

Phosphorus – Historical Agricultural Inputs and Balance in the Lake Erie Basin

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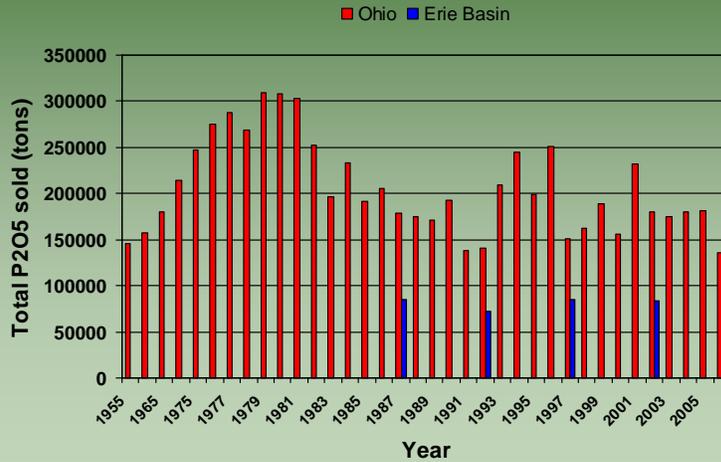


Overview

- **Historical phosphorus inputs**
 - Fertilizer P application trends
- **Animal number trends**
 - Cattle, poultry, and swine
- **Cropping system trends**
 - Total acreage, corn, soybean, wheat, and hay production
- **Phosphorus balance**
 - Animal waste P, fertilizer P, and crop removal

Phosphorus Sales Trends

- Ohio statewide (1955-2006)

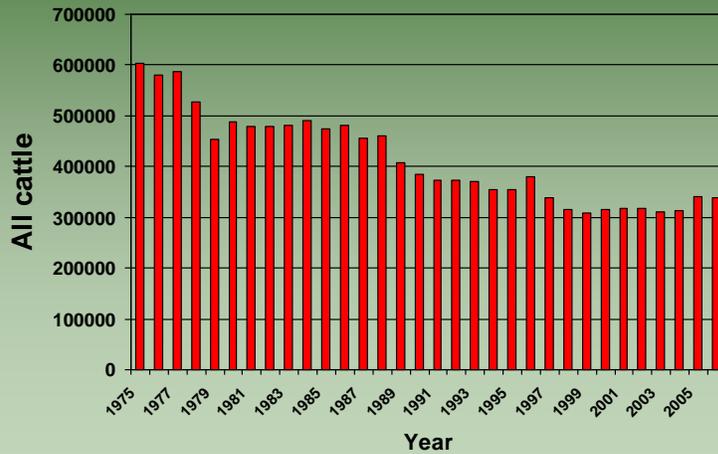


Phosphorus Sales Trends

- About 50% of the total amount of phosphorus sold in Ohio is sold in the Lake Erie Basin (we will use this later)
- Since the early 80s phosphorus sales have dropped and stabilized

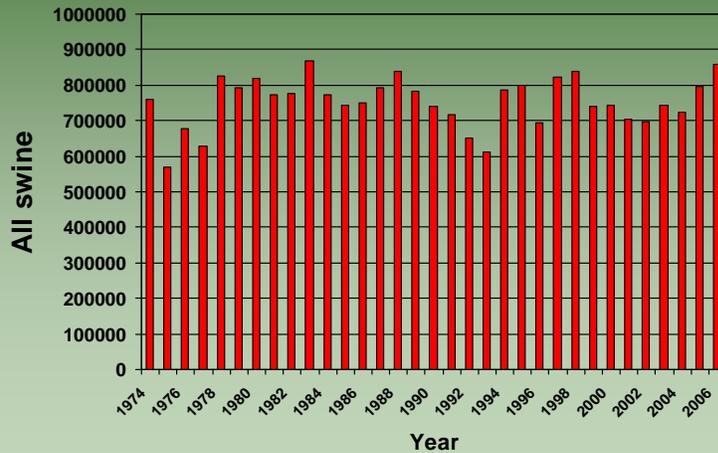
Animal Number Trends

- Cattle in the Lake Erie Basin (1975-2006)



Animal Number Trends

- Swine in the Lake Erie Basin (1974-2006)

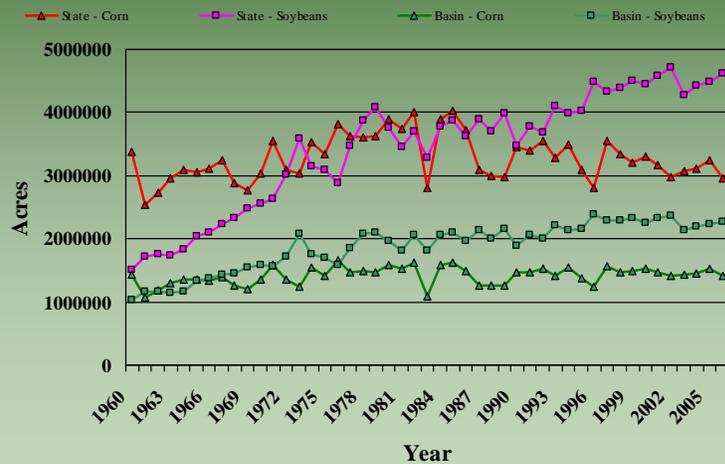


Animal Number Trends

- Cattle numbers have decreased significantly
- Swine numbers have held steady
- Did not conduct analysis to look at size of operations

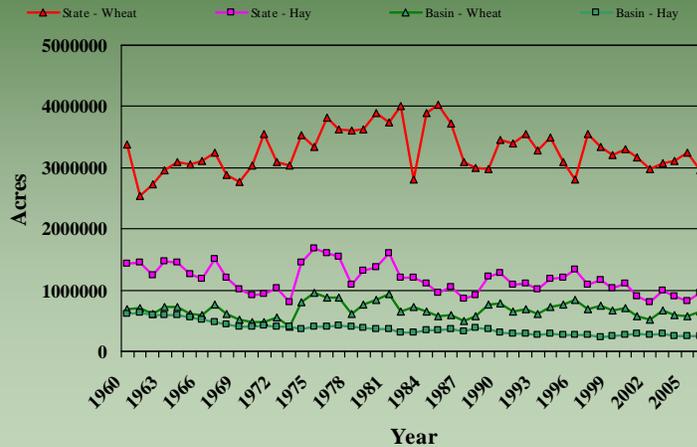
Cropping System Trends

- Statewide and Lake Erie Basin (1960-2006)



Cropping System Trends

- Statewide and Lake Erie Basin (1960-2006)



Cropping System Trends

- In the Lake Erie Basin, corn and soybean acres have not changed appreciably since the late 70s (unlike what has happened at the state level)
- Wheat acreage has been constant
- Hay acres have decreased and soybean acres have increased

Phosphorus Balance

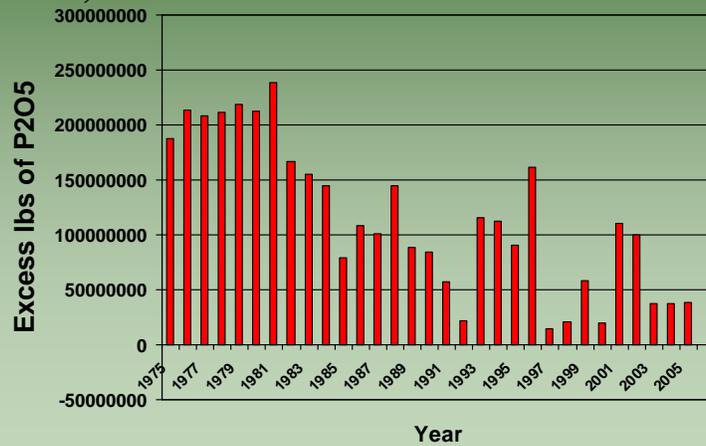
- **Annual ag statistics 1975-2006 was used**
 - **Census numbers were used for all cattle and all swine**
 - **Phosphorus values were determined from Midwest Planner Book Values (Section 18)**
 - **Assumed all cattle was lactating dairy cows @ 1400 lb that produce 50 pounds of milk per day**
 - **Assumed all swine was lactating sow @ 375 lb**

Phosphorus Balance

- **Census numbers were used for corn, soybean, wheat, and hay acreage and yield**
 - **Removal was calculated by multiplying total production (bushels or tons) by P_2O_5 and K_2O concentration (lb/bu or lb/ton)**

Phosphorus Balance

- **Excess P_2O_5 trend in the Lake Erie Basin (1975-2006)**



Data Deficiencies

- **Numbers do not quite match census data from 1992, 1997, and 2002**
 - It is in the ballpark though
- **Do not have animal numbers more delineated to a better estimate of manure produced**
- **This analysis does not include oat production data**

Tillage and Cropping Systems

- **Very little true no-till production for complete crop rotations**
 - Typically corn is tilled (also coincides with application of P fertilizer)
 - Soybean and wheat is typically no-tilled without fertilizer addition

Tentative Conclusion

- **Animal numbers (at least cattle) have decreased significantly from the 1970s**
- **Fertilizer P sales have decreased significantly since the 1980s**
- **Crop acreages in the Lake Erie Basin of Ohio have stayed steady**
 - Exception – hay acres down soybean acres up
- **Phosphorus is approaching a balance (in fact in 2006 it was negative)**



Thanks!!!

- **Questions?**
- **Useful webpages**
 - **Agronomic Crops Team**
 - <http://agcrops.osu.edu/>
 - **OSU Fertility web page**
 - <http://agcrops.osu.edu/fertility>
 - **Crop Observation and Recommendation Network (CORN)**
 - <http://corn.osu.edu/>