

Lake Erie ALGAE SOLUTION FACTS:



Manure & commercial fertilizer phosphorus runoff fuels 90% of Lake Erie's algae

Massive increases in Mega farm (CAFO*), land-applied, untreated manure with phosphorus fuels Erie algae



*Concentrated Animal Feeding Operation

Two huge changes turn Lake Erie green:

New technology in the 1950s: Washing machine detergents & fabric softeners loaded with high amounts of phosphorus

began to be discharged into Lake Erie and turned the lake green with algae.

- 28 states eventually banned phosphorus from laundry detergent and the green went away. Proctor and Gamble fought bitterly.



New technology in the 1980s: Growth of Mega Farms, Confined Animal Feeding Operations (CAFOs) in the U.S. and the Lake Erie watershed.



animals producing massive amounts of consolidated manure.

- The manure produced is applied within miles of the operations.



- By the late 1990s, Mega farm/CAFO growth swelled with huge additions in the Erie watershed.
- This growth includes: 1.8 million hogs, 24 million chickens, and 400,000 cows – and growing.
- Untreated, land-applied manure – solid and liquified – is commonly applied to farm fields.
- Traditionally, livestock was pastured; Mega farms (CAFOs) switched to severely confined

The Mega farm/CAFO manure problem is nationwide.

Lake Erie is the victim. 90% of Mega farms/CAFOs in the Lake Erie watershed have no permits and no testing requirements (EWG 2022)

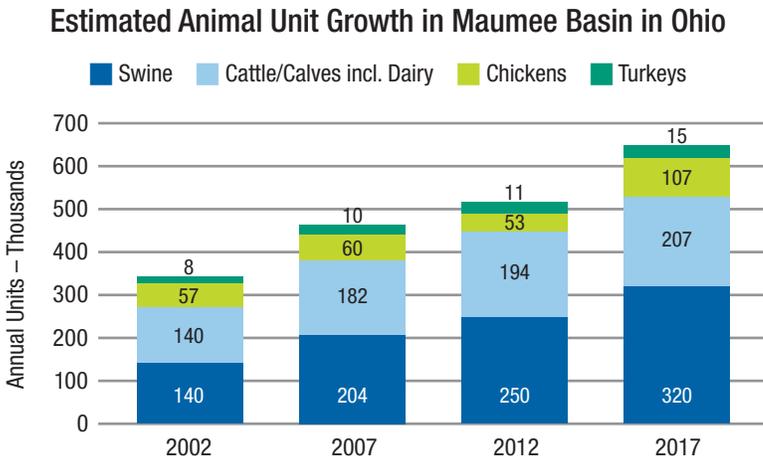
- U.S. requires no manure treatment; fails to control numbers to reduce runoff into waterways
- It's estimated that U.S. livestock annually produces somewhere between 3–20 times more manure than humans produce in the U.S. – as much as 1.2–1.37 billion tons of waste (EPA, 2005).
- Though sewage treatment plants are required for human waste, no such facility exists for livestock waste. The agriculture sector, including CAFOs, is the leading contributor of pollutants into waterways.
- It's been found that states with high concentrations of CAFOs experience on average 20–30 serious water quality problems per year as a result of poor manure management (EPA, 2001)
- Nutrient over-enrichment causes algal blooms, or a rapid increase of algae growth in an aquatic environment. 20 years and billions of dollars to reduce Erie algae is not working. Why? More and more confined cow, pig and chicken operations are locating in the Erie watershed to land-apply all their untreated manure.

China requires manure treatment & controls to reduce runoff to into waterways.

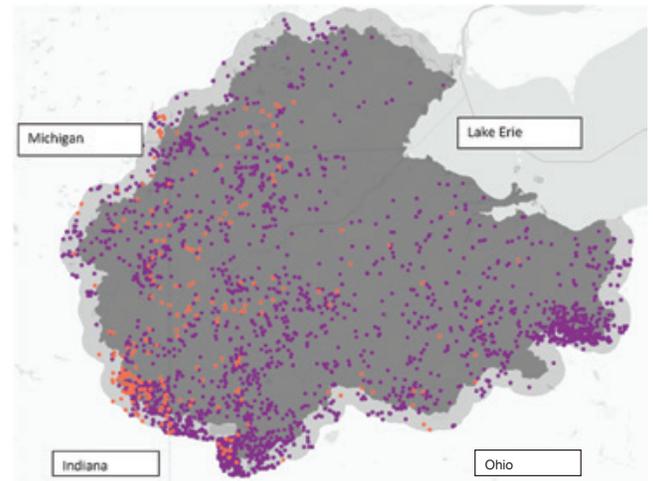
The economic benefit to China from buying U.S. hogs:

- China requires Mega farm/CAFO manure to be treated for E. coli.
- China limits the numbers of animals in a watershed.
- US hogs are about 50% cheaper to raise in US vs China; cheaper animal food; less environmental regulations!

The Ohio Department of Agriculture estimates an 88% growth in animal units from 2002–2017



Locations of Mega farms/CAFOs in Western Lake Erie. 90% have no permits or regulations



\$\$\$ Billions to reduce phosphorus in Lake Erie is NOT WORKING – No effort to treat confined manure; Add no more Mega farms/CAFOs

Ohio Department of Agriculture 2019 – More manure and less commercial fertilizer

- Manure phosphorus is typically used as a replacement for commercial fertilizer.
- As manure phosphorus application has increased, commercial fertilizer application has decreased proportionally.
- There is no benefit from farmer fertilizer reductions because increases in livestock produce more manure
- The average soil test phosphorus levels in the region are also declining (Dayton, 2020).

There is no economic incentive to reduce land application of untreated manure

Commercial fertilizer is expensive – using less saves farmers money. Some farmers are managing soils so that no commercial fertilizer is purchased – yet yields are good. Manure is a waste that must be disposed. **90% of mega farms/CAFOs have no permit; and reporting requirements. It's cheapest to put untreated manure on fields.**



All sources of phosphorus are important to reduce:

- Wastewater treatment plants
- Industrial discharges
- Failing septic systems
- Sewage overflows
- Storm water
- Lawn fertilizer
- Commercial fertilizer

The growing new source is Megafarm/CAFO manure most of which has no permits and no regulations - permitted no testing etc. to show problems



SOIL SCIENCE

Ohio State University Soil Scientist commenting on Lake Erie TMDL 2022:

- Fields in the Maume River Basin are usually drained using subsurface tile drains
- The soils in the Maume River Basin are prone to fracturing resulting in the rapid transport of dissolved reactive phosphorus (DRP) to tile drains and drainage ditches
- Liquid animal manures are widely applied in this watershed
- When liquid manure is applied to the surface, it pools on the field, then drains through macropores to the subsurface and/or it is washed offsite as runoff
- DRP moves through the subsurface with water and will enter the tile drains or recharge baseflow of the streams
- Tile drains and baseflow discharge into drainage ditches or streams, transporting the DRP to the Western Lake Erie Basin

Monitoring shows CAFOs add dissolved phosphorus

Raft University of Wisconsin and Meyer Marquette found:

Between 2010 and 2018 that each new CAFO in the Maume watershed adds 10–15% more dissolved phosphorus downs