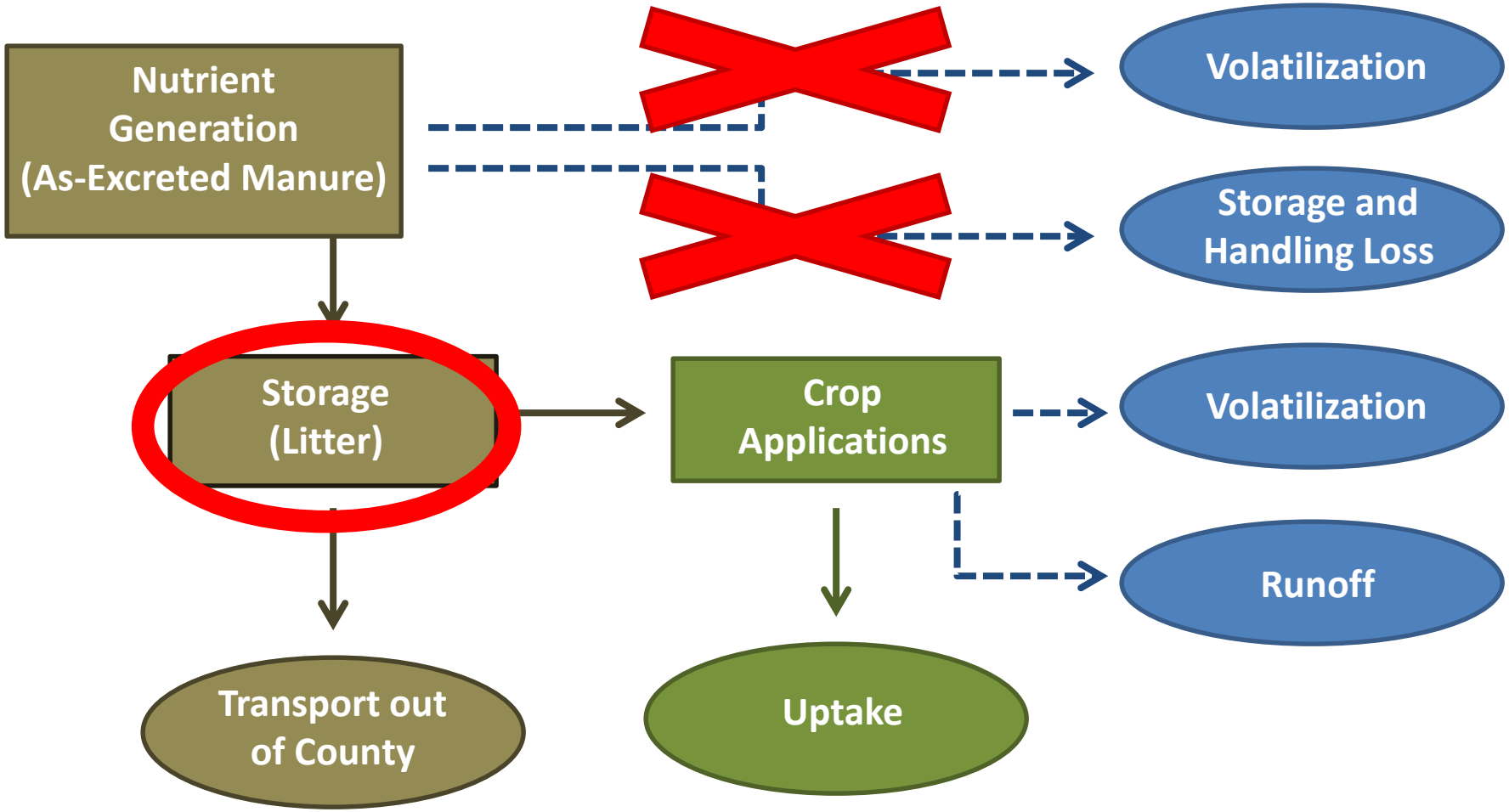
As-Applied Nutrients



Barnyard Recoverability and Volatilization

Animal	% TN volatilized from Barnyard	% Recoverable from Barnyard
Beef and Other Cattle (solid)	35%	99%
Dairy (liquid)	27%	95%
Hogs (liquid)	30%	99%
Poultry	40%	99%
Horses	35%	98%
Sheep	35%	98%
Goats	35%	98%

Turkeys

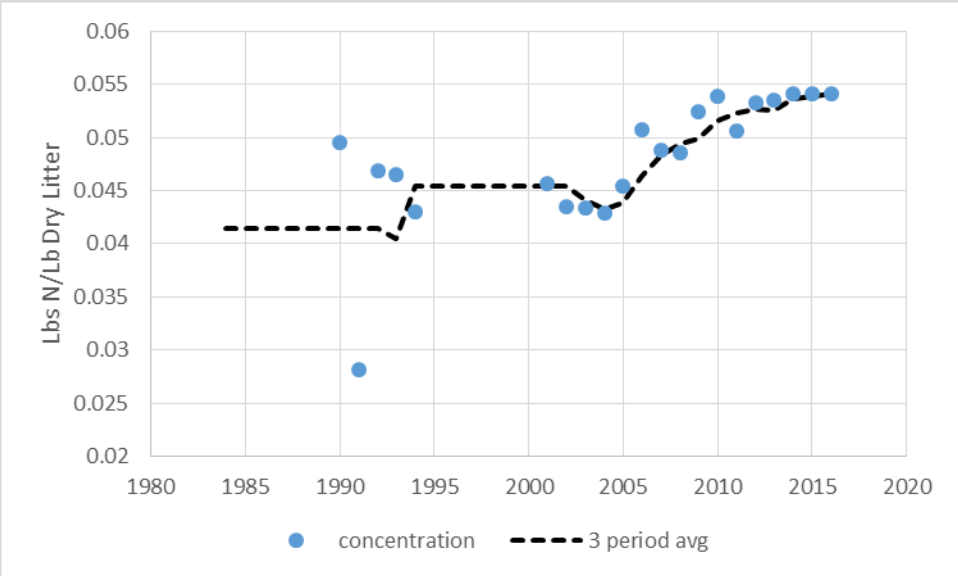
Lbs of N/Year =

(Lbs of Applied Litter/Bird Produced) ← 10.62
/ (1-Barnyard Loss Factor) ← 0.99
X (Lbs of Dry Matter/Lb of Applied Litter) ← 0.7353
*X (Lbs of N/Lb of Dry Matter)**
/ (1-Barnyard Volatilization Factor) ← 0.6
*X (Birds Produced/Year)**

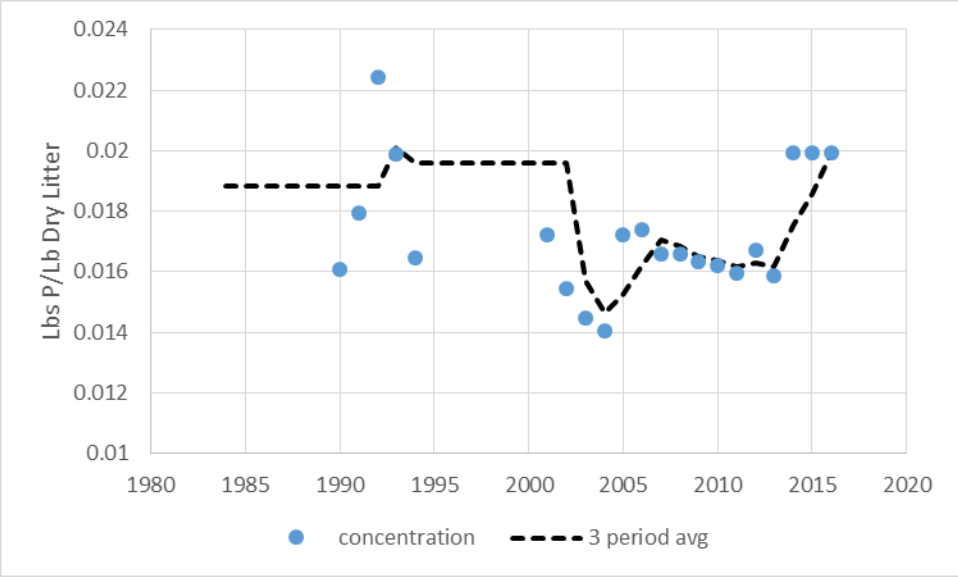
** Varies by Year*

Turkey Nutrient Concentrations

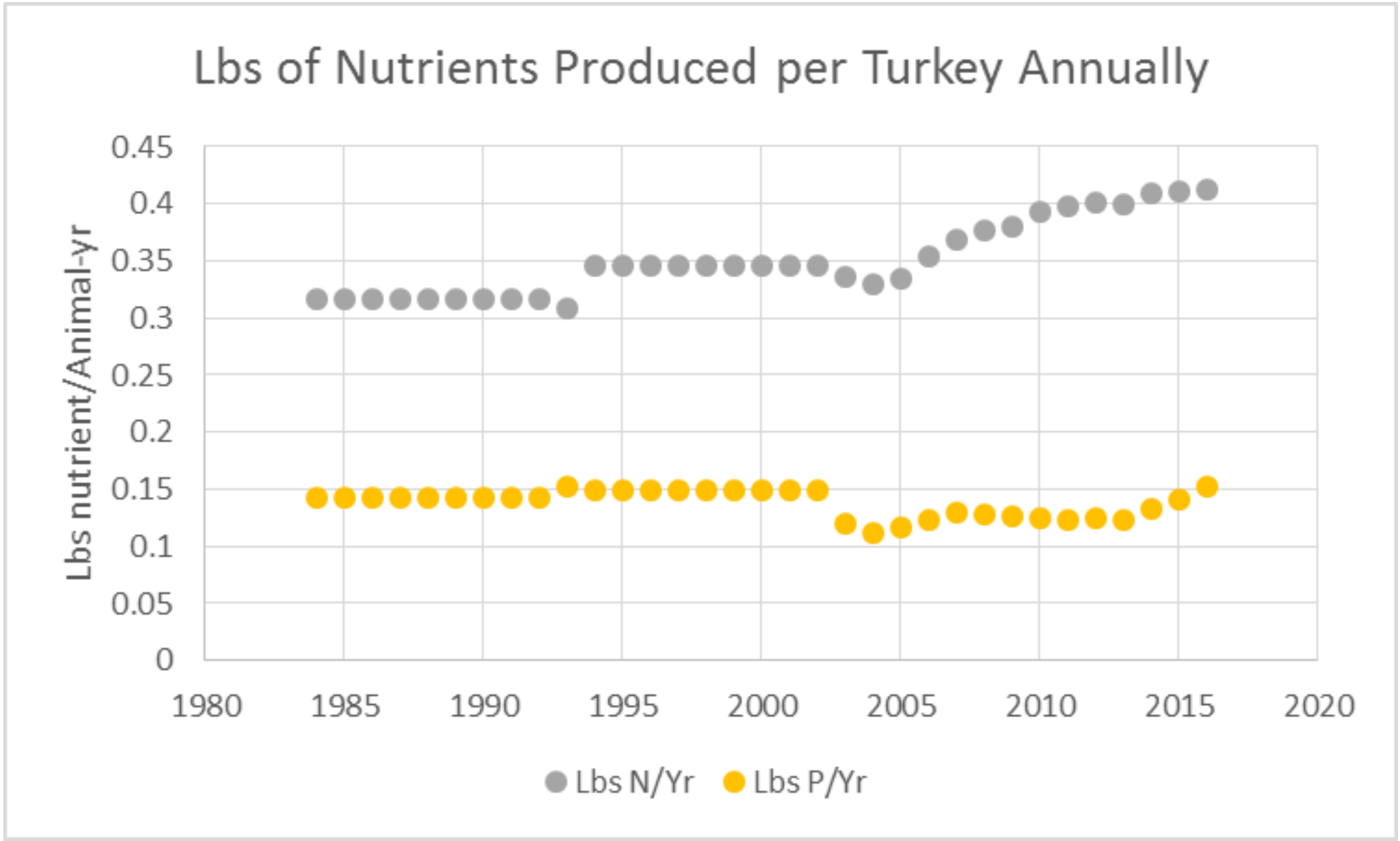
Lbs N/Lb Dry Litter



Lbs P/Lb Dry Litter



- Sample years: Use 3-year moving average
- 1985 through first sample year: Use first moving average point
- Last sample year forward: Use last moving average point
- States should submit sample data each year
- If no sample data is collected, state receives Bay-wide average


Lbs of Nutrients Produced per Turkey Annually
Lbs nutrient/Animal-yr
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
Lbs N/Yr
Lbs P/Yr

Hogs of Pigs for Breeding (Sows)

Lbs of N/Year =

(Lbs of Applied Manure/Animal Produced) ← 13,001.05
/ (1-Barnyard Loss Factor) ← 0.99
X (Lbs of Dry Matter/Lb of Applied Manure) ← 0.0168
X (Lbs of N/Lb of Dry Matter)
/ (1-Barnyard Volatilization Factor) ← 0.7
*X (Animals Produced/Year)**

** Varies by Year*

Hogs of Pigs for Slaughter (Nursery + Finisher)

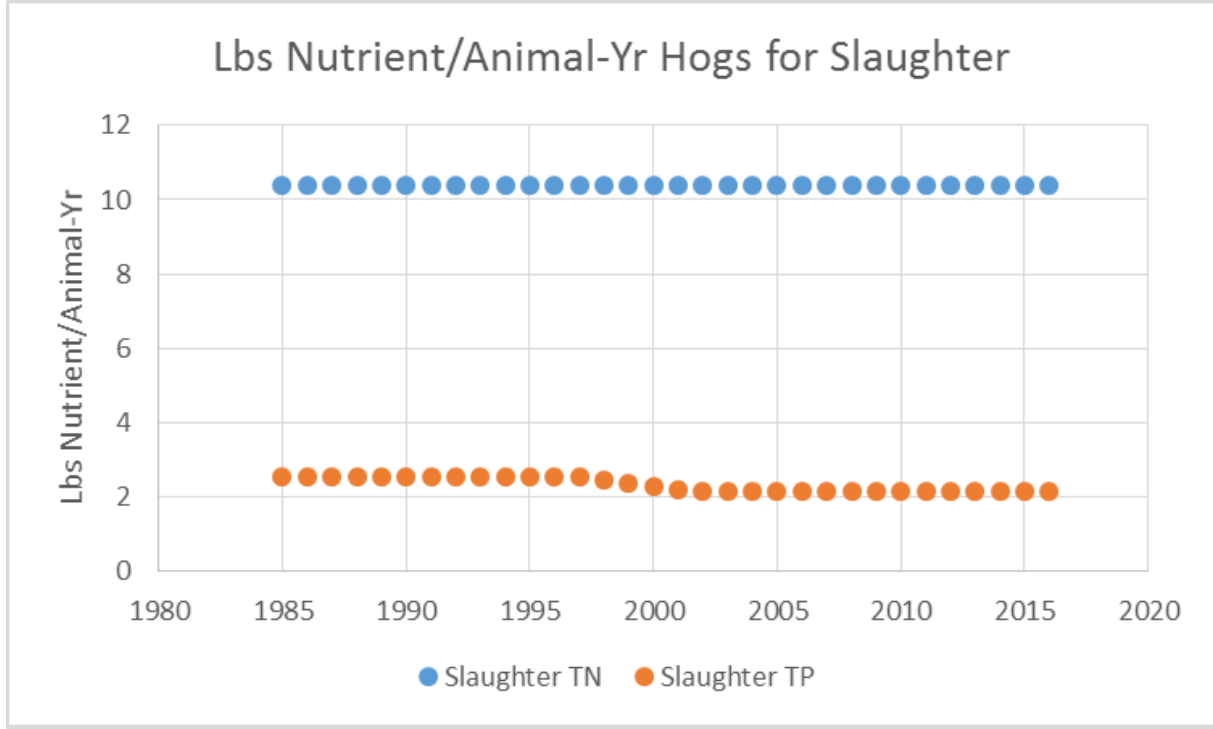
Lbs of N/Year =

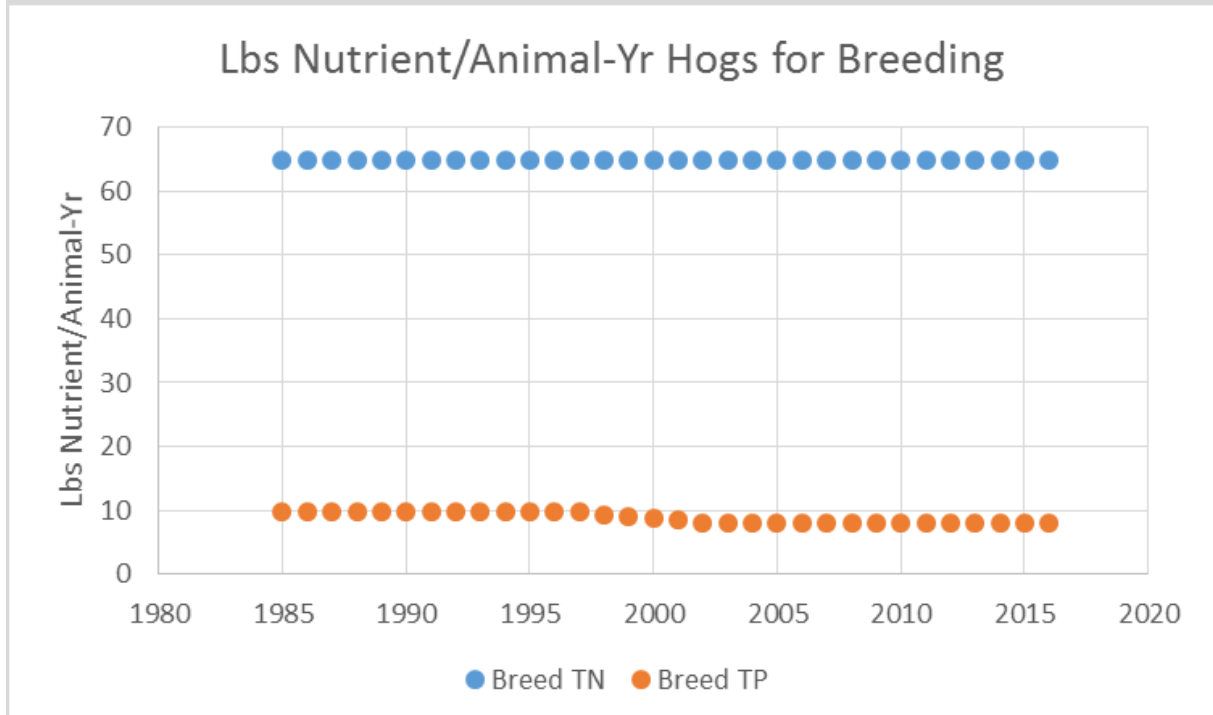
(Lbs of Applied Manure/Animal Produced) ⟵ 2,705.65
/ (1-Barnyard Loss Factor) ⟵ 0.99
X (Lbs of Dry Matter/Lb of Applied Manure) ⟵ 0.0355
X (Lbs of N/Lb of Dry Matter)
/ (1-Barnyard Volatilization Factor) ⟵ 0.7
*X (Animals Produced/Year)**

** Varies by Year*

Nutrient Trends for Swine

- Recommend no change in nitrogen concentration over time.
- Recommend increasing TP concentration 20% for 1985 through 1997. TP concentrations will then decrease 4% annually for 1998 through 2002. Justifications:
  - Swine characterization report suggests anecdotal evidence that TP concentrations fell 20% from 1998 through 2002 due to phytase amendment.
  - Historical data from this time period in PA indicates a similar decrease occurred (23% between 1999 and 2002).


Lbs Nutrient/Animal-Yr Hogs for Slaughter
Lbs Nutrient/Animal-Yr
12
10
8
6
4
2
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
Slaughter TN
Slaughter TP


Lbs Nutrient/Animal-Yr Hogs for Breeding
Lbs Nutrient/Animal-Yr
70
60
50
40
30
20
10
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
Breed TN
Breed TP