



**SIERRA  
CLUB**

JOHN MUIR CHAPTER

# **CAFOs:**

## **A Threat to Water in Wisconsin**

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A report by the Sierra Club-John Muir Chapter

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## Introduction: What is a CAFO?

Wisconsin has deep roots in the agricultural industry. It dominates the state's landscape and is a significant part of the state's economy particularly in rural areas. Done well, it is a sustainable endeavor preserving soil and water resources; done poorly, it can lead to erosion and pollution. Agriculture evolves over time. One of those changes is the dramatic increase in the size and number of Concentrated Animal Feeding Operations (CAFOs). This trend dramatically increased when Wisconsin passed the livestock facility siting law in 2004, which severely restricts the ability of local governments to regulate where CAFOs are located. The growth in number and size of these facilities has led to serious environmental issues in many areas of the state. For example, groundwater contamination in Kewaunee County is so severe that people cannot drink their water. Nitrate contamination, over-pumping of ground water in the Central Sands and fish kills from manure spills in southern Wisconsin are just a few of the other problems that the people of Wisconsin are facing from CAFOs.

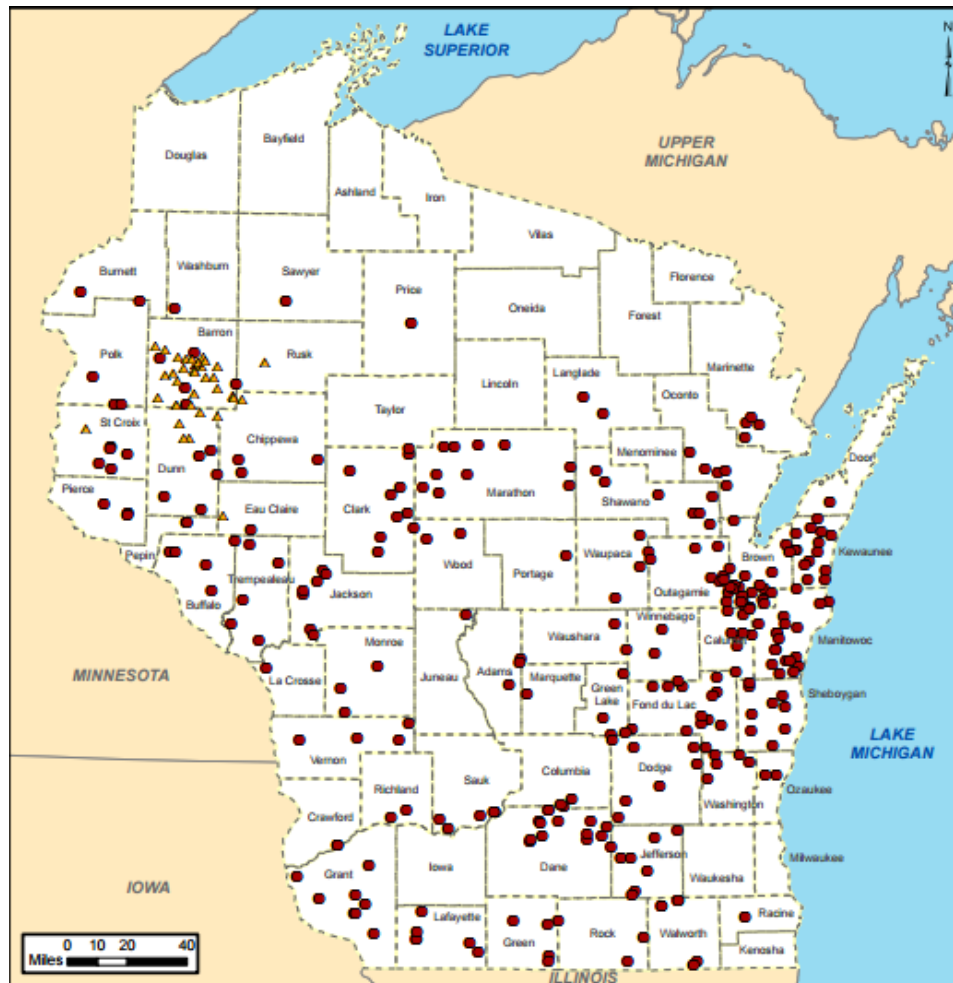
According to the U.S. Environmental Protection Agency (EPA), a CAFO is defined as any animal feeding operation with,

“more than 1,000 animal units (an animal unit is defined as an animal equivalent of 1,000 pounds live weight and equates to 1,000 head of beef cattle, 700 dairy cows, 2,500 swine weighing more than 55 lbs., 125,000 broiler chickens, or 82,000 laying hens or pullets) confined on site for more than 45 days during the year. Any size animal feeding operation that discharges manure or wastewater into a natural or man-made ditch, stream, or other waterway can be regulated, regardless of size.”<sup>1</sup>

Additionally, the Wisconsin Department of Natural Resources (DNR) may designate a smaller-scale animal feeding operation (fewer than 1,000 animal units) as a CAFO if it has pollutant discharges to navigable waters or contaminates a well.<sup>2</sup>



Dairy operations account for the majority of CAFOs in Wisconsin, 252 out of 293 total. According to a WDNR database, there are also 14 swine, 13 beef, eight chicken, and one turkey CAFOs for a total of 289 CAFOs in Wisconsin as of 2012. It should be noted that all turkey CAFOs (37 sites) are included in two permits.



The data also shows that several counties are more densely populated by CAFOs as well: Brown (20), Manitowoc (18), Kewaunee (16), Dane (13), Outagamie (11), Clark (10), Marathon (10), and Sheboygan (10). By region, the most CAFOs are in Northeastern Wisconsin (118) followed by West Central (72), South Central (62), Southeast (24), and Northwest (17).<sup>3</sup> Additionally, many of these permits include multiple operations; as of 2015, Jennie-O Turkey Stores has been using a single permit to cover 55 separate operations.<sup>4</sup>

In addition to these facilities, there are another 43 that skirt regulation by having just under the 1000 animal unit threshold.

## **Risks from CAFOs**

### **Water Quality and Manure**

CAFOs generate large quantities of manure, both liquid and solid. The bacteria, phosphorous, nitrates and other substances in manure can contaminate water supplies. The management and disposal of this manure is the source of many of the problems that can arise from one of these facilities. To put the amount of manure generated in context, a dairy CAFO with 2,500 cows generates the same amount of waste as a city of 410,000 residents. Unlike cities, however, CAFOs do not treat the sewage they produce.<sup>5</sup>

Typically, manure is liquefied with water and used to fertilize fields, a practice known as land-spreading. Land-spreading can be effective if it is done in the right place and at the correct times: on places that have sufficient depth of soil and plant cover to attenuate the manure, soil that is not frozen or saturated, and not close to rain events. Finally, the topography of the land must be taken into consideration. For example, if the spreading ground has too severe a slope, the manure can run off the land into a creek, river or lake and contaminate the surface water.

Disposal of this manure is an issue for most CAFO operations. There often is not enough nearby farmland to safely spread all the manure, or it accumulates during the winter months when it cannot be spread. Contributing to the issue is a lack of sufficient shipping companies to handle manure transportation and spreading during periods when conditions are favorable.

CAFOs utilize on-site lagoons to store and contain the liquefied waste until it can be disposed of. While in these lagoons, the liquefied waste can leach into the groundwater, contaminating neighboring wells and rendering water unsafe for humans and farm animals. The lagoons can also fail due to heavy rains or other causes. When this occurs, the liquefied waste frequently runs off the landscape into streams and rivers, contaminating waterways and causing fish kills.



Full lagoon breaches are not necessary for large-scale manure spills to take place, as they often occur due to failed hose couplings or check valves. One such incident took place in December of 2016 at Emerald Sky Dairy in Emerald, WI. A check valve burst, and tens of thousands of gallons of liquid manure spilled into adjacent wetlands. However, due to flawed self-reporting regulations and enforcement, Emerald Sky Dairy did not report the incident to the DNR until March 29, 2017.<sup>6</sup>



A similar incident occurred in the spring of 2016, when Misty Morning Farms in Grant County was pumping manure from a full 3.3 million gallon manure lagoon to a larger lagoon. A hose coupling broke during the night, sending an unknown amount of liquid manure flowing 2 miles over land until it drained into Castle Rock Creek, a Class II trout stream. A following fish survey found 50 fish in an area where 200-400 fish are usually caught. At least 50 dead fish were found.<sup>7</sup>

The resulting overload of nutrients in the water causes rapid algae growth, which depletes the water of oxygen and kills large numbers of fish and other aquatic life. Manure may also find its way into the groundwater and contaminate that water with dangerous fecal bacteria such as *Escherichia coli*, high levels of nitrates, phosphorus, pathogenic microbes, and viruses. That same water may be used for drinking, cooking and/or bathing, putting human health at risk.



## **Bacteria**

Coliform bacteria are a group of species that originate in the digestive tract of animals and humans and enter the water supply through manure or human sewage contamination. For example, a recent study in Kewaunee County show that of 47 wells tested, 26 were contaminated by manure, 18 by human waste and 3 by both. Coliform bacteria contamination is an indicator that other illness-causing bacteria, parasites and viruses are present in water.<sup>7</sup> Four hundred and twenty public water supply systems in Wisconsin exceeded health standards set by the state. This should not be taken lightly because people can become ill after a single exposure to water contaminated by coliform bacteria.<sup>8</sup> In 2004, a six-month old infant from Kewaunee County was taken to the emergency room after bathing in manure-tainted well water. The rest of the family became sick as well.<sup>9</sup>

## Nutrients

There are many nutrients that are found in waterways due to fertilizer runoff that can be dangerous in high quantities; nitrates and phosphorus are two of the most common in Wisconsin. An estimated 94,000 households in Wisconsin have unsafe levels of nitrates in their drinking water.<sup>10</sup> Nitrates are harmful to adults and cause blue-baby syndrome in infants.<sup>11</sup> Studies have found nitrate exposure to be a possible risk factor associated with gastric cancer, birth defects, hypertension, thyroid disorder and lymphoma.<sup>12</sup> Ninety percent of nitrates come from manure or excess fertilizer runoff stemming from inadequate or careless farming practices.<sup>13</sup> Nitrates easily infiltrate groundwater, contaminating drinking water and posing a health risk for all. Thirteen Wisconsin counties have had to take corrective actions to address nitrate contamination, including construction of new wells, blending of water and installation of new water treatment technology.<sup>14</sup>

Phosphorous is found in the chemical fertilizer that farmers spread on their fields, as well as in the manure that is spread. Storm water runoff from farm fields with high concentrations of phosphorous goes into



Wisconsin's creeks, rivers and lakes, causing algae blooms that can be harmful to health and prevent recreation. Under certain conditions, the algae created by phosphorus pollution are blue - green algae called cyanobacteria. Cyanobacteria can create microcystin, a toxin that has caused illness in humans and has even killed pets that have been exposed to it.<sup>15</sup>



## Water Quantity

CAFOs also present threats to water quantity. Typically, a bovine will consume seven to ten percent of its body weight in water per day, and a cow (typically a lactating dairy cow) will drink around 25 to 50 gallons of water per day. Using a 40-gallon average per day as an example, that would be 13, 440 gallons per year per cow. A dairy operation of 5,000 cows would use approximately 67,000,000 gallons of water per year. To provide all of this water, large CAFOs depend on one or more high-capacity wells. Section NR 812.07(53), Wisconsin Administrative Code, defines a high capacity well system as one or more wells, drill-holes or mine shafts on a property that have a combined approved pump capacity of 70 or more gallons per minute, which is 100,800 gallons per day per well.

Most of this groundwater is never returned to the aquifer as clean water. In some areas of the state the number of high capacity wells has increased to the point that this high use of Wisconsin's ground water is lowering the water table to the point that trout streams, lakes and rivers and neighboring wells are drying up. This means, then, that high cap well pumping depletes the aquifer. In addition, these wells can concentrate pollution to the point that the water violates health standards.



## **Air Quality**

Large CAFO operations often fill the air with bad odors. These odors come from thousands of cows passing methane and from manure lagoons where manure is stored. It also comes from farm fields where the manure is spread. Depending upon the direction the wind is blowing, neighbors will have to tolerate these odors or move away from their homesteads. CAFO waste also pollutes the air. Liquefied animal waste emits 160 known toxic gases, including hydrogen sulfide, a deadly gas with the characteristic stench of rotten eggs.<sup>16</sup> Small droplets of waste also become airborne, carrying a plethora of microorganisms and pathogens into surrounding homesteads and communities.<sup>14</sup>

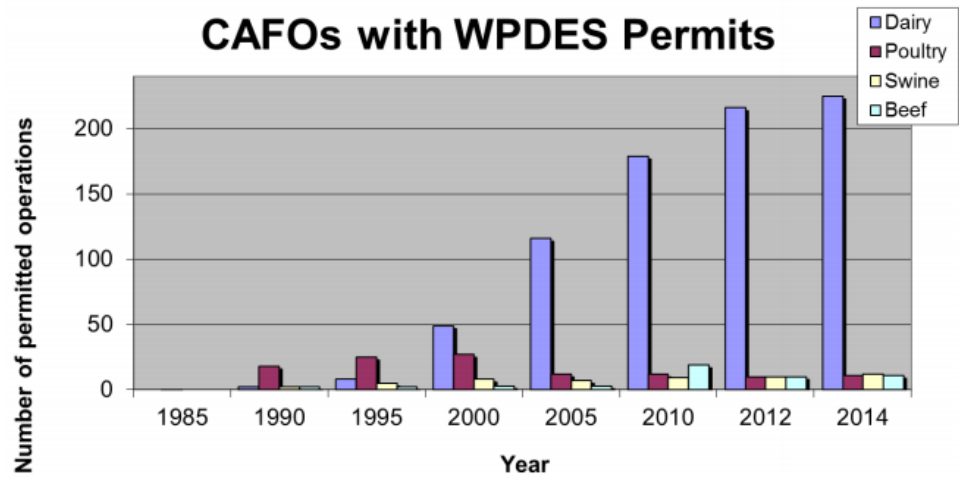
## **Traffic and Community Effects**

CAFOs often require large trucks or tractors to haul or spread manure on nearby farmlands. These trucks and tractors can damage rural roads and bridges due to the size, weight and frequency of the vehicles and their loads. A small CAFO operation with 700 cows and a typical manure spreading rig like a John Deere 8230 tractor with a Husky 5000 manure spreader, has the capacity to reduce the lifespan of a typical county road from 50 years to 30 years.<sup>17</sup> Local governments and their taxpayers are often left to bear the burden of road and bridge maintenance, and many argue that CAFOs are not taking responsibility and paying their fair share.

Due to the many negative effects of CAFOs, nearby property values can drastically drop, as exemplified by Todd Knutson in Green County who successfully petitioned the Wisconsin Department of Revenue to have his property tax assessment lowered because of the negative impacts of a neighboring CAFO.

## CAFO Regulation

The U.S. EPA delegates implementation of the Clean Water Act water pollutant permit and CAFO regulations to the WI Department of Natural Resources (DNR).



Wisconsin implements the Clean Water Act by requiring that CAFOs have a DNR approved Wisconsin Pollutant Discharge Elimination System (WPDES) permit in place when they operate.<sup>2</sup> WPDES permits must be renewed every five years, and Nutrient Management Plans (NMPs) are supposed to be renewed annually and with public notice.<sup>18</sup> These water quality protection permits are meant to ensure farms use proper planning, nutrient management, and structures and systems construction to protect Wisconsin waters. These permits apply only to water protection. The DNR also has some authority to regulate other aspects of CAFO operations such as air emissions but other aspects are either left to local governments or are not regulated at all such as traffic, lighting, or antibiotics.

A regulating system is only as good as the enforcement behind it, and this oversight is currently lacking in Wisconsin. Due to cuts at the Wisconsin DNR in both staff and regulating power, there is even more doubt that the state is competently carrying out its duties to protect water resources. A 2016 report issued by the nonpartisan Legislative Audit Bureau found a series of problems with the DNR's implementation of the CAFO program. These included high levels of staff turnover in the CAFO program and inadequate permitting and inspection processes. 17 farms were inspected after — not before — their permit was issued, and 98 percent of 1,900 required reports that farms were required to submit were not electronically recorded as being received. CAFOs were not inspected as often as they were supposed to be.<sup>19</sup>

## CAFO Siting Law

In addition to concerns from CAFO regulation, there are also many concerns about the facility siting process. In 2004, Wisconsin legislators passed the Livestock Facility Siting Law (Wis. Stat. § 93.90). The rules to support this law were developed in 2006 by the WI Department of Agriculture, Trade, and Consumer Protection (ATCP 51). The law and rules were designed with the intent of making the farm permit application and approval process more efficient. The major theory was that there should be uniform rules throughout the state. The problem is that the topography, geography and geology of the state are not uniform, so a “one size fits all” approach simply does not work. The law is not designed to protect public health or natural resources, and it doesn’t protect either. This law, with its supporting rules, reduces local governments’ ability to protect the health of their residents and their water quality. Rather than using local livestock facility siting regulations that protected both the environment and public health, zoning ordinances now manage land use. This law supports a system under which a properly completed siting application essentially guarantees approval.

Since the livestock citing law passed, the number of CAFOs in Wisconsin has doubled from approximately 150 to over 300. A particularly problematic aspect of this growth is that it has been concentrated in certain areas of the state such as Kewaunee County. The result has been groundwater contamination because the soil and fractured bedrock in the area cannot handle the amount of manure generated by the facilities. This is exacerbated by the flaws in the DNR CAFO program that were found in the (LAB) Legislative Audit Bureau report mentioned earlier.

Since the drastic increase in CAFOs that began in 2004, many argue that the agricultural industry has taken a turn for the worse. Wisconsin is at risk of losing the bucolic small towns with which Wisconsin’s identity is so strongly intertwined. Increasingly, family farms are being forced out of business, unable to compete with CAFOs, some which have investors with deep pockets. These CAFOs have already begun to lower groundwater levels and cause contamination of drinking water supplies. Citizens are becoming ill and are watching their wells run dry.



## Solutions

### Local Governments

Now local governments' options are few. They can attempt to enact more stringent regulations within the livestock siting scheme by satisfying the public health or safety standard or they can pass ordinances within more traditional spheres of local control such as roads and public safety. Here are a few examples.

- The Town of Saratoga has passed ordinances to protect its groundwater: one prohibits the spraying of liquid manure through center pivot irrigation systems, a second regulates storage of solid manure, and a third gives the Town authority to enforce DNR and U.S. Dept. of Agriculture rules regarding manure management.
- Kewaunee County passed the Public Health and Groundwater Protection ordinance in 2014 that regulates the spreading of manure.
- Bayfield County, among others, has passed a temporary moratorium on CAFOs.

### Statewide Legislation

To protect Wisconsin's water, the following statewide legislative actions are vital:

- Repealing or amending the Livestock Citing Law so impacts on water quantity and quality and air are considered and local governments are given more control over citing and regulations for CAFOs.
- Placing a moratorium on new CAFOs or expansions of existing CAFOs, at a minimum until the citing law is repealed or amended.
- Providing sufficient resources to the DNR for implementation and enforcement of laws related to CAFOs.

### What Citizens of Wisconsin Can Do

- Share concerns with neighbors and local governments. Organize a group of neighbors and others who are concerned about the impacts of CAFOs to work with local government to pass ordinances that will protect public health.
- Become a water advocate. Sierra Club's water campaign creates a way for concerned residents to connect with like-minded individuals and to take action to protect Wisconsin's waters. For more information, contact [john.muir.chapter@sierraclub.org](mailto:john.muir.chapter@sierraclub.org).
- Join an activist group already fighting CAFOs, such as Sustainable Rural Wisconsin Network. Find out more at [sustainruralwisconsin.net](http://sustainruralwisconsin.net)

## Appendix

### Can Public Safety and our Water be Better Protected?

There are many federal and state laws and regulations that are designed to protect Wisconsin's water and land resources. Many counties and municipalities have ordinances that protect land and water resources.

#### Federal

The **Clean Water Act (CWA)** and the **Safe Drinking Water Act (SDWA)** are the two primary federal laws that protect our water. The Federal **Water Pollution Control Act**, 33 U.S.C. §§ 1251-1387, was adopted in 1948 and, after amendment in 1972 and 1977, became commonly known as the **Clean Water Act**. The **Safe Drinking Water Act** of 1974 and its amendments establish the basic framework for protecting the **drinking water** used by public **water** systems in the United States. The act is administered through programs that establish standards and treatment requirements for public water supplies, control underground injection of wastes, finance infrastructure projects, and protect sources of drinking water. The act regulates privately and publicly owned water systems that provide piped water for human consumption to at least 15 service connections or that regularly serve at least 25 people.

**44 CFR 59-72.** Communities are also required to adopt an ordinance that meets the minimum standards of this regulation if they wish to participate in the National Flood Insurance Program (NFIP) and have flood insurance available.

#### State

**Wisconsin Statutes 87.30.** Communities are required to adopt a reasonable and effective floodplain ordinance within one year after hydraulic and engineering data adequate to formulate the ordinance becomes available.

**Wisconsin Statutes, 281.36,** regulates water and sewage

**Wisconsin Statutes, 287** relating to solid waste reduction, recovery and recycling

**NR 103, Wisconsin Administrative Code.** Concerns water quality standards for wetlands.

**NR 151, Wisconsin Administrative Code,** regulates water runoff management.

**NR 243, Wisconsin Administrative Code,** regulates animal feeding operations.

**NR 243.17, Wisconsin Administrative Code**, Concerns the operation and maintenance of manure digesters

**NR 299, Wisconsin Administrative Code**. Concerns water quality certification.

**NR 812, Wisconsin Administrative Code**, Concerns high capacity wells.

**NR 445, Wisconsin Administrative Code**. Concerns air toxics, also called hazardous air pollutants (HAPs), are substances either known or suspected to cause cancer or other serious health problems, including damage to the immune, neurological, reproductive and respiratory systems. These pollutants are emitted by sources such as vehicles, factories and power plants.

**24 Solid Waste Administrative Codes** (See DNR CAFO web page)

**Construction Site Storm Water Runoff General Permit No. WI-S067831-5** - The DNR's construction site permit requires landowners to install practices to help decrease the amount of sediment that pollutes Wisconsin's waterways from construction projects

**Wisconsin Pollutant Discharge Elimination System (WPDES)** permits for Concentrated Animal Feeding Operations (CAFOs) are renewed every five years and may be modified, as needed, during the five year permit term. Nutrient Management Plan (NMP) changes occur as often as needed, but at least annually. Public input is required before the Department of Natural Resources issues a new, renewed or modified WPDES permit or approves substantial modifications to an NMP.

**Water Use General Permit** - Required for withdrawals from The Great Lakes that average 100,000 gallons per day or more in any 30-day period but do not equal at least 1,000,000 gallons per day for 30 consecutive days.

**Water Use Individual Permit** - Required for withdrawals from The Great Lakes that equal at least 1,000,000 gallons per day for 30 consecutive days.

## Image Credits

Pg. 4 - WI WPDES Permitted Concentrated Animal Feeding Operations. WI DNR. May 27, 2017. [http://dnr.wi.gov/topic/AgBusiness/documents/cafo\\_statewide\\_map.pdf](http://dnr.wi.gov/topic/AgBusiness/documents/cafo_statewide_map.pdf)

Pg. 6 - Hahn, Jonathan. "Buffalo River Hog CAFO Threatens America's First National River" Sierra. February 24, 2017. <http://www.sierraclub.org/sierra/green-life/buffalo-river-hog-cafo-threatens-america-s-first-national-river>

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Pg. 10 - "Pay Attention to Permits When Hauling Manure Across State Lines" National Hog Farmer. April 12, 2012. <http://www.nationalhogfarmer.com/environment/pay-attention-permits-when-hauling-manure-across-state-lines>

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