

Pam Taylor

Environmentally Concerned Citizens of South Central Michigan/Less = More Coalition

### Concentrated Animal Feeding Operations (CAFOs) in the Western Lake Erie Watershed, 2015

State	No. of CAFOs	Bovine	Poultry	Research	Swine	Total Animals	Manure/gals./yr.
Ohio	57	56,611	10,377,719		279,314	10,713,644	430,248,252
Indiana	75	16,049	678,736	9,200	160,078	864,063	137,410,933
Michigan	14	24,400			15,400	39,800	123,144,430
<b>Totals</b>	<b>146</b>	<b>97,060</b>	<b>11,056,455</b>	<b>9,200</b>	<b>454,792</b>	<b>11,617,507</b>	<b>690,803,615</b>

Ohio has 25 Bovine CAFOs, 7 Poultry CAFOs, and 25 Swine CAFOs. Ohio has 92% of the CAFO animals in the WLEB, which produce 62% of the manure from CAFOs in the WLEB.

Indiana has 13 Bovine CAFOs, 9 Poultry CAFOs, 1 Research CAFO, and 52 Swine CAFOs. Indiana has about 7% of the CAFO animals in the WLEB, which produce about 20% of the manure from CAFOs in the WLEB.

Michigan has 11 Bovine CAFOs and 3 Swine CAFOs. Michigan has about .3% (less than 1%) of the CAFO animals in the WLEB, which produce about 18% of the manure from CAFOs in the WLEB.

All but 6 of the "Bovine" CAFOs are dairies.

### Manure Production (Gals./Yr.) by Species and State in the Western Lake Erie Watershed, 2015

	IN	OH	MI	Totals
Bovine	63,925,461	256,319,155	114,712,930	434,957,546
Poultry	8,825,481	113,636,024		122,461,505
Research	2,180,489	2,385,275		4,565,464
Swine	62,479,802	57,907,798	8,431,500	128,819,100
<b>Totals</b>	<b>137,410,933</b>	<b>430,248,252</b>	<b>123,144,430</b>	<b>690,803,615</b>

Bovine (including the 6 non-dairy CAFOs) = 63%

Poultry = 18%

Research = less than 1%

Swine = 19%

These numbers do not include the "one-unders", concentrated animal feeding operations that have just a few animals less than the animal count required to trigger NPDES CAFO permit requirements. They also do not include smaller livestock farms that do not confine their animals. The factory farms referred to in this document are the "largest of the large", in terms of the animal numbers housed.

These numbers also do not reflect the construction of the new Clemens Food Group pork processing plant in Coldwater, Michigan. Published news reports included predictions of up to 70 new or expanded farms in the Tri-State area to supply this facility.

(As of October, 2015, the State of Michigan had 269 CAFO permits which covered 282 facilities.)

### **ECCSCM's Water Monitoring Program**

ECCSCM monitors 46 edge-of-field sites - where 13 of the 14 MI factory farms in the WLEB produce, store and apply manure in 20 Michigan townships - for E. coli, dissolved oxygen, temperature, BOD, nitrates/nitrites, phosphorus (PO<sub>4</sub> mostly), and ammonia. Nutrient and bacteria levels peak during the spring thaw, late spring/early summer after heavy rains, just after post-harvest manure application, and late fall when lagoons and farm stockpiles are cleaned out before winter. This is flushed downstream in pulses through underground drain tiles and from surface runoff over the year – strongest during late winter, early spring, after wheat harvest in the summer, and fall.

### **ECCSCM's Test Results**

Almost all CAFOs in our area have used one or more USDA/NRCS/EQIP/MAEAP subsidized, voluntary practices for many years, ranging from cover crops, grassy strips, buffers, setbacks, tile plugs, to constructed wetlands. Through October, 2015, results of edge-of-field water tests on fields where manure is applied in the Lenawee/Eastern Hillsdale parts of the Lake Erie Watershed show:

- 75% (111 of 149) of the samples collected met or exceeded the MI water quality standard of 130/100mL for total body contact, E. coli
- 32% (48 of 149) met or exceeded the MI water quality standard of 1000/100mL for partial body contact, E. coli
- 70% (73 of 105) met or exceeded the MI water quality standard of .10 mg/L, ammonia
- 39% (48 of 122) fell below the MI warm-water quality standard of 5.0 mg/L, dissolved oxygen (DO)
- 36% (39 of 108) met or exceeded the MI water quality standard of 10 mg/L, nitrates
- 100% (117 of 117) were above .1 mg/L, and 89% (104 of 117) met or exceeded the MI water quality point discharge standard of 1 mg/L for total phosphorus (tested for orthophosphate and then converted to TP, or tested for TP). MI does not have water quality standards for phosphorus from non-point sources. Levels above .1 mg/L are of concern for aquatic life. Safe levels for aquatic life in natural streams are below .05 mg/L.



## How manure gets into the waterways



### Duckweed and Algae Mats

Liquid manure applied over sub-surface tile systems can go down to the tiles and then out into the waterways, bypassing recommended erosion control measures (which are prescribed in Michigan's MAEAP voluntary program) such as no-till or conservation tillage\*, buffers and grass strips, constructed and 2-stage wetlands, tile plugs, and cover crops, especially during the non-growing season. These conservation practices were developed for erosion control and to control nitrogen (nitrates)\*\*, which have a much larger particle size than dissolved phosphorus. Manure/waste applied to snow or frozen ground runs off, or it can flow directly through tiles, into surface water. These same conditions and systems exist in a large part of the Western Lake Erie watershed in Ohio.# This happens even if there's a cover crop or a grass barrier on the surface, or a constructed wetland. Even on no-till fields##, through macropores in our heavy clay, and even through swampy soil. This picture was taken on April 27, 2015.

\*Duris, Joseph, and Haack, S. K., USGS, *Chemical and Microbiological Water Quality of Subsurface Agricultural Drains during a Field Trial of Liquid Dairy Manure Effluent Application Rate and Varying Tillage Practices, Upper Tiffin Watershed, Southeastern Michigan*, 2008

\*\*Franconi, W., Huang, C., Livingston, S., and Smith, D., *Phosphorus Losses from Monitored Fields with Conservation Practices in the Lake Erie Basin, USA*, AMBIO, Volume 44, Supplement 2, March 2015, pp 319-331

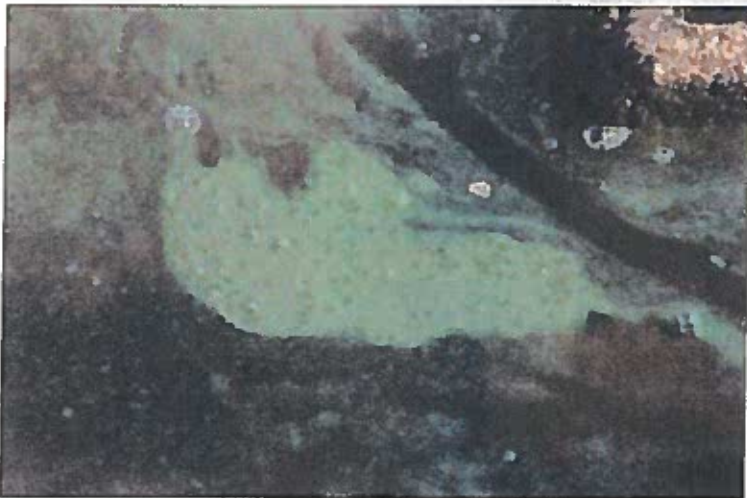
#Horstman, Janelle, BGSU, *The Effects that Liquid Manure and Solid Cattle Manure Have on the Water Quality of Drainage Ditches in Putnam Co, OH* (Honors Project, 2014)

##Green, David, "Frank Gibbs: Liquid Manure is Too Wet", *State Line Observer*, Morenci, MI, Aug. 20, 2006 (Field Demonstration in Lenawee County)





**Photo of manure discharge from tile pipe, Lenawee County, MI**



**Photo of Lime Lake, MI, Aug., 2015. Inlet is adjacent to CAFO barns and manure fields. Wayne St. Univ. Helix Labs found cyanobacteria, microcystin. Bacteria analysis was positive for bovine DNA.**



**Photo of runoff from manure stockpile at farm, Lenawee County, MI**



**Aerial shot of manure lagoons at a CAFO, Lenawee County, MI**



**Tankers applying liquid manure on snow, Lenawee County, MI**



**Manure runoff in Wolf Creek, source of City of Adrian's drinking water supply, Lake Adrian, after manure application on snow/frozen ground.**