



Factory Farm Nation: 2020 Edition

Factory farms continue to take over the agricultural landscape of the United States. There are currently 1.6 billion animals in our nation's 25 thousand factory farms (see Figure 1 on page 2). Together, these animals produce an estimated 885 billion pounds of manure each year, polluting our air and water and releasing climate-warming emissions.

Research and analysis from Food & Water Watch continue to reveal the dangerous trends of factory farm expansion and increasing consolidation in the meat, poultry, dairy and egg industries. We compiled county-level data from the USDA's 2017 Census of Agriculture, assigning each county a density rating based on the number of livestock living on the largest operations.^a The five years since the last Agricultural Census (2012) have brought massive changes, including:

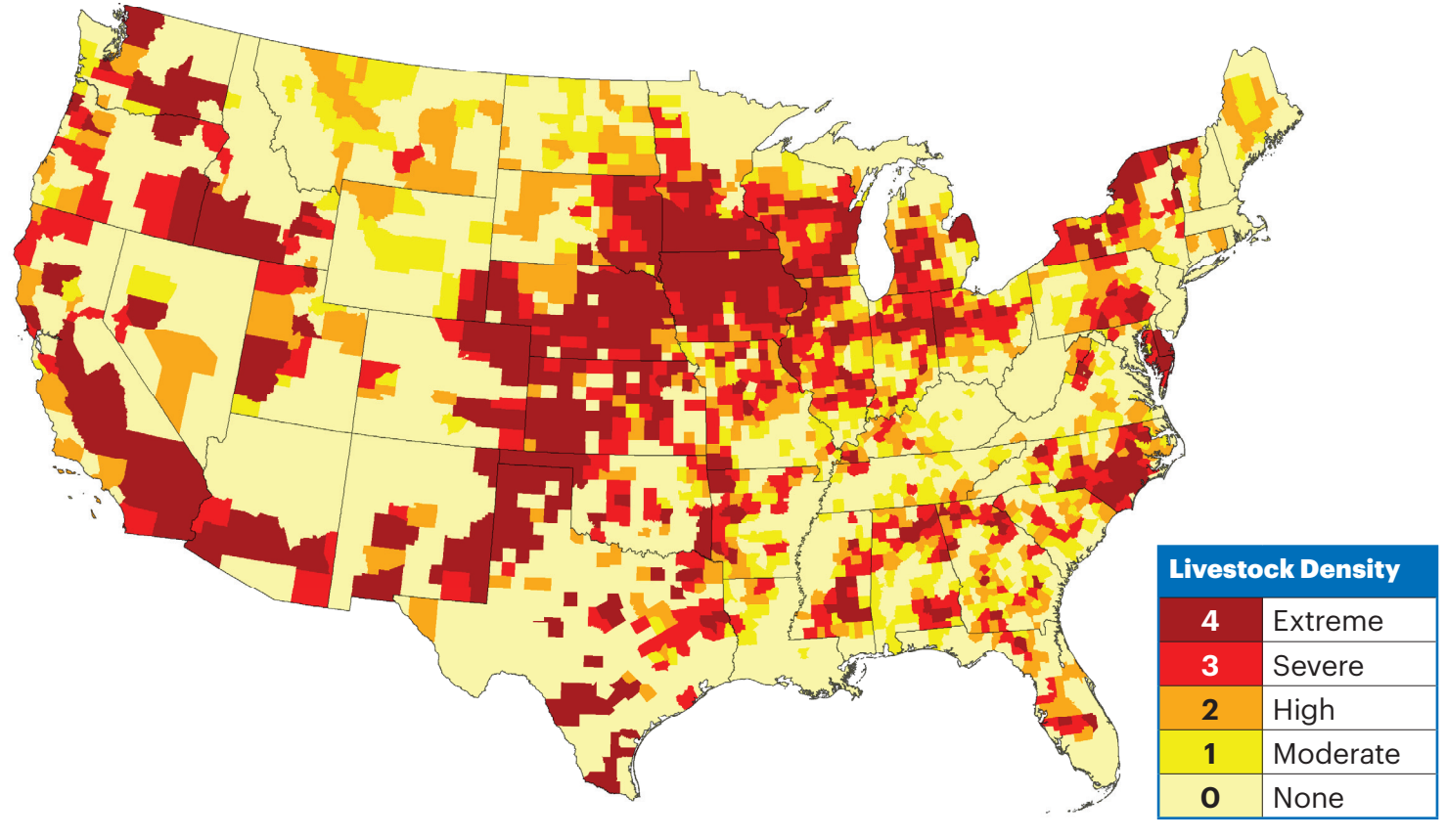
- 190 million more animals living on factory farms (a 14 percent increase);

- 82 billion *additional* tons of manure produced annually — equivalent to the human sewage generated by creating a new city of 60 million residents (or three New York Cities);
- An increase in the average number of animals at factory farms across all livestock categories except beef cattle, as factory farms get even bigger.

Yet this growth masks a parallel problem: the loss of smaller, family-run operations. For example, there were nearly 10,000 fewer dairies of any size in 2017 compared to 2012 (a nearly 15 percent decrease).

^a See methodology section for more details on livestock density rankings.

FIGURE 1. All Livestock on U.S. Factory Farms



What is a Factory Farm?



Beef cattle:
500 head on feed (feedlot)



Dairy:
500 cows



Hogs:
1,000 head



Broiler chickens:
500,000 sold annually



Egg-laying chickens:
100,000

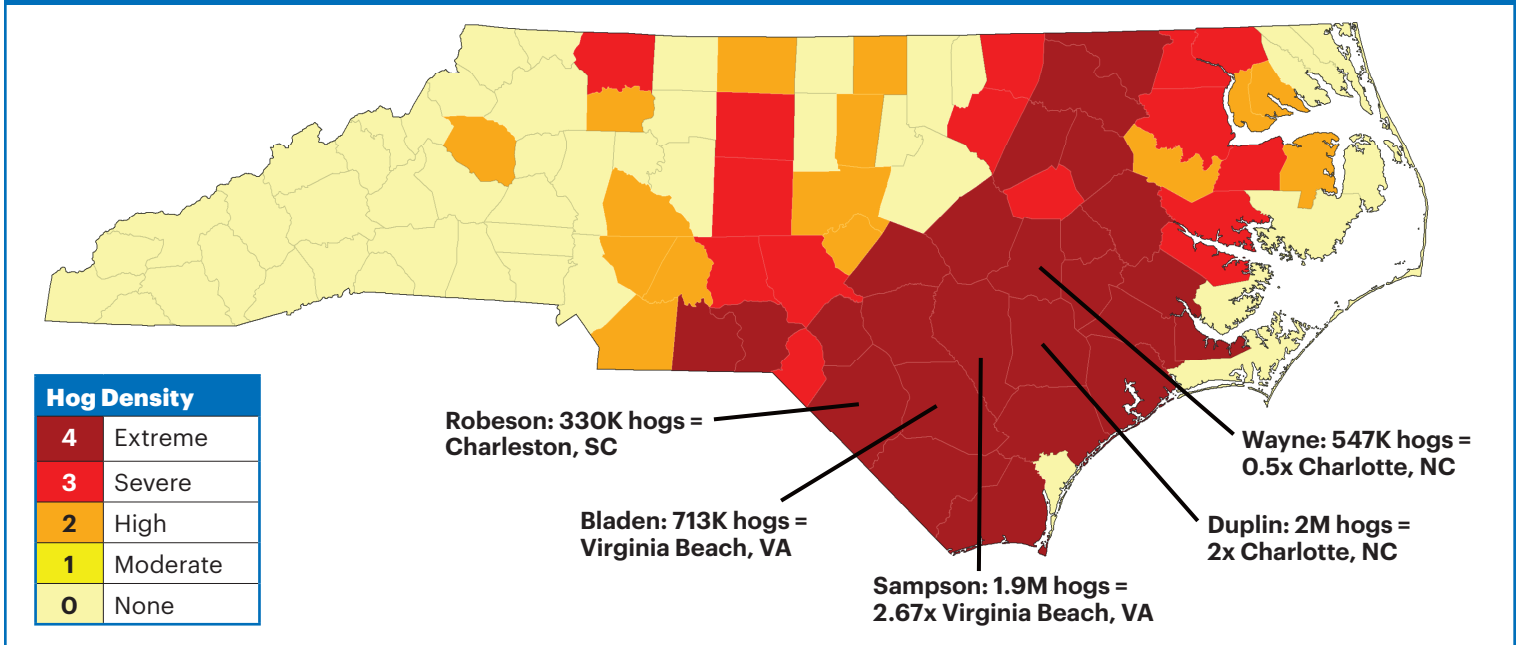
Rural America is in crisis. The factory farm system is in part to blame, making it difficult for all but the largest, most polluting operations to survive. We are losing family farms to these mega-operations that foul our soil and water, fuel climate change, exploit workers and cause needless animal suffering.

We need a fundamental change in how we produce meat, dairy and eggs in our country, starting with an immediate ban on new and expanding factory farms. We must also revamp our state and federal policies so they work to support farmers and consumers, not giant agribusinesses.

Hog Waste Is Destroying Our Water Resources

Over the past few decades, the hog industry became highly concentrated across the American South and Midwest. Thirty-eight percent of North Carolina counties rank 4 (Extreme) or 3 (Severe) for factory hog density (see Figure 2 on page 3); in Iowa, 94 percent of counties earned these rankings.

FIGURE 2. North Carolina's Top Factory Hog Farm Counties Produce as Much Waste as Metropolitan Areas



As each hog produces roughly one and a half tons of manure each year, their combined manure in a county can meet or exceed the equivalent weight in human sewage of major metropolitan areas (see Table 1). For example, hogs on factory farms in Duplin County, North Carolina produce the same weight in manure as residents of Boston. But unlike human sewage, hog and other livestock waste is not treated before being released into the environment.¹

As the hog industry transformed from small family farms to industrial mega-operations, it shifted the burdens and risks of hog manure disposal onto rural communities.² Hog waste spreads human pathogens into the environment, including strains of antibiotic-resistant bacteria.³ Additionally, many industrial operations produce more manure than can be sustainably applied as fertilizer to crops onsite, creating runoff that pollutes soil and water.⁴ Nationwide, pollution from animal feeding operations threatens or impairs more than 14,000 miles of rivers and streams and 90,000 acres of lakes and ponds.⁵

Extreme weather events — which are getting stronger and more prevalent in our changing climate⁶ — contribute to major manure releases. When Hurricane Florence ravaged eastern North Carolina in 2018, it caused extensive flooding of factory farms, drowning thousands of hogs and causing dozens of manure

TABLE 1. Top Factory Hog Farm Counties and Human Sewage Equivalent

State/County	Hogs on Factory Farms	Human Sewage Population Equivalent	Comparable Metropolitan Area*
North Carolina/Duplin	1,950,583	4,643,191	Boston
North Carolina/Sampson	1,878,165	4,470,806	Detroit
Iowa/Washington	1,324,498	3,152,851	San Diego
Iowa/Sioux	1,220,743	2,905,871	Tampa
Oklahoma/Texas	1,094,823	2,606,130	Denver
Iowa/Lyon	1,058,365	2,519,345	Orlando
Iowa/Hamilton	1,006,857	2,396,734	Pittsburgh
Iowa/Plymouth	909,046	2,163,904	Las Vegas
Minnesota/Martin	824,258	1,962,074	Austin
Iowa/Carroll	733,229	1,745,387	Nashville
United States	70,162,897	167,016,592	1/2 of the U.S. population

* Comparison is to the population of the entire greater metropolitan area, not only the city population.

lagoons to overflow or breach entirely. Floodwaters carried this toxic mixture of hog carcasses and “fecal soup” downstream into flooded homes and neighborhoods, and contributed to a spike in *E. coli* contamination of private drinking water wells.⁷

Broiler Chickens Create Hazardous Air Pollution

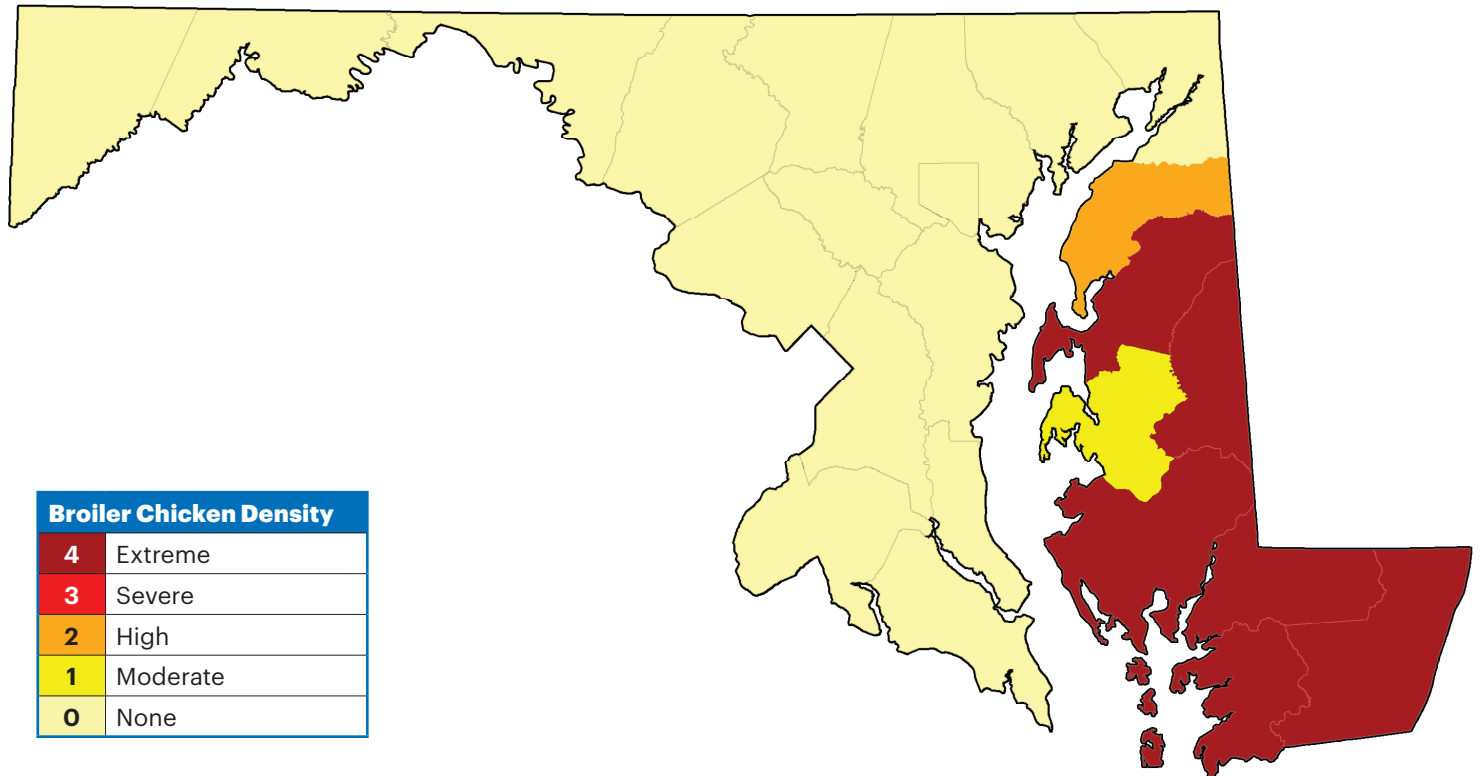
The broiler meat industry is heavily concentrated in certain regions, including Maryland’s Eastern Shore, where communities are often located near multiple facilities housing hundreds of thousands of birds at a time (see Figure 3). These factory broiler operations make bad neighbors, releasing foul odors that travel off the farms and into residents’ homes, even with the windows closed.⁸ They also release a slew of toxic pollutants — including ammonia, particulate matter and endotoxins — which irritate the respiratory system and are linked to lung disease. Industrial poultry houses also spread human pathogens and create volatile organic compounds that can harm the nervous system and contribute to ground-level ozone.⁹

In addition, industrial poultry operations generate an enormous volume of poultry litter (a mixture of manure, feathers and bedding). In Maryland in 2017, factory broiler operations generated an estimated 560 million pounds of poultry litter (see Table 2).

TABLE 2. Some Maryland Counties Produce More Broiler Litter than Human Sewage

County	Broilers on Factory Farms	Annual Litter Production (in Pounds)	Ratio Broiler Litter to Human Sewage
Worcester	8,813,394	126,543,226	1.8x human sewage
Wicomico	8,664,015	124,398,425	0.9x humans sewage
Somerset	7,767,737	111,529,622	3.2x human sewage
Caroline	5,527,044	79,357,616	1.8x human sewage
Dorchester	4,033,248	57,909,612	1.3x human sewage
Queen Anne's	3,136,971	45,040,809	0.7x human sewage

FIGURE 3. Broiler Chickens on Maryland’s Factory Farms



The manure alone was enough to overflow an Olympic-sized swimming pool every day. Poultry litter is high in nitrogen and phosphorus, and overapplication can contaminate groundwater, polluting drinking water sources. Maryland is second only to Delaware for the prevalence of nitrate in groundwater, which is linked to the life-threatening condition known as “blue baby syndrome.”¹⁰ Additionally, agriculture is the leading source of nitrogen and phosphorus loads to the Chesapeake Bay. Poultry litter contributes to this load, impeding efforts to restore this important estuary.¹¹

The extreme concentration of facilities in a given region is all part of the poultry industry’s model of industrial production. Ninety-six percent of broiler chickens in the U.S. are raised under production contracts. In this system, growers do not own the birds but instead raise them under contract with agribusinesses like Perdue and Tysons (the integrators), which slash costs by contracting with multiple growers in a specific region.¹² Integrators further increase their profits by shifting the burden of litter disposal onto the shoulders of growers. Since the poultry industry is so consolidated, many regions have only one integrator, leaving growers with neither leverage to negotiate better contract terms nor an open market on which to raise and sell birds.¹³

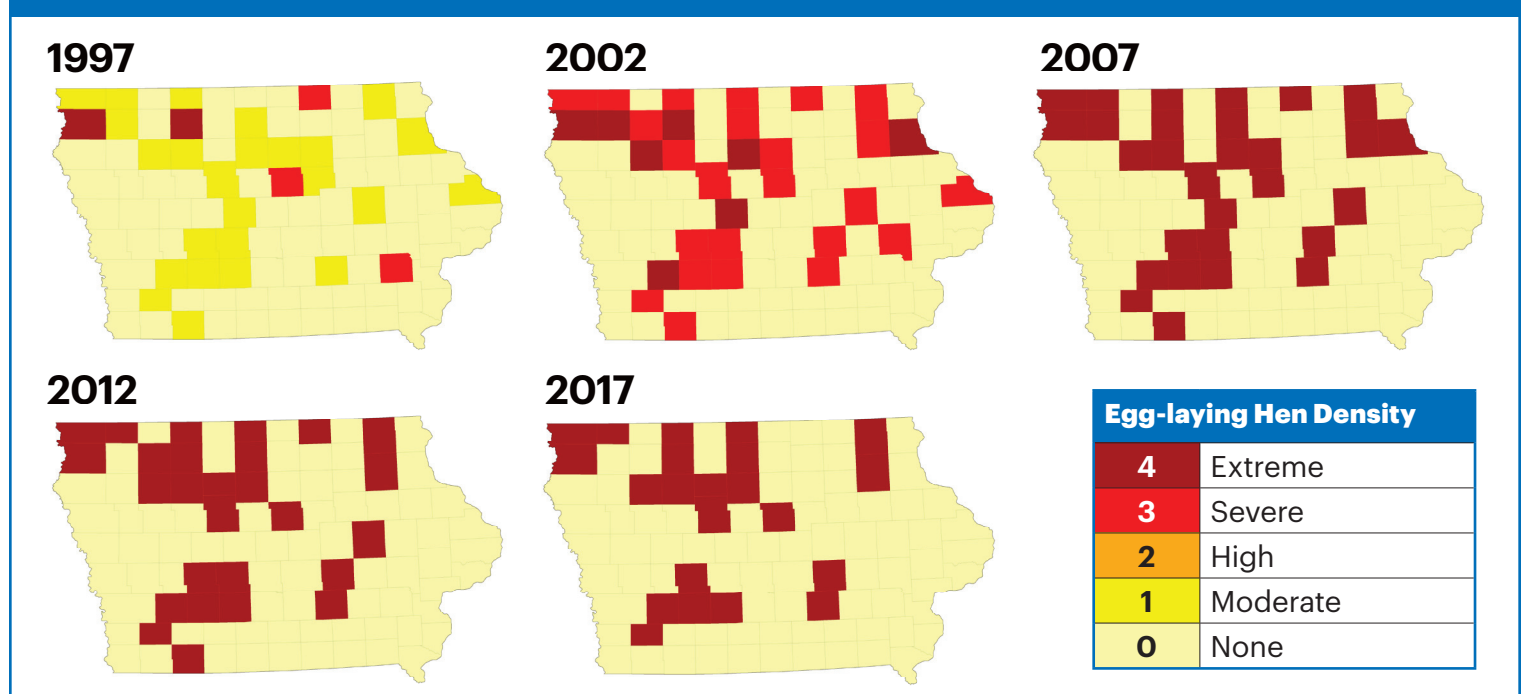
Expanding Egg Operations Will Increase Worker Injuries and Animal Suffering

Nationally, the total number of egg-producing factory farms fell by 17.3 percent between 2012 and 2017, but the total birds on these operations increased, suggesting that these mega-operations are expanding their capacities. For instance, Iowa has a quarter fewer factory egg-laying operations than it did in 2012, but the average size of these operations increased by nearly 50 percent (see Figure 4). The average factory egg-laying operation in the U.S. today houses just under 800,000 birds, each generating 10 Olympic swimming pools’ worth of manure annually (see Table 3).

TABLE 3. Top Egg-laying Factory Farm States

State	Egg-laying Hens on Factory Farms	Annual Manure Production (in Olympic Pools/Day)	Average Inventory per Farm
Iowa	54,120,593	1.9	1,866,227
Ohio	24,129,757	0.8	778,379
Indiana	23,812,468	0.8	1,082,385
Texas	17,575,599	0.6	925,032
Pennsylvania	16,206,211	0.6	558,835
United States	254,765,800	9	796,143

FIGURE 4. Hens on Iowa’s Egg-Producing Factory Farms, 1997-2017



Expanding egg operations mean even more hazardous air and water pollution that plagues nearby residents and the environment. But for workers, these conditions can be a nightmare. Long-term exposure to toxic poultry dust is linked to a slew of respiratory problems including chronic phlegm, asthma and chronic bronchitis.¹⁴ Injuries are another workplace hazard. In fact, the animal production industry as a whole (which includes workers raising animals on farms and feedlots) has an alarmingly high rate of non-fatal workplace injuries — more than eight times that of the oil and gas extraction industry.¹⁵ These figures only included reported incidents; workers may be reluctant to report injuries, especially undocumented immigrants, who often undertake the most dangerous jobs on factory farms.¹⁶

Life inside a factory egg farm is bleak for the hens as well; animal welfare takes a back seat to industry profits.¹⁷ An estimated 95 percent of hens are locked in cages where they have less than a piece of printer paper’s worth of floorspace per bird.¹⁸ Chicks are “debeaked” without anesthesia in order to prevent the birds from harming one another in their crowded environments, but this causes lasting pain and stress. Cattle

and hogs undergo tail docking and dehorning for similar reasons.¹⁹ Unsurprisingly, the factory farm industry is largely resistant to any proposals to improve welfare conditions for workers and animals.²⁰ We cannot wait for industry to choose health and safety over profits; reform must come from revamping our federal agricultural policies that currently uphold the factory farm system.

Mega-Dairies Erode Rural Communities

Explosive growth in factory farms often masks a parallel occurrence: the shuttering of small- and medium-sized family farms, which are the lifeblood of rural communities. Michigan provides a stark example: The number of factory dairy operations in the state more than quadrupled between 1997 and 2017 — and the total number of cows living on these operations increased eightfold. Yet today, Michigan has fewer than half as many small- and medium-sized dairies (those under 500 head) than it did 20 years ago (see Figure 5).

With expanding factory farms, the state now produces more milk than it can process in-state, depressing milk prices (and consequently farm income). Due to

FIGURE 5. Dairy Cows on Michigan’s Factory Farms, 1997-2017

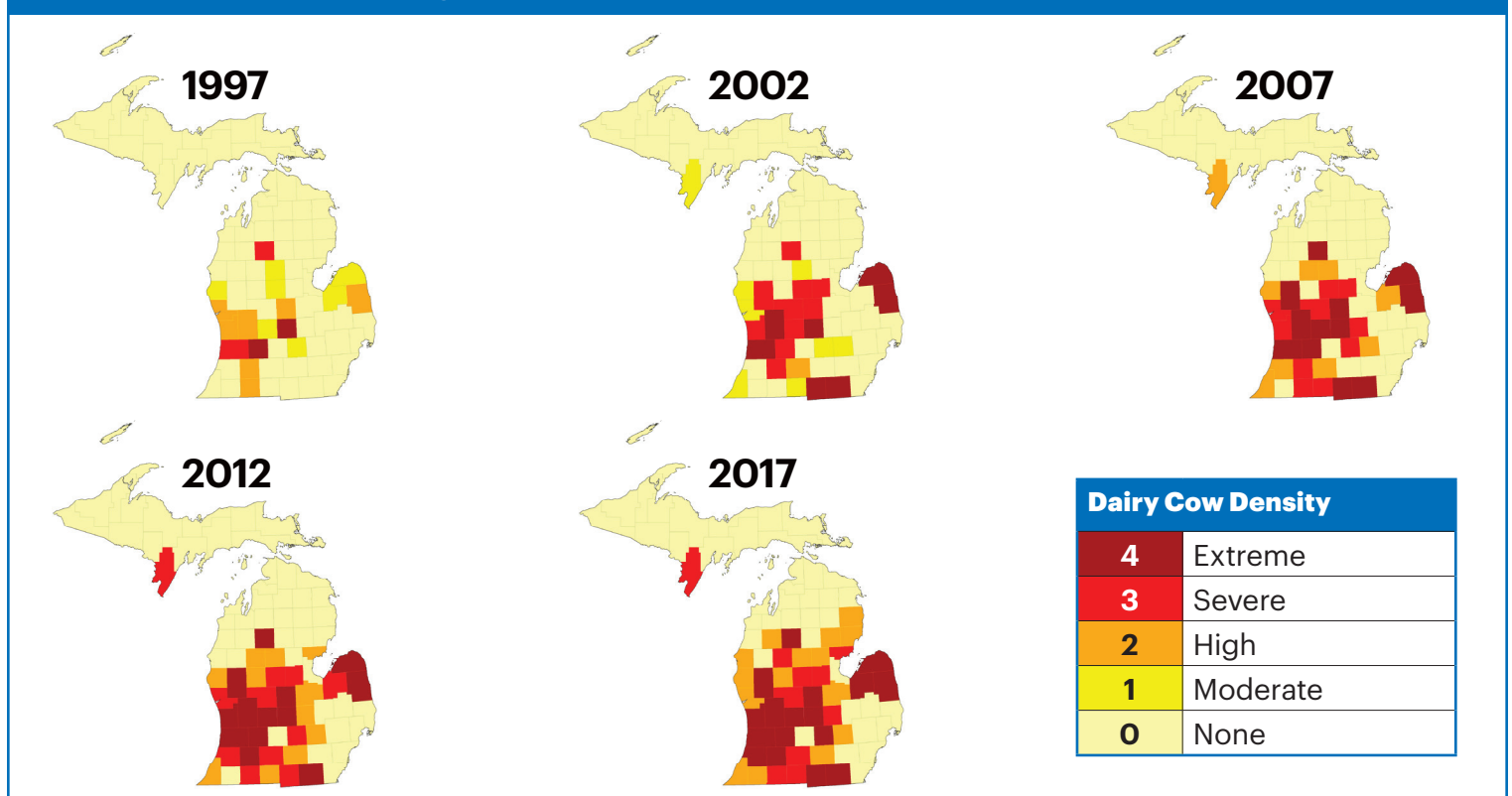
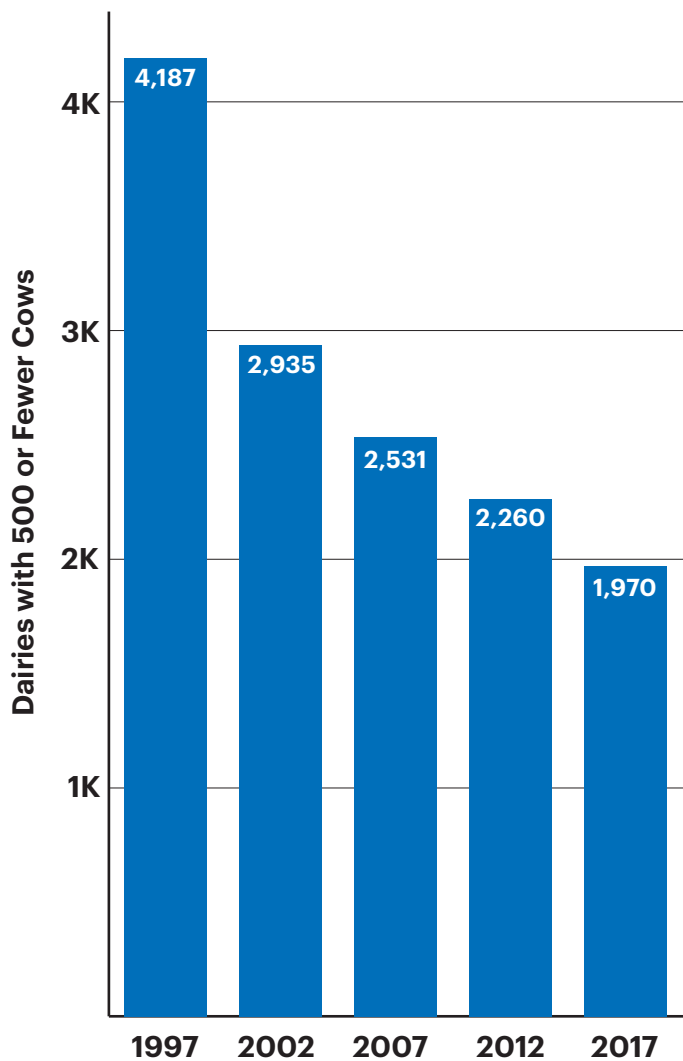


FIGURE 6. Loss in Michigan's Family-Scale Dairy Farms, 1997-2017



these and other economic challenges, many dairies are not even able to meet the cost of production. Unfortunately, smaller dairies may be less able to weather these economic storms year after year. Dairy closures can have a cascading effect in a community, reducing the incentives for haulers to travel to these areas.²¹ Michigan is bleeding small-and medium-sized dairy farms (see Figure 6) — all while state leaders praise the industry for increasing its milk production.²²

Decades of research conclude that the rise in factory farms coincides with stark declines in the economic and social well-being of communities, leading to higher levels of poverty and economic inequality, increased use of supplemental nutrition assistance and out migration.²³ Farm policies that focus merely on increasing production — not on supply management or diversifying operations — perpetuate this damaging scenario.

Market Consolidation Guts Farmer Profit and Raises Beef Prices

Most beef cattle begin their lives on pasture-based farms — nearly half on operations with fewer than 100 head of cattle — before being sold to feedlots where they are finished on grain diets.²⁵ Until the mid-1960s, the majority finished on small “farmer-feedlots” where farmers raised their own feed.²⁶ Today, however,

From Family Farms to Factory Operations



Iowa is another tragic case study in the consequences of a state opening its doors to factory farms. The average number of hogs on Iowa factory farms grew tenfold between 1982 and 2007. However, the total number of hog farms plummeted by more than 80 percent, and the state lost more than 40 percent of all farm jobs. Moreover, the total real value of Iowa's hog sales declined, even though farmers were selling more hogs.²⁴ The factory farm model is bad for Iowa's economy, its farmers and the environment.

mega-feedlots dominate middle America, with five states accounting for 75 percent of all factory feedlot cattle (see Figure 7). The average factory feedlot houses 4,000 head of cattle, but the largest ones can pack in up to 150,000 head or more at one time.²⁷ In 2017, U.S. factory feedlots produced 296 billion pounds of manure — the same weight as sewage generated by two-thirds of U.S. residents (see Table 4).

As feedlot size expanded, so too did the meat-packing industry’s stranglehold on the market.

In 1980, the top four beef-packing firms slaughtered one out of three cattle on feed; this increased to four out of five by 1995 and remains steady to this day.²⁸ Extreme consolidation enables major beef packers to engage in unfair practices that distort the market price of cattle.²⁹ Unfortunately, federal regulations enacted 100 years ago to protect farmers and ranchers in a highly-consolidated market did not prevent further consolidation or these abusive practices, and recent proposals to update these rules fall short of much-needed changes.³⁰

FIGURE 7. Beef Cattle on U.S. Factory Farms

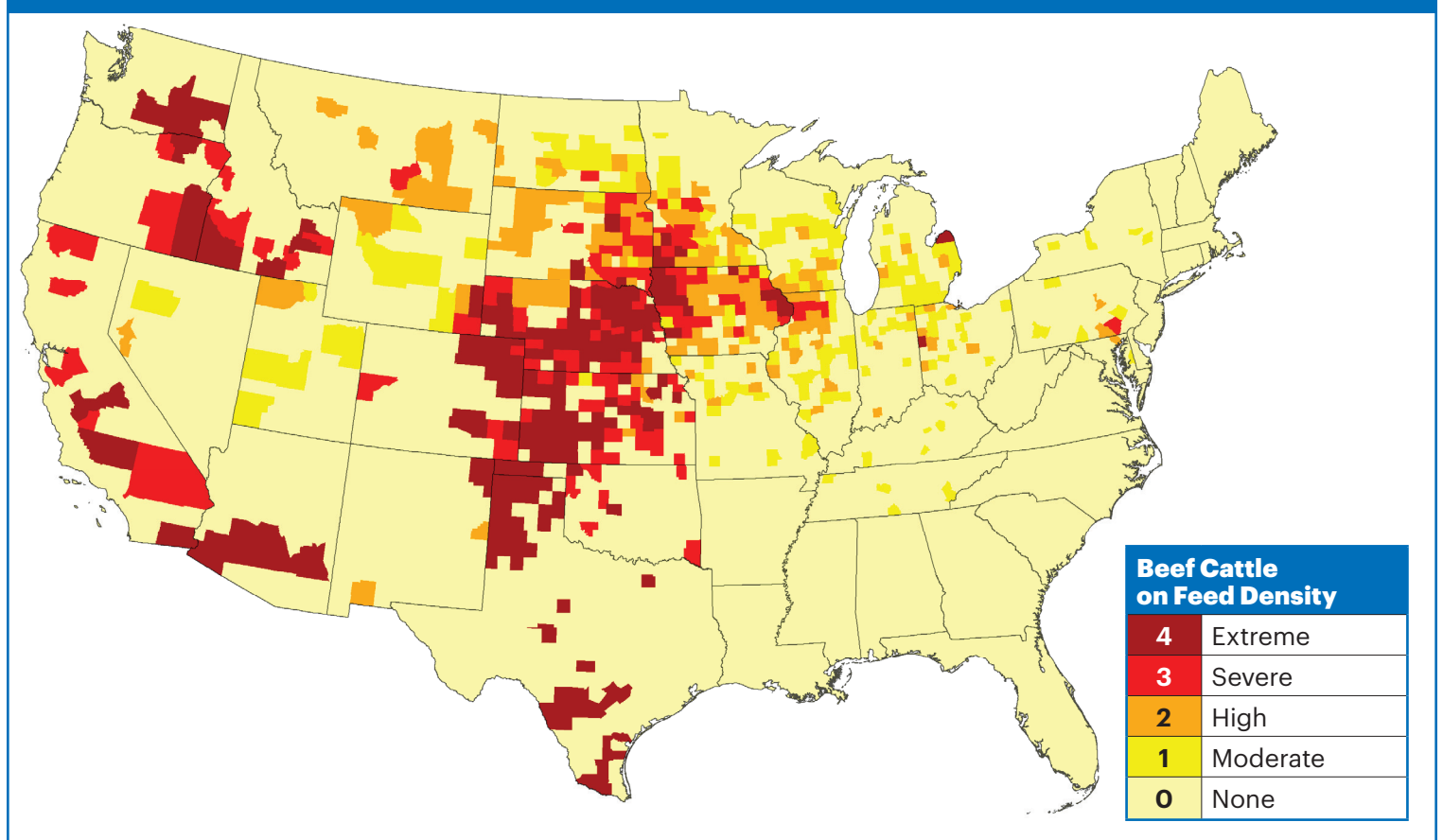


TABLE 4. Top Factory Feedlot States

State	Beef Cattle on Factory Farms	Average Head per Feedlot	Annual Manure Production (in Pounds)	Human Sewage Population Equivalent	Comparable Metropolitan Area*
Nebraska	2,752,571	4,418	63,309,133,000	46,626,258	3.5x Los Angeles
Texas	2,634,548	26,612	60,594,604,000	44,627,047	2x New York City
Kansas	2,365,718	11,374	54,411,513,998	40,073,291	2x New York City
Iowa	1,152,949	1,225	26,517,827,000	19,529,995	3x Houston
Colorado	984,727	11,190	22,648,721,000	16,680,454	3x Atlanta
United States	12,856,898	4,055	295,708,653,996	217,785,133	2/3 of the U.S. population

* Comparison is to the population of the entire greater metropolitan area, not only the city population.

Agribusiness giants perpetuate the myth that factory farms provide cheap meat to American consumers. But if this were the case, the real cost of beef should have fallen as feedlot size expanded. Instead, the opposite is true. Over the past two decades, farmers' share of beef sales declined 8 percent while the cost of ground beef surged 70 percent.³¹ Consumers and farmers are getting fleeced while giant meatpackers profit.

We Can Fix Our Factory Farm Problem

Our nation's agricultural policies incentivize the overproduction of corn and soybeans, fueling climate change and providing artificially cheap feed for factory farms.³² Failure to enforce our nation's anti-trust laws has allowed a handful of companies to gain even greater control of the livestock market.³³ And factory farms continue to evade regulation under our nation's premier environmental laws such as the Clean Water Act and Clean Air Act.³⁴

We need a complete overhaul of our federal farm policies so that they work for farmers and consumers — not agribusiness giants — all while reducing livestock's climate footprint. This must include:

- An immediate, national ban on new factory farms and on the expansion of existing ones;
- Research and funding to help current factory farms transition to smaller, more sustainable crop and/or livestock systems;

- Investment to expand local markets and build the infrastructure needed to help farmers bring their products to market;
- Reestablishing supply management controls, including the national grain reserve and price floors;
- Expanding crop insurance and other subsidies to cover more crops that directly feed humans;
- Closing loopholes that allow factory farms to hijack funds earmarked for conservation practices;³⁵
- Enforcing Clean Water Act and Clean Air Act regulations with respect to livestock operations.

Americans are already rethinking the role of meat in their diets, with an estimated two-thirds reporting a reduction in meat consumption for health and environmental reasons.³⁶ Eating less meat and dairy, and purchasing these products from farms implementing sustainable practices, is a win-win-win for consumers, farmers and the planet.

However, we cannot shop our way out of this problem. We need to vote for candidates who share this vision of a more just and sustainable food system — and who are willing take on the agribusiness giants that are only out to promote their corporate interests.

The first step towards fixing our food system is to ban factory farms. Only then can we transition away from polluting, unethical factory operations to sustainable, holistic farming systems.

Methodology

Density Maps

Food & Water Watch compiled data from the five most recent USDA Census of Agriculture reports (1997, 2002, 2007, 2012 and 2017), a comprehensive survey that includes data such as livestock inventory, number and size of operations, and livestock sales from every U.S. county. We classified operations as "factory farms" if they met the following Census categories: 500 or more beef cattle on feed, 500 or more dairy cows, 1,000 or more hogs, 500,000 or more broiler chickens sold annually, and 100,000 or more egg-laying hens. These size categories roughly align with the U.S. Environmental Protection Agency's definition of a medium-sized concentrated animal feeding operation (CAFO).³⁷

We totaled the county-level inventory data for operations we classify as factory farms and assigned each county a density ranking ranging from "Low" to "Extreme." This ranking system is a quartile distribution of factory farm livestock inventories from the 2007 USDA Ag Census, and we applied the same ranking criteria for the Census

years preceding and following 2007. We created the maps using ArcGIS, ArcMap Version 10.7.1, joining the county-level livestock inventory data (and our ranking system) to the USGS National Atlas county boundaries.

USDA does not report county-level inventory and sales data for broilers and layers by farm size. Instead, Food & Water Watch first used state-level data to calculate the average inventories and sales per factory layer/broiler farm. We then applied the state average to each operation within that state's counties before calculating their county-level inventories. Similarly, we also applied state-wide averages in instances where USDA withheld inventory figures for factory operations within a given county (in order to protect the identities of operations in counties where few exist).³⁸

For the "All Livestock" density maps, Food & Water Watch first converted inventory data into animal units, a weight-based measurement that is used to aggregate livestock inventories across various species. Animal unit measurements vary slightly between different state and federal agencies, but roughly speaking, one beef cow equals approximately two-thirds of a dairy cow, 8 hogs, 400 broiler chickens or 220 laying hens.³⁹ (For the broiler category, which reports sales rather than inventories, we first divided the county sales in the given year by 5.5 — the approximate number of flocks raised annually per operation.)⁴⁰

TABLE 5. Factory Farm Map Density Table							
Density	Map Color	All Livestock (Animal Units)	Dairy Cows	Beef Cattle on Feed	Hogs	Broiler Chickens Sold	Egg-Laying Hens
Extreme	Dark Red	More than 13,200	More than 4,200	More than 17,400	More than 48,500	More than 2.75 million	More than 1.25 million
Severe	Red	5,200 – 13,200	2,100 – 4,200	7,300 – 17,400	19,000 – 48,500	1 million – 2.75 million	750,000 – 1.25 million
High	Orange	2,000 – 5,199	1,200 – 2,099	2,175 – 7,299	9,500 – 18,999	350,000 – 999,999	500,000 – 749,999
Moderate	Yellow	Fewer than 2,000	Fewer than 1,200	Fewer than 2,175	Fewer than 9,500	Fewer than 350,000	Fewer than 500,000
None	Light Yellow	None	None	None	None	None	None

Manure Production and Human Sewage Equivalencies

Food & Water Watch previously relied on estimates for livestock and human manure production from a 2004 EPA factory farm risk assessment.⁴¹ For this map release, we updated our calculations on livestock manure production using the most recent agency estimates we could find — specifically, a 2013 EPA report that employed USDA methodologies.⁴² The estimates for livestock manure production were nearly identical to those in EPA (2004) and were used when estimating the total weight of manure produced by all five livestock categories, and for cattle and hogs individually.

When considering broilers alone, we calculated litter production (the combination of manure, feathers and bedding from chicken houses) using estimates developed for the Chesapeake Bay Foundation.⁴³ As this methodology only relates to broiler (meat) chickens, we could not apply it to egg-laying hens, and instead used a USDA estimate on manure *volume* to compare hen manure production to Olympic-sized swimming pools.⁴⁴

For this map release, Food & Water Watch no longer used EPA (2004) to estimate human manure production, as it only considers fecal matter, whereas its livestock estimates include both urine and feces, creating an insufficient comparison.⁴⁵ Instead, we used the most recent estimate of human manure (urine and feces) production we could find referenced in an agency document, a 2008 Government Accountability Office report.⁴⁶ This lowered the livestock-to-human waste ratios from previous map iterations and reports. We continued to use U.S. Census Bureau's American Community Survey 5-year population estimates in order to compare county-level livestock waste production to major metropolitan areas.

Endnotes

- 1 U.S. Environmental Protection Agency (EPA). "Risk Assessment Evaluation for Concentrated Animal Feeding Operations." EPA/600/R-04/042. May 2004 at 9.
- 2 Ashwood, Loka et al. "Where's the farmer? Limiting liability in Mid-western industrial hog production." *Rural Sociology*. Vol., 79, No. 1. March 2014 at 6 to 7 and 22 to 23.
- 3 Pornsukarom, Suchawan and Siddhartha Thakur. "Assessing the impact of manure application in commercial swine farms on the transmission of antimicrobial resistant *Salmonella* in the environment." *PLoS ONE*. Vol. 11, No. 10. October 2016 at abstract.
- 4 Kellogg, Robert L. et al. United States Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS) and Economic Research Service (ERS). "Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States." Nps00-0579. December 2000 at Executive Summary, 1 and 89 to 92.
- 5 EPA. [Data table]. Water quality assessment and TMDL information, national summary tables and charts. Available at https://ofmpub.epa.gov/waters10/attains_index.home. Accessed February 2020.
- 6 Ghazali, Daniel Aiham et al. "Climate change impacts on disaster and emergency medicine focusing on mitigation disruptive effects: An international perspective." *International Journal of Environmental Research and Public Health*. Vol. 15, No. 1379. July 2018 at abstract.
- 7 Graff, Michael. "Millions of dead chickens and pigs found in hurricane floods." *Guardian*. September 22, 2018; Murawski, John. "The amount of *E. coli* and fecal matter in NC wells has spiked since Hurricane Florence." *Raleigh News & Observer*. October 24, 2018; Kasserman, Krissy. Food & Water Watch (FWW). "The hog sht floodwater of Hurricane Florence is no accident." September 28, 2018. Available at <https://www.foodandwaterwatch.org/insight/hog-sht-floodwater-hurricane-florence-no-accident>.
- 8 Fairchild, B. D. et al. "Ammonia concentrations downstream of broiler operations." *The Journal of Applied Poultry Research*. Vol. 18, Iss. 3. Fall 2009 at 631, 634 and 636; Baykov, Bayko and Michail Stoyanov. "Microbial air pollution caused by intensive broiler chicken breeding." *FEMS Microbiology Ecology*. Vol. 29. 1999 at 390 to 391; Dance, Scott. "As chicken industry booms, Eastern Shore farmers face not-in-my-backyard activism." *Baltimore Sun*. April 2, 2016.
- 9 Kirychuk, S. P. et al. "Total dust and endotoxin in poultry operations: Comparison between cage and floor housing and respiratory effects in workers." *Journal of Occupational and Environmental Medicine*. Vol. 48, No. 7. July 2006 at 741 and 745; Trabue, Steven et al. "Speciation of volatile organic compounds from poultry production." *Agricultural and Biosystems Engineering*. Vol. 44, Iss. 29. September 2010 at 3545 to 3546; EPA. Office of Inspector General (OIG). "Eleven Years After Agreement, EPA Has Not Developed Reliable Emission Estimation Methods to Determine Whether Animal Feeding Operations Comply with Clean Air Act and Other Statutes." Report No. 17-P-0396. September 19, 2017 at 2.
- 10 MacDonald, James M. USDA ERS. "Technology, Organization, and Financial Performance in U.S. Broiler Production." Economic Information Bulletin Number 126. June 2014 at 23; Davis, Michael A. et al. "Poultry manure as a fertilizer." University of Florida Extension. Reviewed January 2017; EPA. [Data table]. Estimated nitrate concentrations in groundwater used for drinking. Available at <https://www.epa.gov/nutrient-policy-data/estimated-nitrate-concentrations-groundwater-used-drinking>. Accessed September 2019; Swistock, Bryan. PennState Extension. "Nitrates in drinking water." 2019 at 1.
- 11 Chesapeake Bay Program. [Data tables]. Modeled nitrogen loads to the Chesapeake Bay, 1985-2025 and 1985-2025. On file at Food & Water Watch. Available at <https://www.chesapeakeprogress.com/clean-water/watershed-implementation-plans>. Accessed October 2019.
- 12 FWW analysis of USDA National Agricultural Statistics Service (NASS) data. Available at <https://quickstats.nass.usda.gov/>. Accessed August 2019; MacDonald (2014) at 1; Key, Nigel and James M. MacDonald. USDA ERS. "Local Monopsony Power in the Market for Broilers? Evidence from a Farm Survey." Selected Paper at the Annual Meeting of the AAEA. Orlando, Florida. July 27-29, 2008 at 3.
- 13 Andrews, David and Timothy J. Kautza. Report of the Pew Commission on Industrial Farm Animal Production. "Impact of industrial farm animal production on rural communities." 2008 at iv; Key & MacDonald (2008) at 3 to 4 and 7.
- 14 Kirychuk, S. P. et al. at 741 and 744 to 745; Viegas, S. et al. "Occupational exposure to poultry dust and effects on the respiratory system in workers." *Journal of Toxicology and Environmental Health, Part A*. Vol. 76. 2013 at 230 to 231.
- 15 FWW analysis of U.S. Bureau of Labor Statistics (BLS). [Data tables]. Industries at a Glance. Animal Production: NAICS 112. Available at <https://www.bls.gov/iag/tgs/iag112.htm>, and Oil and Gas Extraction: NAICS 211, available at <https://www.bls.gov/iag/tgs/iag21.htm>. Accessed January 2020.
- 16 U.S. Government Accountability Office (GAO). "Workplace Safety and Health: Additional Data Needed to Address Continued Hazards in the Meat and Poultry Industry." GAO-16-337. April 2016 at 47; Perez, Maria. "Wisconsin's dairy industry would collapse without the work of Latino immigrants — many of them undocumented." *Milwaukee Journal Sentinel*. November 21, 2019.
- 17 Cassuto, David N. and Cayleigh Eckhardt. "Don't be cruel (any-more): A look at the animal cruelty regimes of the United States and Brazil with a call for a new Animal Welfare Agency." *Boston College Environmental Affairs Law Review*. Vol. 43, Iss. 1. February 2016 at 6 to 7.
- 18 Greene, Joel L. and Tadlock Cowan. Congressional Research Service (CRS). "Table egg production and hen welfare: Agreement and legislative proposals." 7-5700. February 14, 2014 at 7; Kelto, Anders. "Farm fresh? Natural? Eggs not always what they're cracked up to be." *NPR*. December 23, 2014.
- 19 Cassuto & Eckhardt at 6 to 7 and 25 to 26; MacDonald, James. USDA ERS. "CAFOs: Farm animals and industrialized livestock production." *Oxford Research Encyclopedia*. July 2018 at 14.
- 20 Fortune, Aidan. "US meat industry sues California over welfare legislation." *Global Meat News*. October 9, 2019; Erwin, Nicole. "Too fast for safety? Poultry industry wants to speed up the slaughter line." *NPR*. October 27, 2017.
- 21 Heslip, Nicole. "Growing pains in Michigan's dairy industry." *Farm Progress*. January 5, 2018; Heslip, Nicole. "Michigan dairy farmers either exit or eat up equity." *Farm Progress*. October 4, 2018.
- 22 Office of Governor Gretchen Whitmer. [Press release]. "Dairy industry celebrates Michigan Dairy Foods Awareness Day at the Capitol." June 12, 2019; Sorge, Marge. "Milk means more: Dairy industry celebrated for contributions to Michigan's economy." *The Hub Flint*. June 7, 2018.
- 23 Lobao, Linda and Curtis W. Stofferahn. "The community effects of industrialized farming: Social science research and challenges to corporate farming laws." *Agriculture and Human Values*. Vol. 25, Iss. 2. June 2008 at 220 to 221 and 225; Durrenberger, E. Paul and Kendall M. Thu. "The expansion of large scale hog farming in Iowa: The applicability of Goldschmidt's findings fifty years later." *Human Organization*. Vol. 55, No. 4. Winter 1996 at 411 to 412; Lyson, Thomas A. and Rick Welsh. "Agricultural industrialization, anticorporate farming laws, and rural community welfare." *Environment and Planning A: Economy and Space*. Vol. 37, Iss. 8. August 1, 2005 at 1487 to 1488.
- 24 FWW. "The Economic Cost of Food Monopolies." November 2012 at 8 and 18.

- 25 Drouillard, James S. "Current situation and future trends for beef production in the United States of America — A review." *Asian-Australasian Journal of Animal Sciences*. Vol. 31, No. 7. July 2018 at 1007 to 1010; Tester, Colson A. et al. "Impact of weather and herd size management on beef cow profitability." *Journal of Agricultural and Applied Economics*. Vol. 51, Iss. 4. November 2019 at 546.
- 26 MacDonald, James M. and William D. McBride. USDA. ERS. "The Transformation of U.S. Livestock Agriculture: Scale, Efficiency, and Risks." Economic Information Bulletin Number 43. January 2009 at 12.
- 27 USDA. Agricultural Marketing Service (AMS). "Packers and Stockyards Division: Annual Report 2018." August 2019 at 17; Painter, Kristen Leigh. "Cargill is selling two cattle feedlots, exiting that portion of the beef industry." *Star Tribune*. April 26, 2017.
- 28 USDA. Grain Inspection, Packers and Stockyards Administration (GIPSA). "2008 Annual Report." March 1, 2009 at 46; USDA AMS 2019 at 9.
- 29 FWW. [Fact sheet]. "Horizontal consolidation and buyer power in the beef industry." July 2010 at 2.
- 30 FWW 2010 at 1 to 2; National Farmers Union. [Press release]. "Livestock competition rule unlikely to provide needed protections to farmers." January 10, 2020.
- 31 FWW analysis of USDA ERS. [Data table]. Meat price spreads, Historical monthly price spread data for beef, pork, broilers. February 28, 2019. Available at <https://www.ers.usda.gov/data-products/meat-price-spreads/>. Accessed December 2019; BLS. [Data table]. CPI-average price data for ground beef, 100 percent beef, per lb. Available at https://data.bls.gov/timeseries/APU0000703112?data_tool=XGtable. Accessed December 2019; BLS. CPI Inflation Calculator. Available at <https://data.bls.gov/cgi-bin/cpicalc.pl>. Accessed February 2020.
- 32 Rosa, Isabel and Renée Johnson. CRS. "Federal Crop Insurance: Specialty Crops." R45459. Updated January 14, 2019 at 9; Smith, Trevor J. "Corn, cows, and climate change: How federal agricultural subsidies enable factory farming and exacerbate U.S. greenhouse gas emissions." *Washington Journal of Environmental Law & Policy*. Vol. 9, Iss. 1. March 2019 at abstract and 43 to 44.
- 33 Douglas, Leah. "Antitrust in food and farming under President Trump." *Journal of Food Law & Policy*. Vol. 13, No. 1. 2018 at 78 to 79.
- 34 Pew Environment Group. [Fact sheet]. "Animal agriculture and the clean water act." December 1, 2010 at 1 to 2; EPA OIG at At a Glance.
- 35 FWW. "The Urgent Case for a Ban on Factory Farms." May 2018 at 10.
- 36 Neff, Roni A. et al. "Reducing meat consumption in the USA: A nationally representative survey of attitudes and behaviours." *Public Health Nutrition*. Vol. 21, No. 10. March 2018 at abstract.
- 37 40 CFR § 122.23.
- 38 See USDA NASS. "2017 Census of Agriculture: U.S. Summary and State Data." AC-17-A-51. April 2019 at IX.
- 39 See Gollehon, Noel, et al. USDA ERS. "Confined Animal Production and Manure Nutrients." AIB-771. June 2001 at table 1 at 8.
- 40 Rhodes, Jennifer L. et al. University of Maryland Extension. "Broiler Production Management for Potential and Existing Growers." Updated 2011 at 13.
- 41 EPA (2004) at table 3.3 at 9.
- 42 EPA. "Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality." EPA 820-R-13-002. July 2013 at 109.
- 43 Chesapeake Bay Program. Agricultural Modeling Subcommittee. "Recommendations to Estimate Poultry Nutrient Production in the Phase 6 Watershed Model." March 2015 at 6.
- 44 USDA NRCS. "Agricultural Waste Management Field Handbook, Chapter 4: Agricultural waste characteristics." 210-VI-AWMFH. March 2008 at 4-12 to 4-20.
- 45 EPA (2004) at 9 and 63.
- 46 GAO. "Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy to Protect Air and Water Quality from Pollutants of Concern." GAO-08-944. September 2008 at 58.

Food & Water Watch mobilizes regular people to build political power to move bold and uncompromised solutions to the most pressing food, water and climate problems of our time. We work to protect people's health, communities and democracy from the growing destructive power of the most powerful economic interests.



(202) 683-2500

foodandwaterwatch.org • info@fwwatch.org

Copyright © April 2020 Food & Water Watch