

MORE MANURE THAN THE LAND CAN HANDLE



Toxic algal blooms in western Lake Erie have become a chronic threat to drinking water, wildlife, and the Great Lakes recreation economy. These algae are fueled by excess phosphorus from agricultural runoff like fertilizer and manure. Crops can only absorb so much phosphorus before the excess will accumulate in the soil and run off into surface water. To reduce pollution, states set limits on commercial fertilizer. Once the soil has enough phosphorus, operators shouldn't apply more fertilizer. But manure is not nearly as tightly controlled. Animal feeding operations spread manure on nearby farms, and they are often not required to report where they spread or if fertilizer has already been applied. In many areas there is not nearly enough cropland to receive all of the

Different Rules, Same Phosphorus

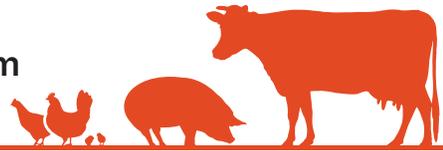
The soil often has a lot of phosphorus already before manure is even applied

COMMERCIAL FERTILIZER
40ppm



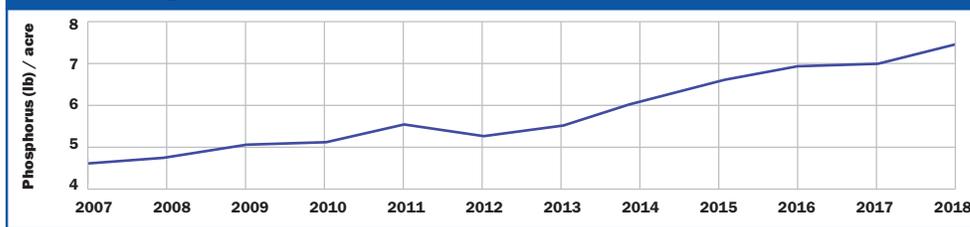
Recommended soil phosphorus level limit for applying phosphorus to corn & soybeans

MANURE
150 - 200ppm



Recommended soil phosphorus level limit for applying phosphorus to corn & soybeans

More Phosphorus from Manure, Same Amount of Land to Put it On



Animal feeding operations have increased their manure output over time, while the acreage under cultivation has remained relatively stable. Operators generally spread manure on farms within a ten-mile radius, because it would be cost-prohibitive to bring manure further.

Corn can only absorb and remove **25lb of phosphorus** per acre (at 150-bushels-per-acre). The areas in brown are where we estimate the density of phosphorus output from manure exceeds this limit, based on the acreage under cultivation within 10 mi of each animal feeding operation.

Even if *only manure* were applied (and no commercial fertilizer), some areas would still have **more than 2x the amount of phosphorus** that could be removed through crop agriculture. Runoff pollution issues are worse in years with heavy flooding. Manure continues rain or shine, but there are less crops in the ground to take up the nutrients.

Density of Excess Phosphorus from Manure

