

Town Board Meeting
Town of Rock Elm
Elmwood, WI 54740
Pierce County

Thursday March 20, 2025
Beginning at 8:00PM
Rock Elm Town Hall

- I. Approve Agenda
- II. Public Input
- III. Report from Andy Marshall ---attorney that helped town of Eureka with original draft of Operations Ordinance
- IV. Report from Victoria Ziegler—DNR CAFO Program Coordinator
- V. Town Board and CAFO/Operations Ordinance committee to go through PROPOSED Operations Ordinance in detail, with possible action.
- VI. Public Input
- VII. Possibly set date for a public hearing on this Ordinance
- VIII. Adjourn

Copy of PROPOSED Operations Ordinance attached, pages 27 thru 38 are the ordinance and other pages are findings of fact, sources, and appendixes

Rock Elm Concentrated Animal Feeding Operation (CAFO)

DRAFT February 10, 2025 Ordinance 24-XX Summary

Section	Summary
Whereas & Therefore	4 statements - Established committee to do research and make recommendations
Local Findings	20 Findings - Specific to Town
General Findings on Industry	128 Findings - Organized in the same categories as the Section 10 Conditions
Section 1 - Authority	Constitution, Wisconsin Statutes 92.15 & 60.22
Section 2 - Purpose	Regulate operations with 1000 animal units or more
Section 3 - Definitions	<ol style="list-style-type: none"> 1. Animal unit definition based on Wisconsin NR 243 2. CAFO defined as 1000 animal units 3. Include outside CAFOs spreading manure in Rock Elm
Section 4 - License Required	New Facilities - 1000 animal units
Section 5 - License Administration	<ol style="list-style-type: none"> 1. Town Board 2. Designated third party(ies)
Section 6 - License Application & Standards	<ol style="list-style-type: none"> 1. Apply before operating or starting construction 2. Town Board approve
Section 7 - License Application Fee	<ol style="list-style-type: none"> 1. \$3 per animal unit up to 2000 animal units and \$1 per animal unit thereafter 2. Town may reevaluate and adjust application fee on an annual basis.

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Amended

Rock Elm Concentrated Animal Feeding Operation (CAFO)

DRAFT February 10, 2025 Ordinance 24-XX Summary

Fees, Compensations, Financial Surety and Penalties		
Section	Description	Amount
Section 7	Application Fee for the purpose of offsetting the Town's costs to review and process the application	<ol style="list-style-type: none"> 1. \$3 per animal unit up to 2000 animal units and \$1 per animal unit thereafter 2. Town may reevaluate and adjust application fee on an annual basis.
Section 8.2	<ol style="list-style-type: none"> 1. Compensation for third party review of plans 2. Fully compensate Town for all legal services, expert consulting services, and other expenses which may be reasonably incurred for verifying and enforcing compliance with the terms of the permit 	Determined by size and scope of the operation
Section 9	Financial surety to ensure that sufficient funds will be available for pollution clean-up, nuisance abatement, and proper closure of the operation	Determined by size and scope of the operation
Section 14	Annual Renewal Fee	<ol style="list-style-type: none"> 1. \$1 per animal unit 2. Town may reevaluate and adjust application fee on an annual basis.
Section 15	Penalties for violation of ordinance provisions, failure or refusal to comply, material false statements or knowing omissions of documents	<ol style="list-style-type: none"> 1. Not less than \$100 nor more than \$1,000, plus the applicable surcharges, assessments, and costs for each violation 2. Each day is separate offense 3. Town may seek injunctive relief

1 **DRAFT FOR DISCUSSION ONLY - February 10, 2025**

2 **TOWN OF ROCK ELM**
3 **PIERCE COUNTY, WISCONSIN**

4
5 **ORDINANCE NO. 25-XXX**
6 **CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) ORDINANCE**
7

8 **WHEREAS**, the Town Board of the Town of Rock Elm established the Town of Rock Elm
9 Operations Ordinance Committee (Committee) to complete a review of the possible impacts
10 of permit issuance under the CAFO Ordinance;
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12 **WHEREAS**, the Town devoted a substantial amount of time and expertise in reviewing the
13 potential impacts of large-scale livestock farming with respect to the particular natural resources of
14 the Town of Rock Elm;
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16 **WHEREAS**, the Committee reviewed the scientific literature and formulated
17 recommendations to the Town of Rock Elm Town Board for ordinance provisions to address the
18 concerns raised by CAFOs;
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20 **NOW, THEREFORE**, the Town Board of the Town of Rock Elm makes the following
21 Findings of Fact and declarations in support of this Ordinance:
22

23 **Local Findings**
24

- 25 1. The Comprehensive Plan was adopted by the Town Board of the Town of Rock Elm in 2011.
26 The goal is that the rural character of the area will remain, and the quality of our natural
27 resources will continue to improve. Participants saw the Town of Rock Elm remaining
28 largely a rural community during the next twenty years with many large scale farming
29 operations and some smaller organic and specialty farms. Elected/appointed officials listed
30 the changing face of agriculture from “family” to large “corporate” farms and its potential
31 impact on the environment, residential development and local income as a top issue. Rapid
32 deterioration of township roads from larger agricultural equipment was cited as a serious
33 problem. The Plan Commission found clean air and streams to be a strength and possible
34 ground water contamination as a weakness. Resident surveys found 82% supported
35 agricultural expansion and 55.2% supported additional land use regulation to protect
36 groundwater. (Town of Rock Elm's Comprehensive Plan)
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- 38 2. The Town is located in Pierce County. The county's Waste Storage Ordinance was
39 updated in 2023. It addresses concerns about the impact of livestock waste on the health of
40 residents, livestock, animals, plants and to the property tax base. The ordinance also
41 recognizes that improper management of waste storage facilities and use of waste may cause
42 pollution to ground and surface waters. Anyone who constructs or enlarges a waste storage
43 facility is required to be permitted. Waste is defined as manure, milking center waste and
44 other organic waste. Manure is defined as livestock feces and urine as well as other materials
45 such as bedding, water, soil, hair, feathers and debris. Erosion, tillage, setback and
46 phosphorus standards must be met. New or altered facilities must be designed, constructed
47 and maintained to minimize the risk of structural failure and to minimize the potential for
48 waste to discharge to surface water or groundwater. Waste storage facilities may not lack
49 structural integrity or have significant leakage. Liquid waste storage capacity shall be a

Pierce County Land Conservation department, Ad Hoc Groundwater Committee and the Finance Committee have proposed that the county fund a 5-year, 300-well testing program through UW-Stevens Point. (Pierce County Groundwater Committee) (UWSP-Well Water)

9. The Town has a vulnerable landscape with large areas susceptible to groundwater pollution. Five factors contribute to groundwater susceptibility, including: type of soil, bedrock and materials between soil and bedrock; depth to bedrock; and depth to groundwater table. Data from the Wisconsin Department of Natural Resources (WDNR) Groundwater Susceptibility Model were divided into five evenly spread categories ranging from high to low. Of the Town's total acres:

- 32% are moderately high to highly susceptible
- 41% are moderately susceptible
- 28% are moderately low susceptibility
- 0% are least susceptible

(See Appendix B. Map 1.)

10. For approximately 97% of the Town of Rock Elm's acres, groundwater is at depths greater than 50 feet below the land surface. Three percent of acres lie from 20 feet to 50 feet and 0% are less than 20 feet.

Depth to Groundwater	
1-20ft	0%
20ft - 50ft	3%
Over 50ft	97%

(See Appendix B. Map 2.)

11. Data for the Town of Rock Elm extracted from WiscLand 2 show the approximate land cover as follows:

Land Cover - WiscLand (NOT land use)	Percent
Agriculture	53%
Barren	0%
Forest	30%
Grassland	15%
Open Water	<1%
Urban/Developed	1%
Wetland	1%

(See Appendix B. Map 3.)

12. Of the Town of Rock Elm's total acres the Natural Resources Conservation Service (NRCS) Web Soil Survey for Fragile Soil Index shows that:

- 6% Fragile
- 81% Moderately Fragile
- 4% Slightly Fragile
- 0% Not Fragile
- 9% None or Not Rated

(See Appendix B. Map 4.)

17. The Elmwood Fire District serves the village of Elmwood, the towns of Rock Elm, Spring Lake, and El Paso in Pierce County, and the towns of Weston, Eau Galle and Lucas in Dunn County. The Fire District is operated by 30 volunteer firefighters, one chief, one assistant chief and five captains. The Elmwood Fire District has the following equipment:

- Two pumper engines (one combination heavy rescue)
- One tender with 3,000-gallon capacity
- Two brush trucks with 300-gallon capacity
- One Utility vehicle

The Elmwood fire district has agreements with Plum City, Spring Valley, Ellsworth and Menomonie. They currently have six volunteer firefighters that have specific fire training related to agriculture.

18. As agricultural operations, CAFOs are not required to submit engineering, plumbing or electrical plans. Potential concerns of fire fighters include, but are not limited to:

- Where to contain thousands of animals evacuated from a burning building
- How to contain firefighting water runoff
- Large scale of the buildings in proportion to local firefighting equipment
- Location of fire doors, hook-ups for access to high capacity wells, gas lines
- Availability of generators in case of power outage
- Need for rally point for all farm workers to ensure all are accounted for in event of fire
- Need for pre-incident meeting and on-site staff emergency training

(Pierce County Land Use Permit)

19. Local fire departments work in partnership with the Chippewa Valley Technical College (CVTC) on training programs. CVTC does not have firefighting training specific to CAFOs. The National Fire Protection Agency (NFPA) publishes a range of standards and codes. Their NFPA 150: Fire and Life Safety in Animal Housing Facilities Code does not specifically address CAFOs or the anaerobic digesters that many CAFOs are now adding. (NFPA Hawes email) (NFPA 150) (Chippewa Valley Schwartz email)

20. The Town of Rock Elm's total 2022 tax assessed property value is approximately \$51.54 million. Property values could be affected by CAFOs depending on where they are located:

- Property values within 1/2 mile of 10 selected sites range in value from \$414,100 to \$2.4 million.
- Property values within 1 mile of 10 selected sites would range in value of \$1.6 million and \$5.5 million

(See Appendix B. Maps 6-7.)

Condition 1 Findings - Operations, Public Health



1. On November 2, 2019, the American Public Health Association enacted a policy statement advising federal, state and local governments and public health agencies to impose a moratorium on all new and expanding CAFOs. Under this recommendation, the halt would be in place until additional scientific data has been collected and public health concerns associated with CAFOs are addressed. (APHA 2019)

Methane	Microbial degradation of organic matter under anaerobic conditions	Colorless, odorless, highly flammable	No health risks. Is a greenhouse gas and contributes to climate change. ?
Particulate Matter	Feed, bedding materials, dry manure, unpaved soil surfaces, animal dander, poultry feathers	Comprised of fecal matter, feed materials, pollen, bacteria, fungi, skin cells, silicates	Chronic bronchitis chronic respiratory symptoms, declines in lung function, organic dust toxic syndrome

Pathogens found in animal manure that have been determined to cause illness in humans include the following:

Pathogen	Disease	Symptoms
<i>Bacillus anthracis</i>	Anthrax	Skin sores, headache, fever, chills, nausea, vomiting
<i>Escherichia coli</i>	Colibacillosis, Coliform mastitis-metris	Diarrhea, abdominal gas
<i>Leptospira pomona</i>	Leptospirosis	Abdominal pain, muscle pain, vomiting, fever
<i>Listeria monocytogenes</i>	Listeriosis	Fever fatigue, nausea, vomiting, diarrhea
<i>Salmonella species</i>	Salmonellosis	Abdominal pain, diarrhea, nausea, chills, fever, headache
<i>Clostridium tetani</i>	Tetanus	Violent muscle spasms, lockjaw, difficulty breathing
<i>Histoplasma capsulatum</i>	Histoplasmosis	Fever, chills, muscle ache, cough, rash, joint pain and stiffness
<i>Microsporum and Trichophyton</i>	Ringworm	Itching, rash
<i>Giardia lamblia</i>	Giardiasis	Diarrhea, abdominal pain, abdominal gas, nausea, vomiting, fever
<i>Cryptosporidium species</i>	Cryptosporidiosis	Diarrhea, dehydration, weakness, abdominal cramping

(Hribar 2010)


- The impact on CAFOs of human pandemics such as Covid-19 would represent a risk for Town of Rock Elm residents. Most CAFO operators contract with processing plants to deliver milk, beef, pork or chicken. Wisconsin dairies were forced to dump milk as schools, restaurants, hotels and other business buyers closed down. Processors across the nation and

to human spread of the virus. CDC continues to report additional cases of people who had exposure to infected dairy cows. The first suspected human-to-human cases were reported in September 2024. As of early February 2025, there were 67 confirmed human cases and one confirmed human death. That latest human case counts are available at CDC Mammals.

Historically, this avian flu virus has caused up to 30% fatality in humans. Some experts deem the risk level for the general U.S. population to be low. Others feel that the dairy industry has needlessly constrained efforts to stop the virus from mutating by refusing to test herds and workers or require protective equipment for workers. The USDA is also viewed as being unable to address H5N1 in a vigorous way. A Texas study analyzed samples from three wastewater plants near known dairy outbreaks and found high levels of a marker for H5N1. They think the virus likely came from effluents from processing plants for milk or beef. International development and stockpiling of human vaccine is needed. US Health and Human Services made grants of \$176 and \$590 million in 2024 and 2025 to Moderna for development of mRNA vaccines. A virus strain found in dairy cows in the U.S. in 2024 may only need one mutation for it to be able to spread among humans. Spillover of animal viruses into human populations stem ultimately from our ways of life and how they shape the human-animal interface. (CDC Mammals) (Cohen) (Douglas) (HHS 2025) (Lancet) (Moderna) (Ting-Hui) (UMN Osterholm) (Physician's Weekly)

11. Fueled by financial giants such as BlackRock Real Assets, CAFO developers are now working to integrate their facilities into the fossil fuel industry's infrastructure with biogas from waste digesters and claims of cutting methane pollution from livestock. Federal, state and university programs also promote development of biogas from waste digesters with taxpayer dollars. Under California's Low Carbon Fuel Standard (LCFS) program, companies financially benefit from building digesters and selling renewable natural gas (RNG). The 2022 federal Inflation Reduction Act (IRA) provided over \$2 billion for USDA's Rural Energy for America (REAP) program to promote rural or agriculture-related renewable energy. Digesters can qualify for this funding. There are a range of public health and environmental risks associated with digesters:

- Digesters' byproduct is called digestate. During the digester process, phosphorus, nitrogen nutrients and ammonia, as well as other components, are concentrated into dry and liquid products spread on farm fields.
 - On-farm co-digesters mix animal waste with a number of inputs from outside the farm including food waste (can include industrial food manufacturing waste), yard waste and biosolids, making it difficult to determine digestate nutrient levels.
 - Digesters do not destroy all pathogens and pathogens reproduce over time after digestate is removed from the digester.
 - Digestate's impact on various aspects of soil health is not well understood.
 - Digesters and biogas production produce toxic air pollutants.
 - Expansion of natural gas infrastructure hinders a renewable energy future and efforts to cut carbon emissions through carbon lock-in and stranded assets. Methane reductions are overstated.
 - High technical skills are needed to operate, maintain and repair digesters.
- (Burch) (D'Onofrio) (EPA-AD) (Holly) (Goldstein) (Kemfert) (Levin) (Nag) (Penn State 2023a) (Penn State 2023b) (UC Davis) (Zhang)

- 1 8. CAFO operators have a limited number of days when they can do land application based on
2 varying weather, soil types, harvest status, equipment availability and condition of waste.
3 Maps from the Runoff Risk Advisory Forecast and SNAP Plus provide information that,
4 combined with knowledge of field-specific conditions, allow for better decisions on the
5 timing of nutrient applications. (UWI-SNAP) (WI DATCP Runoff)
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- 7 9. Historically, livestock farmers disposed of manure by applying it to fields as fertilizer. But a
8 CAFO often has more manure than it can use at any one time. Excess is typically stored in
9 lagoons which can contaminate water via seepage, breaches or overflow. During the cold
10 spring of 2013, a Minnesota CAFO discharged an estimated 1 million gallons of animal waste
11 when a lagoon wall ruptured. This type of impact can be decreased with better practices, such
12 as liners, leak detection systems, engineered berms designed for 100-year events and
13 requirements for engineered enclosed waste storage tanks and treatment facilities. (USEPA
14 2012)
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- 16  10. DATCP's 2019 Livestock Facility Siting Technical Expert Committee proposed upgrading
17 Wisconsin's rules for waste storage, compost, process water, leachate, nutrient management
18 structures. No action has been taken. (WDATCP 2019)
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- 20 11. For decades CAFOs thought the federal Resource Conservation and Recovery Act (RCRA),
21 applied to garbage landfills. That changed in 2015, when a federal judge in Washington State
22 ruled that RCRA did apply to CAFO waste as part of a lawsuit against the 7,000 head Cow
23 Palace. Settlement required mitigation measures including manure storage liners, monitoring
24 wells, compliance monitoring and a reduction in the use of manure as fertilizer. (Ziembra
25 2015)
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- 27 12. CAFOs house animals in highly specialized facilities engineered to capture and store manure.
28 Many operations own less land than needed to safely use the manure to fertilize crops. Some
29 fields can be listed in multiple NMPs or owned by people who have not granted access.
30 WDNr has, but rarely used, authority to require operators to have Manure Easements or
31 Land Application Agreements with owners of land where they plan to spread it. However,
32 under intense local pressure, in 2023 WDNr did require Cumberland LLC in Polk County to
33 submit written verification of permission from land owners to apply manure and process
34 wastewater to all fields that are not under common ownership. In 2024 the DNR initially
35 required Ridge Breeze Dairy in Pierce County to submit land owner agreements but then
36 went back to only requiring affidavits from land operators/growers. (Bennet) (Drake Law)
37 (Polk County) (Redman) (U of Missouri)
38
- 39 13. Digestate from anaerobic digesters does not act like raw manure, making nutrient
40 management more difficult and potentially increasing agricultural runoff and water pollution.
41 Digesters do not decrease the volume or nutrients of the waste processed. Digestate is still
42 routinely applied to fields that already have high levels of phosphorus, which increases the
43 risk of phosphorus run-off. Much of the nitrogen in livestock waste is converted from its
44 organic form to ammonium. Ammonium can be transformed to either ammonia or nitrate.
45 Nitrate can leach through the soil and eventually reach groundwater. Field application and
46 management to reduce nitrogen losses may be more demanding for digestate than for
47 untreated liquid manure. (Horta) (Penn State 2023a) (Penn State 2023b)
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5. There are a wide range of disposal methods, including: Composting on-site; Composting off-site; Burial; Burial above ground; Rendering; Incineration; Incineration (energy from waste); Burning (open/air curtain); Burning (mobile gasifier or similar). Each disposal method has costs and benefits depending on the particular CAFO's location, needs and available resources. (Arora 2017) (Costa 2019) (Hseu 2017) (USDA Aug 2019) (USEPA 2018) (USEPA covid) (UMN 2014)
 6. Chemical disinfection of all contaminated structures, equipment, vehicles, and surfaces on the premises follows animal euthanasia and disposal. Insecticides and rodenticides are also applied. Facilities may be left fallow with adequate fencing and security against unauthorized entry or wildlife incursions. (UMN Pitkin) (USDA Aug 2019)
 7. Closely related but safer surrogate viruses are used to test disinfectant efficacy to prevent accidental infections. However, this is challenging because surrogate viruses do not always act like the actual virus, depending on the chemical. Eliminating residual microbial DNA or RNA, as well as pathogenic microbes which are often the reason for reoccurring disease, can be especially difficult. (Steinmann) (USDA Aug 2019)
 8. In some operations, it may be economically feasible to depopulate and disinfect the facilities and, after a few weeks, repopulate with stock free of target diseases. Producers should thoroughly analyze risk factors for herd re-infection as well as the level of biosecurity that can be maintained throughout the depopulation, disinfection, and repopulation processes. All previously highly pathogenic avian influenza (HPAI) infected premises must be both CLEANED and DISINFECTED. Cleaning and disinfection practices during an outbreak will focus on virus elimination in a cost-effective manner. Hog CAFOs located in swine-dense areas are at high risk for re-infection of several important swine pathogens. (SwineCast 1168) (USDA Aug 2019) (USDA Oct 2022)
 9. Disposal and disinfection present concerns for local communities, including:
 - Potential on-site groundwater contamination by diseased decomposing animals and chemicals used to disinfect buildings, equipment and vehicles.
 - Liability for landfill operators from potential groundwater contamination.
 - Air pollution from incineration.
 - Potential for pathogen contamination spread if livestock leave the CAFO.
 - Difficulty finding new buyers for land with large burial sites.(UMN 2014) (USDA Aug 2019)

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Condition 4 Findings - Biosecurity, Animal Health

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1. In the context of animal agriculture, biosecurity is a series of management steps and practices implemented to prevent the introduction of infectious agents, especially Foreign Animal Diseases (FAD), into a herd or flock, the spread of these agents through the herd, and out of the herd to other animals or humans, herds or flocks. A strong biosecurity program is critical and must be properly implemented not just developed as a plan on paper. (Alarcón 2020) (FAO 2020) (Graham 2008) (Paploski) (UMN Pitkin)

ancestral relationships and evolution of viruses as they spread quickly among CAFOs requires state-of-the-art genome sequencing and virologic epidemiology. (Kikuti)

9. Field reports from veterinarians managing multiple herds at multiple locations belonging to large systems indicate that new PRRS virus variants are able to elude filtration systems. Filtration systems are not preventing virus spread. There are often multiple virus strains in infected animals that can spread rapidly to adjacent facilities throughout the neighborhood. (Sanhueza 2020) (SwineCast 1168) (UMN Aug 2021)
10. A September 2021 forum with veterinarians from academia and corporations described the 2021 PRRS outbreak as a "complete off-the-rails disaster..." with "so much virus in the neighborhood that it overwhelmed the filters." There is little ability to track neighboring management practices such as vaccination protocol and movement of animals and personnel to and between CAFOs or the existence and implementation of biosecurity plans. Experts recommend that corporations consider abandoning the "central hog belt" and starting over in new geographical areas. (SwineCast 1168)
11. The movement of people and equipment among livestock facilities is a primary route of transmission for disease. Mitigation strategies should go beyond ordinary preventative measures. Strategies such as animal traceability, disease syndrome reporting and analysis and risk-based herd health management are all ways to enhance the resilience of livestock production. Inspection of cleanliness and disinfection of incoming transport vehicles may be necessary. CAFO managers and owners must be willing to invest and workers must be willing to comply with mitigation strategies. (FAO 2020) (Graham 2008) (SwineCast 1168)
12. Contaminated feed and ingredients may represent a risk for transport of pathogens at the domestic and global levels. (AASV 2020) (Dee 2018) (Niederwerder 2019)
13. Infectious disease testing, transmission-prevention and control are measures to detect disease and control it when found. Testing for infectious disease within a facility should be performed on a schedule and at a frequency based on the common diseases of concern, the age of the animal group at risk, observations of the health of individual animals and groups of animals. If a disease is detected, response actions should be implemented immediately. (UMN Sep 2021) (UMN 2015) (UMN Pitkin)
14. With the growth of CAFOs, some states have enacted ballot proposals and laws focused on improving conditions for the animals. California's Proposition 12 is one of the most far reaching and tool full effect in 2022. (CDFA Prop 12)

Condition 5 Findings - Animal Transportation

1. Disease outbreaks require restriction of pathogen transmission at all production levels, including transportation. Because of the increasing movement of animals in multisite production, as well as the centralization of the U.S. packing industry, the chances of organism transmission has increased. All trucks, trailers, and other vehicles used for transporting animals, animal products, products, feed, offal, and contaminated equipment are a potential risk in the spread of disease. Under favorable conditions, viruses can survive anywhere from a few days for influenza to 18 months for African Swine Fever. (Thompson 2001) (Rule 2008)

Department of Transportation. (DATCP Home Animal Movement), (Wi Legislature: Chapter ATCP 10)

9. Vehicle traffic at a facility can be broken down into those that are involved with livestock shipments, non-livestock shipments, and employee/personal vehicle traffic. Facilities should consider the following:
 - Separate parking and entrances for livestock, non-livestock, and personal vehicle traffic.
 - Segregated traffic flows for vehicles entering the livestock areas from non-livestock areas when leaving facility.
 - Washing/cleaning and disinfecting station for vehicles entering the livestock areas when leaving the facility.
 - Ability to contact drivers and owners of previous livestock shipments(UMN 2015)

Condition 6 Findings - Private and Public Drinking and Agricultural Wells

1. Private and public drinking water wells are regulated very differently:
 - a. **Public drinking water systems** - Passed in 1974, the federal Safe Drinking Water Act, sets standards for water treatment as well as systematic collection and analysis of water quality for these systems.
 - b. **Private wells** - Safe Drinking Water Act standards *do not* apply to private wells. No state or federal laws requires existing private wells to be tested for contaminants. All of the Town of Rock Elm's drinking water comes from private wells.
(AAP 2009) (MacDonald 2017) (Safe Water Drinking Act) (Ward 2009)
2. Wells pumping less than 36 million gallons a year are not regulated. Wells with a pumping capacity that exceed 100,000 gallons a day (70 gallons per minute or 36 million gallons a year) are regulated by the WDNR as high capacity wells. This includes agricultural wells. Wells are further classified by a water loss above or below 2 million gallons a day in a 30-day period from the basin from which it is withdrawn as a result of interbasin diversion or consumptive use or both. (Wi DNR High Capacity Wells) (Wi Legislature: 281.35)
3. Wisconsin's constitutional public trust doctrine requires the state to protect its "navigable waters" for the public's benefit. A July 2021 ruling by the Wisconsin Supreme Court affirmed that wells above and below the 30-day period threshold require the WDNR to determine that no public water rights in navigable waters will be adversely affected and that the proposed withdrawal will not have a significant detrimental effect on the quantity and quality of the waters of the state. Permits may include conditions as to location, depth, pumping capacity, rate of flow, and ultimate use, that ensure that the high capacity well does not cause significant environmental impact. (Wi Legislature: 281.34) (Wi Supreme Court Case: 2018AP59)
4. A wide range of organizations argued to the Wisconsin Supreme Court that the state does not have authority to protect public waters from some types of well pumping. These include: Wisconsin Manufacturers & Commerce, Dairy Business Association, Midwest Food Processors Association, Wisconsin Potato & Vegetable Growers Association, Wisconsin Cheese Makers Association, Wisconsin Farm Bureau Federation, Wisconsin Paper Council,

Condition 7 Findings - Air Pollution

1. One of the biggest concerns about large livestock operations is the impact on public health and property values of toxic air pollution from manure spreading as well as dust and manure blown from powerful building fans. While science-based regulations for manure spreading attempt to protect water, there is very limited regulation of air pollution. Federal regulators have not developed standards. A 2010 WDNR study identified 30 beneficial management practices for mitigating hazardous air emissions from animal waste. No action was taken. (APHA 2019) (FWW 2021) (Spencer 2004) (USEPA 2013) (USEPA 2017) (UMN 2021) (WDNR 2010)
2. Community members living near CAFO operations face increased exposure to air pollution which can cause or exacerbate respiratory conditions including asthma; eye irritation, difficulty breathing, wheezing, sore throat, chest tightness, nausea; and bronchitis and allergic reactions. Air emissions include particulates, volatile organic compounds, and gases such as nitrous oxide, hydrogen sulfide, and ammonia. Odors associated with air pollutants from large-scale hog operations have been shown to interfere with daily activities, quality of life, social gatherings, and community cohesion and contribute to stress and acute increased blood pressure. (Cambra 2010) (Donham 2007) (Heederick 2007) (Horton 2009) (Hribar 2010) (Mirabelli 2006) (Schinasi 2011) (Wing 2000) (Wing 2013)
3. An analysis of Wisconsin health data from 2008 to 2016 for rural residents found relationships between living close to dairy CAFOs and negative respiratory health such as allergies, asthma, uncontrolled asthma, need for medication and impaired lung function. This includes reduced lung function and self-reported asthma at distances of 3 to 4 miles. This may contribute to health disparities among rural residents. North Carolina citizens show high rates of infant mortality, asthma, low birth weights, kidney disease and tuberculosis in communities near hog factories. (Kravchenko 2018) (Schultz 2019)
4. Ruminant digestion is the largest human-caused source of methane emissions in the United States. A 2015 US EPA study of greenhouse causing gases estimated 25.4 percent of total methane emissions came from ruminants. These emissions are highly dependent on dairy and beef populations. From 1990 to 1995, emissions increased and then generally decreased from 1996 to 2004, mainly due to fluctuations in beef cattle populations and increased digestibility of feed for feedlot cattle. Emissions increased from 2005 to 2007, as both dairy and beef populations increased. Research indicates that the feed digestibility of dairy cow diets also decreased during this period. Emissions decreased again from 2008 to 2015 as beef cattle populations again decreased. (USEPA GHG 2017)
5. Dairies installing biogas waste digester point to methane reductions but there are concerns that they produce air pollution and drive industry consolidation into bigger and bigger farms. A 2017 study of dairies found digesters could reduce overall greenhouse gas emissions, mostly methane, by 25 percent. At the same time, the study found increases in nitrous oxide and ammonia emissions rose by 81 percent. The AgSTAR Livestock Anaerobic Digester voluntary database lists 43 operational Wisconsin dairy digesters. They range in size from 130 to 9,100 cows per facility with a median of 2,100 cows per digester. Wisconsin has 22 dairy digester facilities producing electricity and/or heat from biogas that ranged from 130 to 8,500 cows per facility with a median of 1,950 cows. The 11 existing dairy digester facilities producing only Renewable Natural Gas (RNG) ranged from 1,700 to 9,100 cows per facility

water consumption for dairy?

1 out of business. This can be further complicated when livestock producers are contractors for
2 large processing companies that file for bankruptcy or terminate contracts. In 2024, dozens of
3 chicken factories in Iowa, Minnesota and Wisconsin were unable to feed their flocks after
4 Pure Prairie Poultry filed for bankruptcy and stopped reimbursements. Some contractors used
5 social media to plead with people to come take the starving birds. Millions had to be
6 euthanized at tax payer expense. Years after the state of Oregon permitted the 30,000 head
7 Lost Valley Dairy, the factory is now being decommissioned and attempts at remediation for
8 water pollution continue. (Ballentine) (Dairy News 2024) (Figueroa)
9

- 10 4. Financial health of government and citizens is based in large part on property values. Large
11 livestock facilities can bring new investment while also negatively impacting property values.
12 CAFOs can have large adverse impacts on home values within 3 miles and directly
13 downwind. Empirical evidence indicates that residences near Animal Operations are
14 significantly affected, and data seems to suggest a valuation impact of up to 26 percent for
15 nearby properties, depending on distance, wind direction, and other factors. There has been
16 some suggestion that properties immediately abutting a CAFO can be diminished as much as
17 88 percent. Nearby small farms can be impacted by such factors as water degradation and
18 insects. (Isakson) (Kilpatrick 2001) (Kilpatrick 2015) (Kim) (Lawley) (Wi DOR)
19
- 20 5. Using longitudinal data from 1995-2017 on a large spatial scale, research finds that CAFO
21 intensity increases the levels of nutrients, specifically total phosphorus and ammonia, in
22 surface water. Adding one CAFO to a Hydrologic Unit Code-8 (HUC8) region leads to a
23 1.7% increase in total phosphorus levels and a 2.7% increase in ammonia levels, relative to
24 sample mean levels. Results imply that the marginal CAFO in Wisconsin produces non-
25 market surface water quality damages of at least \$203,541 per year. (Raff 2021)
26
- 27 6. Environmental policies at both the state and federal levels for CAFOs directly affect the
28 economy of Wisconsin communities. For example, state and federal policies are using tax
29 dollars to build a market for biogas from anaerobic digesters on CAFOs. These policies force
30 local communities to deal with ever larger CAFOs looking to cash in on programs that former
31 USDA Secretary Tom Vilsack claimed would save American farmers. Instead, more
32 consolidation means fewer farms. (D'Onofrio) (WBAY TV)
33
- 34 7. St. Croix County, Wisconsin denied a Conditional Use Permit to a digester developer in 2019
35 based on nine reasons it would be substantially adverse to property values in the
36 neighborhood affected. These included multiple professional real estate agent opinions and
37 examples from other digesters. (St. Croix County 2019)
38
- 39 8. CAFO workers care for thousands of animals. These are skilled workers with a multitude of
40 tasks such as: breeding, birthing, feeding, collecting waste, moving animals, removing
41 mortalities, milking and cleaning equipment. However, CAFOs are not required to develop
42 plans to address a sudden loss of the workforce or the impact it could have on the local
43 community. One threat to CAFO workforce is H5 Bird Flu infections. As of mid-January
44 2025, 928 dairy herds in 16 states were infected with the H5 virus. That includes an estimated
45 70 percent of California's herds. No Wisconsin dairy herds are known to be infected.
46 Fourteen infected poultry flocks in four Wisconsin counties have been identified in the last 12
47 months. Sixty-seven workers in ten states, including Wisconsin, have been infected by the H5
48 virus from exposure to infected animals. Thirty-six of these were in California dairy workers.
49 Twenty-three poultry workers have been infected including one in Wisconsin's Barron

Condition 10 Findings - Monitoring

1. The Wisconsin Supreme Court ruled in July 2021 that WDNR has the authority to require offsite groundwater monitoring as part of a CAFO wastewater discharge permit. The ruling does not require permits to include monitoring. Kinnard Farms in Kewaunee County and the Wisconsin Legislature argued that Act 21 prevents the DNR from taking steps through its permitting process to protect groundwater. (Kirwin) (WI Supreme 2016AP1688)
2. Large-scale industrial food animal production can cause numerous public health and environmental problems and should thus be monitored to prevent harm to surrounding communities. Since each situation is different, monitoring program design should be tailored to particular situations. (Hribar 2010) (USEPA 2003)
3. The most fundamental step in the development of a monitoring plan is to define the goals and objectives. Designing a monitoring plan also includes selecting sampling variables, a sampling strategy, station locations, data analysis techniques, the length of the monitoring program, and the overall level of effort to be invested. (USEPA 2003)
4. Most groundwater contamination incidents involve substances released at or only slightly below the land surface. Contamination can occur by infiltration, recharge from surface water, direct migration, and interaquifer exchange. The first and second mechanisms primarily affect surface aquifers, the third and fourth may affect either surface or deep aquifers. (USEPA 1994)
5. Groundwater monitoring is necessary to determine: background groundwater quality; existing groundwater conditions near retention ponds, corrals, and land application areas; effect of the improved management practices on groundwater quality. (CAEPA 2010)
6. Livestock operators must have a reporting and monitoring system to ensure odor control practices are implemented in accordance with specifications. New Wisconsin rules should require local governments to monitor permitted livestock facilities using a checklist that is comprehensive and forward looking and that covers whether an operation anticipates adding animals or building livestock structures. Local governments should have the option of monitoring by conducting site visits or requiring self-reporting by livestock operators. (WDATCP 2019)
7. Data collection of particulate-matter air exposure in rural areas is needed because of the huge gap in knowledge as compared to gases emitted by CAFOs. Exposure mechanisms for particulates are expected to be different than those for gases because particulates from CAFOs are biologically active and are known to be relatively large. Therefore, data is needed on sedimentation out of the air, resuspension and aerosols from waste spreading. (Heederik 2007)

Condition 11 Findings - Preserve Quality of Life

Roads - Damage and Traffic Disruptions

1. Rural roads account for an estimated 33 percent of the vehicle miles traveled in the U.S., but 56 percent of fatalities. Rural roads may have design elements that increase the risk of fatalities or serious injuries, such as inappropriately high speed limits, narrow lane widths and

2. A Texas fire at South Fork Dairy exploded into the single deadliest event involving livestock in Texas history, when nearly 18,000 cows died in a barn the size of two Amazon distribution centers. The blaze began with a manure vacuum, the specialized, diesel-powered truck that had no apparent regulation or oversight from farm, transportation or workplace regulators. (Jervis)
3. The need for multiple rural fire departments to respond may stretch or exceed their capacity to address other fires at the same time. CAFOs may also be served by rural fire departments that do not have a sufficient water supply as provided by a municipal supply. (NFPA 1144)
4. Fire Safety Needs Analyses look at the: ability of multiple fire departments to respond to a fire, while still supporting the needs of the community; availability of sufficient water on site to douse a fire; and building designs and operating plans that reduce the likelihood of a fire. Standards are laid out by the National Fire Protection Association (NFPA) in NFPA 1141: Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas. (NFPA 1141)
5. Water Supply Needs Analyses look at the adequacy and reliability of a water supply to control and extinguish anticipated fires in the jurisdiction every day of the year. Guidelines are included in NFPA 1142: Standard on Water Supplies for Suburban and Rural Fire Fighting. An adequate water supply may entail the need to obtain permits and drill new supply wells. Storage may be needed for enough water to ensure the necessary pumping rate, as well as the total amount of water required to extinguish a large fire. (NFPA 1142)
6. Water Supply Needs Analyses should include an evaluation of the potential impact on surrounding private, public, and agricultural wells, as well as springs.
7. United Egg Producers (UEP) Fire Mitigation Task Force recommends facilities develop an Emergency Preparedness and Response Plan. Recommendations include: regular meetings with local fire departments; manure belt inspections; ongoing worker training and several other key components. (UEP)
8. A 2022 study by the Fire Protection Research Foundation found the leading causes of animal housing fires to be heating devices in winter months and malfunctioning of electrical systems. NFPA 150: Fire and Life Safety in Animal Housing Facilities Code addresses the fire and life safety needs of both animals and humans. CAFOs can also be affected by wild land fires. NFPA1144: Standard for Reducing Structure Ignition Hazards and Wildland Fires provides a methodology for assessing wildland fire ignition hazards around existing structures and developments to reduce the potential of structure ignition from wildland fires. (NFPA 1144) (NFPA 150) (Castro)

WTA

TOWN OF ROCK ELM
CONCENTRATED ANIMAL FEEDING OPERATIONS ORDINANCE No. 24-xx

The Town Board of the Town of Rock Elm, Pierce County, Wisconsin, does ordain as follows:

Section 1. Authority

This Ordinance is adopted pursuant to the powers granted under the Wisconsin Constitution, and Wisconsin Statutes including but not limited to Section 92.15. This Ordinance is further adopted pursuant to the powers granted to the Town Board under the grant of village powers pursuant to Sec. 60.22 of Wis. Statutes for the protection of public health, safety and general welfare.

Section 2. Purpose

The purpose of this Ordinance is to effectively, efficiently and comprehensively regulate the operation of Large-Scale Concentrated Animal Feeding Operations of 1,000 animal units or greater ("CAFO") in the Town of Rock Elm, without respect to siting, to protect public health (including human and animal health), safety, and general welfare, to prevent pollution and the creation of private nuisances and public nuisances, to preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town of Rock Elm and to achieve water quality standards within the Town of Rock Elm. This Ordinance sets forth the procedures for obtaining a CAFO Operations Permit for the operation of new and expanded livestock facilities in the Town of Rock Elm (sometimes referred to as "the Town").

*siting -
is where
buildings
are 93.9*

The need for this Ordinance is based upon the Town's obligation to protect the health, safety and general welfare of the public and is based upon reasonable and scientifically defensible findings, as adopted by the Town Board, clearly showing that these requirements are absolutely necessary to protect public health and safety. Specifically, the Town finds that there is ample scientific research and evidence establishing that CAFOs pose a significant risk to the integrity of the Town's groundwater, surface water, air quality, the health and well-being of its residents and local property values. These findings are based in part on the scientific articles and research studies discussed and listed in Appendices A. & B.

Section 3. Definitions

1. "Animal Units" means the equivalent unit of livestock present at an operation as calculated under Wisconsin NR 243.05 using Animal Unit Calculation Worksheet Form 3400-25A.
2. "Applicant" or "permittee" refers to the owner of the entity seeking a CAFO Operations Permit under the terms of this Ordinance.
3. "Large-Scale Concentrated Animal Feeding Operation" or "CAFO" means;
 - a. A lot or facility, other than a pasture or grazing area, where 1,000 or more animal units have been, are, or will be stabled or concentrated, and will be fed or maintained by the same owner(s), manager(s) or operator(s) for a total of 45 days or more in any 12-month period, two or more smaller lots or facilities under common ownership or common management or operation are a single Large-Scale Concentrated Animal Feeding Operation or CAFO if the total number of animals stabled or concentrated at the lots or facilities equal 1,000 or more animal units and at least one of the following is true: (1)

1 **Section 5. Licensing Administration**

2
3 The Town Board shall administer this Ordinance and related matters thereto and shall have the authority
4 to issues licenses under this Ordinance, and to designate the local authority/ies to whom the Operator is
5 required to submit all reports and notices; and shall have the authority to enforce the license requirements,
6 including immediate revocation of the license for flagrant violations.
7

8 **Section 6. License Application and Standards**

9
10 The applicant shall apply for a CAFO Operations Permit prior to beginning an expansion or conducting
11 any operations associated with a Large-Scale Concentrated Animal Feeding Operation in the Town of
12 Rock Elm. The application shall be submitted on a form provided by the Town Clerk.
13

14 The Town Board shall decide whether to approve and issue a CAFO Operations Permit to an applicant
15 that has submitted a complete application and paid the required application fee, after holding a public
16 hearing on the application and considering any evidence concerning the application and the proposed
17 operation presented by the applicant and any other interested persons or parties, including members of the
18 public, other governmental agencies or entities, special legal counsel and expert consultants who may be
19 hired by the Town Board to review the application and advise the Town Board.
20

21 The Town Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if
22 it is determined by a majority vote of all members, supported by clear and convincing evidence presented
23 by the applicant, that: the applicant can and will comply with all conditions imposed by the Town; that
24 the applicant's operations as proposed, with or without conditions, will protect public health (including
25 human and animal health), safety, and general welfare, prevent pollution, prevent the creation of private
26 nuisances, prevent the creation of public nuisances and preserve the quality of life, environment, existing
27 small-scale livestock and other agricultural operations of the Town of Rock Elm; and that the applicant
28 and the application meet all other requirements of this Ordinance.
29

30 **Section 7. License Application Fee**

31
32 A non-refundable application fee of Three Dollars (\$3) per proposed animal unit up to 2,000 animal units
33 and One Dollar (\$1.00) per proposed animal unit thereafter payable to the Town of Rock Elm shall
34 accompany an application for the purpose of offsetting the Town's costs to review and process the
35 application. The Town may reevaluate and adjust accordingly the amount of the application fee on an
36 annual basis.
37

38 **Section 8. Application Procedure**

39
40 1. An applicant for a CAFO Operations Permit shall complete a Town of Rock Elm CAFO Operations
41 Permit Application (See Appendix C.) and pay the required application fee. The applicant must be an
42 owner of the corporate entity proposing to operate the CAFO and sign the application. The
43 application must also be signed by the property owner, who agrees to be held by the same standards
44 as the operator, and by one or more qualified and professionally licensed third party engineers or
45 geoscientists who attest that they have prepared or have reviewed the plans and certify that they will
46 meet the following performance requirements:
47

- 48 a. Prevent the spread of infectious diseases from the CAFO to other animals, livestock and
49 humans;

1 property boundaries and provides for adequate offsets, waste containment, air and odor
2 emission control devices including particulate filters to prevent air pollution and the
3 transmission of disease particles from the CAFO, anaerobic digester, or offsite waste
4 management area;

5
6 h. The Community Economic, Land Use and Property Value Assessment and Impact Study has
7 been performed by a licensed appraiser and a qualified land use planner, is scientifically
8 sound and concludes that there will be no negative impact to properties within 1 mile of the
9 proposed CAFO, and a net positive benefit to the Town, including considering the risks of the
10 operations on the public health, particularly in the case of a sudden loss of workforce;

11
12 i. The Construction, Fire and Road Plans, including signed engineered drawings for the
13 measures required to meet the performance requirements of this ordinance and the measures
14 specified in the plan have been submitted with the application, and include a fire-
15 prevention/fire-fighting capacity/fire-water capacity needs analysis, the requisite fire water
16 storage/fire prevention/fire-fighting equipment and worker accountability plans, as well as a
17 traffic study and road improvement needs analysis and road traffic and roadway improvement
18 plans, along with letters of conformance, on agency letterhead, stating that application-
19 submitted plans are complementary with and are in conformance with the associated traffic
20 and road plans and requirements of and from the local, regional, state and federal road and
21 transportation authorities;

22
23 j. The Compliance Assurance Testing, Sampling and Monitoring Plan shall provide for an
24 identified chain-of-command, including local authority incident commanders, for the
25 reporting and correction, including emergency measures, of any and all deviation(s) from the
26 plan's enforceable metrics, as well as the daily monitoring of all operations for compliance
27 with the enforceable metrics identified in the plan, including inspection and sampling of
28 storm water discharges, quarterly ground water monitoring at locations that will allow
29 corrective actions and containment measures to prevent offsite migration or vertical migration
30 of contamination, identification and verification of the efficacy of testing methods and quality
31 assurance reviews of test results, and reporting within 24 hours of any and all deviations from
32 compliance metrics to the owner, the third-party corrective measures contractor, and the local
33 authorities identified in the local permit;

34
35 k. The Compliance Assurance Plan shall document that the prepared plans and procedures are
36 based on sound science and includes an updated review of best practices and technologies
37 and test methods, and provides for specific compliance metrics to assure the performance
38 requirements of the plans are met and the permit approval conditions are satisfied, and for
39 annual audits, inspections, and certification by qualified and experienced, and licensed third
40 party(ies), of compliance with the procedures and provisions of the various operational plans,
41 including with the identified metrics in the plans;

42
43 2. Upon signing and submitting a CAFO Operations Permit Application to the Town Clerk, the
44 applicant shall include and sign a notarized statement that the applicant agrees to fully compensate the
45 Town for all legal services, expert consulting services, and other expenses which may be reasonably
46 incurred by the Town in reviewing and considering the application, regardless of whether or not the
47 application for a permit is subsequently approved, with or without conditions, or denied by the Town
48 Board. The applicant statement shall also state that the applicant agrees to fully compensate the Town
49 for all legal services, expert consulting services and other expenses, for verifying and enforcing

1 in Section 8.1.b. will be based on spreadable acres, not total acres, and
2 ii. the application will include all Manure Land Application Agreements with
3 landowners, with a minimum contract period of five (5) years, and such
4 agreements must include provisions for application of wastes in accord with the
5 Waste Management Plan required in Section 8. 1. b.;

- 6
7 3. Conditions relating to the population and depopulation of individual animal housing facilities, to
8 protect public health and prevent the spread of animal-borne and vector-borne disease, to assure a
9 safe level of sanitation, and to assure human health hazard control or health protection for the
10 community, including provisions for health department inspections and testing of dead animals and
11 provisions for the safe treatment and transport off-site disposal of sanitation wastes at a separately
12 permitted commercial facility;
13
14 4. Conditions relating to biosecurity and the maintenance of animal health and welfare, to prevent the
15 spread of animal-borne and vector-borne disease, to protect public health, and provide for animal
16 safety and welfare, including provisions for frequent testing of livestock for specific diseases of
17 concern and development of emergency containment measures in the event of the detection of a
18 disease of particular concern;
19
20 5. Conditions relating to transportation of animals as part of the ongoing operations, to protect public
21 health, prevent pollution, and prevent private nuisances and public nuisances, including completion of
22 a traffic and transportation needs analysis and applicant's paying for traffic control and roadway
23 improvements, including provisions for high-pressure washing with disinfectant of all transport
24 trailers coming into the Town to include treatment and disposal of water used for disinfectant;
25
26 6. Conditions relating to protection of private and public drinking and agricultural wells, and other
27 public water supplies, as part of an ongoing operation to protect public health, prevent pollution, and
28 prevent private nuisances and public nuisances, including provisions for completing a thorough
29 survey and mapping of private and public wells and springs and artesian fed water bodies, including
30 wetlands and karst areas, as well as a thorough hydrogeologic characterization of ground water within
31 5 miles of the proposed CAFO;
32
33 7. Conditions relating to air emissions and dust control as part of an ongoing operation, to protect public
34 health, prevent pollution and prevent private nuisances and public nuisances, including provisions for
35 property boundary offsets, air emission and air quality testing and for specific types of air emission
36 controls on all facility exhaust fans, waste management areas, and livestock quarantine holding areas;
37
38 8. Conditions relating to protection of the private and public property rights and property values of
39 affected property owners, as part of an ongoing operation, to protect the general welfare of the
40 Town's residents and property owners, and to prevent private nuisances and public nuisances;
41
42 9. Conditions relating to permit compliance, enforcement and monitoring, including establishment of
43 fees that may be assessed against the permittee to cover the costs of hiring, training, and maintaining
44 Town personnel, or for contracting with private consultants, to conduct permit compliance,
45 enforcement and monitoring activities for the Town, as well as provisions for annual certification of
46 compliance by the owner/operator and by qualified and licensed third-party auditor, approved by the
47 Town;
48
49 10. Conditions relating to the monitoring of surface water, ground water, air quality and all other

environmental factors and considerations, including retention pond sampling and testing and ground water quality monitoring at compliance points sufficiently far from the facility's property line to allow implementation of prevention of offsite migration corrective action and containment measures acceptable to the Town;

11. Any other conditions deemed reasonably necessary or appropriate by the Town Board to effectively, efficiently, and comprehensively regulate the operations of a facility, to protect public health (including human and animal health), safety, and general welfare, prevent pollution and the creation of private nuisances and public nuisances, and preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town, including provisions for adequate fire-fighting equipment and storage of adequate fire-fighting water based on a needs analysis approved by the Town and a Fire Safety Needs Analysis Plan that is annually reviewed and updated based on the following:

- a. Guidelines from the National Fire Protection Association NFPA 1141: Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas;
- b. Water Supply Needs Analysis based on guidelines included in NFPA 1142: Standard on Water Supplies for Suburban and Rural Fire Fighting;
- c. Wildlands Fire Analysis based NFPA 1144: Standard for Reducing Structure Ignition Hazards and Wildland Fires;
- d. Animal Housing Analysis based on NFPA 150: Fire and Life Safety in Animal Housing Facilities Code.

These conditions may apply not only to the CAFO facility itself, but also to any *rental property* upon which manure, carcasses, body tissue or other by products of the CAFO are spread, deposited or disposed of. Any conditions imposed under this Ordinance may be modified by the Town Board at the time of each annual renewal. Any modifications must be documented as required by section 11, below.

Section 11. Record of Decision

The Town Board must issue its decision in writing. The decision must be based on written findings of fact supported by evidence in the record.

Section 12. Transferability of License

A CAFO Operations Permit and the privileges granted by this license run with the land approved under the license and remain in effect, despite a change in ownership of the livestock facility, as long as the new operator does not violate the terms of the local approval.

Within thirty (30) days of a change of ownership of the livestock facility, the new owner(s) of the facility shall submit a signed and notarized affidavit to the Town Clerk ensuring compliance with the requirements of the ordinance. The new owner(s) will also file information with the Town Clerk providing pertinent information, including but not limited to such information as the name, address, phone and email of the new owner and date of transfer of ownership. *Financial Surety*

Section 13. Expiration of License

A CAFO Operations Permit remains in effect regardless of the amount of time that elapses before the livestock operator exercises the authority granted under this permit, and regardless of whether the

1 The Town shall exercise sound judgment in deciding whether to suspend or revoke a CAFO Operations
2 Permit. The Town shall consider extenuating circumstances, such as adverse weather conditions, that may
3 affect an operator's ability to comply.
4

5 In addition to any other penalty imposed by this Ordinance, the cost of abatement of any public nuisance
6 on the licensed premises by the Town may be collected under this Ordinance or Sec. 823.06 of Wis.
7 Statutes against the owner of the real estate upon which the public nuisance exists. Such costs of
8 abatement may be recovered against the real estate as a special charge under Sec. 66.0627 of Wis. Statutes
9 unless paid earlier.
10

11 **Section 16. Appeals**

12

13 An applicant or any other person or party who is aggrieved by a final decision of the Town Board on
14 whether to issue a CAFO Operations Permit, either with or without conditions, or a taxpayer, may, within
15 thirty (30) days after the filing of the decision with the Town Clerk, commence an action seeking the
16 remedy available by certiorari in Pierce County Circuit Court. The court shall not stay the decision
17 appealed from, but may, with notice to the Town Board, grant a restraining order. The Town Board shall
18 not be required to return the original papers acted upon by it, but it shall be sufficient to return certified or
19 sworn copies thereof. If necessary, for the proper disposition of the matter, the court may take evidence,
20 or appoint a referee to take evidence and report findings of fact and conclusions of law as it directs, which
21 shall constitute a part of the proceedings upon which the determination of the court shall be made. The
22 court may reverse or affirm, wholly or partly, or may modify, the decision brought up for review.
23

24 In any certiorari proceeding brought under the preceding paragraph, attorney fees and costs shall not be
25 allowed against the Town Board unless it shall appear to the court that it acted with gross negligence, or
26 in bad faith, or with malice in making the decision appealed from.
27

28 A final decision of the Town Board under this ordinance is not subject to appeal under Wis. Stat.
29 93.90(5), Wis. Stat 93.30, or Wis. Admin Code Ch. ATPCP 51, which apply only to siting decisions.
30

31 **Section 17. Severability**

32

33 If any provision of this Ordinance or its application to any person or circumstance is held invalid, the
34 invalidity does not affect other provisions or applications of this Ordinance that can be given effect
35 without the invalid provision or application, and to that end, the provisions of this Ordinance are
36 severable.
37

*Are rental landowners responsible
for any mis use or over use.*

TOWN OF ROCK ELM

PIERCE COUNTY, WISCONSIN

ORDINANCE NO. 24-xx

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) ORDINANCE

DRAFT FOR DISCUSSION ONLY - APPENDIX A

Journal Articles & Reports

University Programs

Regulatory & Court Documents

Media Articles

Journal Articles

1. Alarcón, L.V., Allepuz, A. & Mateu, E. Biosecurity in pig farms: a review. *Porc Health Manag* 7, 5 (2021).

Link: <https://doi.org/10.1186/s40813-020-00181-z>

The perception of the importance of animal health and its relationship with biosecurity has increased in recent years with the emergence and re-emergence of several diseases difficult to control. This is particularly evident in the case of pig farming as shown by the recent episodes of African swine fever or porcine epidemic diarrhea. Moreover, a better biosecurity may help to improve productivity and may contribute to reducing the use of antibiotics. Biosecurity can be defined as the application of measures aimed to reduce the probability of the introduction (external biosecurity) and further spread of pathogens within the farm (internal biosecurity). Thus, the key idea is to avoid transmission, either between farms or within the farm. This implies knowledge of the epidemiology of the diseases to be avoided that is not always available, but since ways of transmission of pathogens are limited to a few, it is possible to implement effective actions even with some gaps in our knowledge on a given disease. The development of quantitative assessment methods will permit a more precise selection of measures and a fine evaluation of their impact. Collaboration with other branches of science such as sociology or psychology may help to the sustainable implementation of biosecurity plans.

2. Almond, G. Water: Optimizing Performance While Reducing Waste. *46th Annual North Carolina Pork Conference North Carolina State University*, 2002.

Link: [Water: Optimizing Performance \(ncsu.edu\)](https://www.ncsu.edu/water-optimizing-performance)

Due to the relative abundance of water and its “low price”, there previously was little demand for research on the role of water and water delivery systems in US pork production, and specifically with applications to North Carolina. Water is important in pork production for two general reasons: its role in pig performance and its contribution to waste.

3. American Academy of Pediatrics. Committee on Environmental Health and Committee on Infectious Diseases, 2009. Drinking water from private wells and risks to children. *Pediatrics* 123(6):1599–1605.

Link: [Drinking Water From Private Wells and Risks to Children \(aappublications.org\)](https://aappublications.org/)

Drinking water for approximately one sixth of US households is obtained from private wells. These wells can become contaminated by pollutant chemicals or pathogenic organisms and cause illness. Although the US Environmental Protection Agency and all states offer guidance for construction, maintenance, and testing of private wells, there is little regulation. This policy statement provides recommendations for inspection, testing, and remediation for wells providing drinking water for children.

reportedly recover with supportive treatment, and the mortality/culling rate has been low at 2% or less on average.

9. American Veterinarian Medical Association. *Novel bird flu strain continues to threaten animal, public health* Accessed January 29, 2025
Link: [Novel bird flu strain continues to threaten animal, public health](#)
As the epizootic of highly pathogenic avian influenza (HPAI, more specifically avian influenza type A H5N1) spreading globally approaches its fourth year, animal and public health officials are monitoring how quickly a new variant of the H5N1 virus—the clade 2.3.4.4b viruses—can jump to new animals, including people.
10. Arora, K. General Guidelines on Composting of HPAI Infected Carcasses. *Iowa State Extension Store*. July 2017.
Link: [General Guidelines on Composting of HPAI Infected Carcasses \(iastate.edu\)](#)
Containment of highly pathogenic avian influenza (HPAI) is a critical step which must be properly performed to ensure human and animal safety. This publication discusses how to prepare to contain a potential outbreak and what should be done to safely contain it.
11. Baykov B, Stoyanov M. Microbial air pollution caused by intensive broiler chicken breeding. *FEMS Microbiol Ecol*. 1999;29(4):389-392.
Link: <https://academic.oup.com/femsec/article/29/4/389/527380/Microbial-air-pollution-caused-by-intensive-broiler-breeding-operations>
This study examined the extent of microbial atmospheric pollution caused by industrial broiler breeding operations and found that as birds aged, microbial numbers increased in the indoor air and were spread into the environment to a greater degree. The study also found that microorganisms could be spread by air flow up to 3000 meters from the production buildings.
12. Brender JD, Weyer PJ, Romitti PA, et al. Prenatal nitrate intake from drinking water and selected birth defects in offspring of participants in the national birth defects prevention study. *Environ Health Perspect*. 2013;121(9):1083-1089.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/23771435>
The relationship between prenatal exposure to nitrates in drinking water and birth defects was examined in this study. The study concluded that higher maternal water nitrate consumption was associated with birth defects, including spina bifida, limb deficiency, cleft palate, and cleft lip.
13. Broom, DM. (2003) Causes of Poor Welfare in Large Animals During Transport. *Veterinary research communications*, 27 Suppl 1, 515–518.
Link: [Causes of poor welfare in animal transport \(nih.gov\)](#)
The welfare of animals during transport should be assessed using a range of behavioral, physiological and carcass quality measures. In addition, health is an important part of welfare so the extent of any disease, injury or mortality resulting from, or exacerbated by, transport should be measured. Many of the indicators are measures of stress in that they involve long-term adverse effects on the individual. Key factors affecting the welfare of animals during handling and transport which are discussed are: attitudes to animals and the need for training of staff; methods of payment of staff; laws and retailers' codes; genetics, especially selection for high productivity; rearing conditions and experience; the mixing of animals from different social groups; handling procedures: driving methods; stocking density; increased susceptibility to disease and increased spread of disease.
14. Brumm, M. Patterns of Drinking Use in Pork Production Facilities. (2006) *Nebraska Swine Reports*. 221.

and generally accepted livestock waste management practices do not protect water resources from the pathogens, pharmaceuticals and excessive nutrients found in animal waste. As concern about the potential human and environmental health impact of long-term exposure to contaminated water grows, there is greater need for rigorous monitoring of CAFOs, improved understanding of the major toxicants affecting human and environmental health, and a system to enforce these practices.

18. Cambra-Lopez M, Aarnink AJ, Zhao Y, Calvet S, Tones AG. Airborne particulate matter from livestock production systems: A review of an air pollution problem. *Environmental Pollution*. 2010;158(1):1-17.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/19656601>

This paper reviews research on particulate matter inside and emitted from livestock production system and reports that livestock housing is an important source of particulate matter emissions. The paper recommends additional research to characterize and control particulate matter in livestock houses, as high concentrations such as those found in livestock houses can threaten the environment and the health and welfare of humans and animals.

19. Carmichael WW. Health effects of toxin-producing cyanobacteria: "The CyanoHABs". *Human and Ecological Risk Assessment: An International Journal*. 2001;7(5):1393-1407.

Link: <http://www.tandfonline.com/doi/abs/10.1080/20018091095087>

Current understandings of cyanobacteria toxin poisonings (CTPs) and their risk to human health were reviewed in this paper. CTPs occur in fresh and brackish waters throughout the world as a result of eutrophication and climate change. Cyanobacteria toxins are responsible for acute lethal, acute, chronic and sub-chronic poisonings of wild and domestic animals and humans. These poisonings result in respiratory and allergic reactions, gastrointestinal disturbances, acute hepatotoxicosis and peracute neurotoxicosis.

20. Casey JA, Curriero FC, Cosgrove SE, Nachman KE, Schwartz BS. High-density livestock operations, crop field application of manure, and risk of community-associated methicillin-resistant *Staphylococcus aureus* infection in Pennsylvania. *JAMA Internal Medicine*. 2013;173(21):1980-1990.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/24043228>

Nearly 80% of antibiotics in the United States are sold for use in livestock feeds. The manure produced by these animals contains antibiotic-resistant bacteria, resistance genes, and antibiotics and is subsequently applied to crop fields, where it may put community members at risk for antibiotic-resistant infections. The objective of this study was to assess the association between individual exposure to swine and dairy/veal industrial agriculture and risk of methicillin-resistant *Staphylococcus aureus* (MRSA) infection. This study was a population-based, nested case-control study of primary care patients from a single health care system in Pennsylvania from 2005 to 2010. Incident MRSA cases were identified using electronic health records, classified as community-associated MRSA or health care—associated MRSA, and frequency matched to randomly selected controls and patients with skin and soft-tissue infection. Nutrient management plans were used to create 2 exposure variables: seasonal crop field manure application and number of livestock animals at the operation. In a sub-study, we collected 200 isolates from patients stratified by location of diagnosis and proximity to livestock operations. The study measured community-associated MRSA, health care—associated MRSA, and skin and soft-tissue infection status (with no history of MRSA) compared with controls. From a total population of 446,480 patients, 1,539 community-associated MRSA, 1335 health care-associated MRSA, 2895 skin and soft-tissue infection cases, and 2914 controls were included. After adjustment for MRSA risk factors, the highest quartile of swine crop field exposure was significantly associated with community-associated MRSA, health care-associated MRSA, and skin and soft-tissue infection case status (adjusted odds ratios, 1.38 [95%

25. Chiu H, Tsai S, Yang C. Nitrate in drinking water and risk of death from bladder cancer: An ecological case-control study in Taiwan. *Journal of Toxicology and Environmental Health, Part A*. 2007;70(12):1000-1004.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/17497410>
The association between bladder cancer mortality and nitrate exposure from Taiwan drinking water was investigated in this study. The results showed a significant positive relationship between the levels of nitrates in the drinking water and the risk of death from bladder cancer, indicating that environmental exposure to nitrates plays a role in the development of bladder cancer.
26. Coffey, Brian et al., The Economic Impact of BSE on the U.S. Beef Industry: Product Value Losses, Regulatory Costs, and Consumer Reactions, Kansas State University, April 2000
Link: [Economic Impact of BSE](#)
As BSE spread outside Europe to Japan and, in mid-2003, to Canada, USDA enhanced its surveillance efforts and increased funding for BSE related research. Regulatory efforts to counter the disease were further strengthened when, on December 23, 2003, it was reported that a dairy cow in Washington state had tested positive. Within days of the announcement, 53 countries banned imports of U.S. cattle and beef products. In 2003, U.S. beef exports were valued at \$3.95 billion and accounted for 9.6 percent of U.S. commercial beef production. The import bans caused U.S. beef exports to plummet and exports for the year declined 82 percent below 2003's level.
27. Cordua, William. Town of Rock Elm, Rock Elm Disturbance and Groundwater Question. Email December 4, 2024
Link: [Rock Elm Disturbance and Groundwater Email.pdf](#)
28. Cordua, William. Rock Elm Asteroid Crater Site of Speculation, Study, University of Wisconsin - River Falls, September 13, 2002
Link: https://web.archive.org/web/20120205035616/http://www2.uwrf.edu/news_bureau/0913022.html
29. Akdeniz, N. A review of the animal disease outbreaks and biosecure animal mortality composting systems. *Waste Management*, Volume 90, 2019, Pages 121-131,
Link: <https://doi.org/10.1016/j.wasman.2019.04.047>
Despite the development of new vaccines and the application of rigorous biosecurity measures, animal diseases pose a continuing threat to animal health, food safety, national economy, and the environment. Intense livestock production, increased travel, and changing climate have increased the risk of catastrophic animal losses due to infectious diseases. In the event of an outbreak, it is essential to properly manage the infected animals to prevent the spread of diseases. The most common disposal methods used during a disease outbreak include burial, landfilling, incineration and composting. Biosecurity, transportation logistics, public perception, and environmental concerns limit the use of some of these methods. During a disease outbreak, the large number of mortalities often exceeds the capacity of local rendering plants and landfills. Transporting mortalities to disposal and incineration facilities outside the production operation introduces biosecurity risks. Burying mortalities is limited by the size and availability of suitable sites and it has the risk of pathogen survival and contamination of groundwater and soil. Portable incinerators are expensive and have the potential to aerosolize infectious particles. Composting, on the other hand, has been recognized as a biosecure disposal method. Although composting has been shown to eliminate HPAI, FMD, PED, and PRRS viruses, no studies have been reported regarding African swine fever. More studies are needed to show the biosecurity of composting in

combinations") under conditions simulating transport between continents and provide further evidence that contaminated feed ingredients may represent a risk for transport of pathogens at domestic and global levels.

34. Deschuyffeleer, T. P., Tyberghien, L. F., Dickx, V. L., Geens, T., Saelen, J. M., Vanrompay, D. C., & Braeckman, L. A. (2012). Risk assessment and management of *Chlamydia psittaci* in poultry processing plants. *The Annals of occupational hygiene*, 56(3), 340–349.

Link: <https://doi.org/10.1093/annhyg/mer102>

Chlamydia psittaci causes respiratory disease in poultry and can be transmitted to humans.

Historical outbreaks of psittacosis in poultry workers indicated the need for higher awareness and an efficient risk assessment and management. This group reviewed relevant previous research, practical guidelines, and European directives. Subsequently, basic suggestions were made on how to assess and manage the risk of psittacosis in poultry processing plants based on a classical four-step approach. Collective and personal protective measures as well as the role of occupational medicine are described. Despite the finding that exposure is found in every branch, abattoir workstations seem to be associated with the highest prevalence of psittacosis. Complete eradication is difficult to achieve. Ventilation, cleaning, hand hygiene, and personal protective equipment are the most important protective measures to limit and control exposure to *C. psittaci*. Adequate information, communication, and health surveillance belong to the responsibilities of the occupational physician. Future challenges lay in the rigorous reporting of infections in both poultry and poultry workers and in the development of an avian and human vaccine.

35. Donham KJ, Wing S, Osterberg D, et al. Community health and socioeconomic issues surrounding concentrated animal feeding operations. *Environ Health Perspect.* 2007:317-320.

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817697/>

The Workgroup on Community and Socioeconomic Issues examined the impacts of CAFOs on the health of rural communities, using the World Health Organization's definition of health, "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." The workgroup recommended more stringent CAFO permitting, limiting animal density per watershed, improving local control, mandating environmental impact statements and considering bonding for manure storage basins.

36. D'Onofrio, Sarah. Greenwashing "Brown Gold": A Critical Analysis of Anaerobic Digesters and California's Neoliberal Environmental Programs in Wisconsin's Dairyland. *University of Tennessee August 2023 PhD dissertation*

Link: ["Brown Gold": A Critical Analysis of Anaerobic Digesters...](#)

In the state of Wisconsin, which is the second largest dairy producing state in the US behind California, digesters that were used in state sponsored market based programs decades before are now being repurposed to spur on what the dairy industry is calling "a manure gold rush" for programs in California. But if states have been encouraged since the 1980s to "think like a market," who is thinking like a state? In California's marketized environmental program, markets themselves have stepped in as regulator. The outcome of this arrangement is a system that marches forward in the name of climate progress, yet no one can be held accountable for its failures, particularly related to environmental injustice.

37. Dyal JW, Grant MP, Broadwater K, et al. COVID-19 Among Workers in Meat and Poultry Processing Facilities — 19 States, April 2020. *MMWR Morb Mortal Wkly Rep* 2020:557-561

Link: [COVID-19 Among Workers in Meat and Poultry Processing Facilities \(cdc.gov\)](https://www.cdc.gov/mmwr/preview/mmwrhtml/mmwr557-561a.htm)

Congregate work and residential locations are at increased risk for infectious disease transmission including respiratory illness outbreaks. SARS-CoV-2, the virus that causes coronavirus disease

Private wells serving fewer than 25 people are federally unregulated, and their users may be exposed to naturally occurring agents of concern. This panel assessed current conditions of ground water as a source for private wells, identified emerging threats, critical gaps in knowledge, and public health needs, and recommended strategies to guide future activities to ensure the safety of private drinking water wells.

43. Fry JP, Laestadius LI, Grechis C, Nachman KE, Neff RA. Investigating the role of state permitting and agriculture agencies in addressing public health concerns related to industrial food animal production. *PloS one*. 2014;9(2):e89870.
Link: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0089870>
This study explored how state permitting and agriculture agencies respond to environmental public health concerns regarding industrial food animal production through qualitative interviews with state agency staff in seven states. The study found that the agencies were unable to adequately address these environmental public health concerns due to narrow regulations, limited resources and a lack of public health expertise. When these constraints are considered alongside those faced by health departments, significant gaps in the ability to respond to and prevent public health concerns and issues are revealed.
44. Gomes A, Quinteiro-Filho W, Ribeiro A, et al. Overcrowding stress decreases macrophage activity and increases *Salmonella* enteritidis invasion in broiler chickens. *Avian Pathol*. 2014;43(1):82-90.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/24350836>
This study sought to characterize the immunosuppressive effect of overcrowding stress in broiler chickens. Overcrowding was found to compromise the intestinal immune barrier and integrity of the small intestine, resulting in inflammation and decreased nutrient absorption. The study concludes that animal welfare measures and avoiding overcrowding stress factors in maintaining poultry health and decreased susceptibility to *Salmonella* infection.
45. Graham JP, Leibler JH, Price LB, Otte JM, Pfeiffer DU, Tiensin T, et al. The animal-human interface and infectious disease in industrial food animal production: rethinking biosecurity and biocontainment. *Public Health Rep*. 2008;123(3):282-99.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/19006971>
Understanding interactions between animals and humans is critical in preventing outbreaks of zoonotic disease. This is particularly important for avian influenza. Food animal production has been transformed since the 1918 influenza pandemic. Poultry and swine production have changed from small-scale methods to industrial-scale operations. There is substantial evidence of pathogen movement between and among these industrial facilities, release to the external environment, and exposure to farm workers, which challenges the assumption that modern poultry production is more biosecure and biocontained as compared with backyard or small holder operations in preventing introduction and release of pathogens. An analysis of data from the Thai government investigation in 2004 indicates that the odds of H5N1 outbreaks and infections were significantly higher in large-scale commercial poultry operations as compared with backyard flocks. These data suggest that successful strategies to prevent or mitigate the emergence of pandemic avian influenza must consider risk factors specific to modern industrialized food animal production.
46. Graham JP, Evans SL, Price LB, Silbergeld EK. Fate of antimicrobial-resistant enterococci and staphylococci and resistance determinants in stored poultry litter. *Environ Res*. 2009;109(6):682-689.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/19541298>

51. Guthrie, T. Water Needs of Pigs. Michigan State Extension. May 2011
Link: [Water needs of pigs - MSU Extension](#)
How much water do pigs need? Pigs lose water through four routes: kidneys (urination), intestines (defecation), lungs (respiration) and some through evaporation (skin- sweat glands are largely dormant).
52. Harmon, J. Drip Cooling for Sows in Farrowing House. *Iowa State Extension Store*. October 2008
Link: [Drip Cooling of Sows in Farrowing House \(iastate.edu\)](#)
Research indicates that summer heat stress on sows can be reduced by using a system that continually drips water on the sow's shoulder in hot weather.
53. Heaney CD, et. al. Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. *Sci Total Environ*. 2015;511:676-683.
Link: <http://www.sciencedirect.com/science/article/pii/S0048969714017641>
The microbial quality of surface water proximal to swine CAFOs was investigated in this study to better understand the impact of CAFOs on the surrounding environment. The results demonstrate overall poor water quality in areas with a high density of swine CAFOs, with high fecal indicator bacteria concentrations in waters both up- and down-stream of CAFO lagoon waste land application sites. The swine-specific microbial source tracking markers used in the study were also shown to be useful for tracking off-site conveyance of swine fecal wastes and during rain events.
54. Heederik D, Sigsgaard T, Thorne PS, et al. Health effects of airborne exposures from concentrated animal feeding operations. *Environ Health Perspect*. 2007;298-302.
Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817709/>
This report from a Conference on Environmental Health Impacts of Concentrated Animal Feeding Operations: Anticipating Hazards —Searching for Solutions working group states that toxic gases, vapors and particles are emitted from CAFOs into the general environment, and that while these agents are known to be harmful to human health, there are few studies that explore the health risks of exposure to these agents for the people living near CAFOs. While there is evidence that psychophysiologic changes may result from exposure to malodors and that microbial exposures are related to deleterious respiratory health effects, the working group concluded that there is great need to study and evaluate the health effects of community exposure to these CAFO related air pollutants to better understand the impact of CAFOs on the health of community members and farm workers.
55. Heisler J, Glibert PM, Burkholder JM, et al. Eutrophication and harmful algal blooms: A scientific consensus. *Harmful Algae*. 2008;8(1):3-13.
Link: <http://www.sciencedirect.com/science/article/pii/S1568988308001066>
The US EPA held a roundtable discussion to develop consensus among academic, federal and state agency representatives on the relationship between eutrophication and harmful algal blooms. Seven statements were adopted during the session, which include acknowledgement of the important role of nutrient pollution and degraded water quality in the development and persistence of many harmful algal blooms.
56. Holly, Michael A., et al. Greenhouse Gas and Ammonia Emissions from Digested and Separated Dairy Manure during Storage and after Land Application. *Agriculture, Ecosystems & Environment* 239:410–19.
Link: [Ranking hazards pertaining to human health concerns from land application...](#)

performed, there is not enough information on the characteristics of groundwater at the burial sites, duration of pig carcass decomposition, and effects of leachate on groundwater quality worldwide. Although information on the biological and chemical characteristics of leachate is gradually being accumulated from the limited number of studies, guidelines for groundwater quality control should be established for livestock carcass disposal in all modern countries.

61. Isakson, Hans R. An analysis of the impact of swine CAFOs on the value of nearby houses. *Agricultural Economics*. November 2008; pages 365-372.

Link: <https://doi.org/10.1111/j.1574-0862.2008.00339.x>

The impact of 39 swine confined or concentrated animal feeding operations (CAFOs) in Black Hawk County, Iowa on 5,822 house sales is explored by introducing a new variable that more accurately captures the effects of prevailing winds, exploring potential adverse effects within concentric circles around each CAFO, managing selection bias, and incorporating spatial correlation into the error term of the empirical model. Large adverse impacts suffered by houses that are within 3 miles and directly downwind from a CAFO are found. Beyond 3 miles, CAFOs have a generally decreasing adverse impact on house prices as distance to the CAFO increases.

62. Jackson, L, Keeney, D, Gilbert, E. Swine manure management plans in North-Central Iowa: Nutrient loading and policy implications. *Journal of Soil and Water Conservation* April 2000, 55 (2) 205-212.

Link: Swine manure management plans in North-Central Iowa...

Public record were used to document the manure management practices of CAFOs housing 59,700 finishing hogs in a 1,554 ha area of Hamilton County, Iowa. Together, they generated an estimated 811,500 kg of nitrogen (N) each year, more than 70% of which volatilized into the atmosphere. CAFOs minimized the area required for applying manure by underestimating manure N content, projecting above average crop yields, and applying manure to soybeans. Some fields were claimed by more than one operator, and some field sizes were overestimated. Manure application based on crop demand for phosphorus would require 9,350 ha of cropland, compared to the 990 ha actually used. Several policy changes could alleviate the nutrient management problems...

63. Jahne MA, Rogers SW, Holsen TM, Grimberg SJ, Ramler IP. Emission and dispersion of bioaerosols from dairy manure application sites: Human health risk assessment. *Environ Sci Technol*. 2015; 49(16):9842-9849 .

Link: <https://www.ncbi.nlm.nih.gov/pubmed/26158489>

Understanding interactions between animals and humans is critical in preventing outbreaks of zoonotic disease. This is particularly important for avian influenza. Food animal production has been transformed since the 1918 influenza pandemic. Poultry and swine production have changed from small-scale methods to industrial-scale operations. There is substantial evidence of pathogen movement between and among these industrial facilities, release to the external environment, and exposure to farm workers, which challenges the assumption that modern poultry production is more biosecure and biocontained as compared with backyard or small holder operations in preventing introduction and release of pathogens. An analysis of data from the Thai government investigation in 2004 indicates that the odds of H5N1 outbreaks and infections were significantly higher in large-scale commercial poultry operations as compared with backyard flocks. These data suggest that successful strategies to prevent or mitigate the emergence of pandemic avian influenza must consider risk factors specific to modern industrialized food animal production.

nomenclature used in the field has been restriction fragment length polymorphism (RFLP) typing, a review of the limitations of different PRRSV classification systems is warranted.

69. Kim, J, Goldsmith P. Using Spatial Econometrics to Assess the Impact of Swine Production on Residential Property Values American Agricultural Economics Association, Denver, July, 2004
Link: [USING SPATIAL ECONOMETRICS TO ASSESS THE IMPACT OF SWINE PRODUCTION ON RESIDENTIAL PROPERTY VALUES \(umn.edu\)](#)

A spatial hedonic model is developed to assess monetary harm of confined animal feeding operations (CAFOs) on property values, taking explicitly spatial dependence in property values into account. Spatial autocorrelation was found in the form of spatial lag dependence, not spatial error dependence. When spatial lag dependence is explicitly taken into account, on average the impact is reduced by 18%. The magnitude of the spatial autoregressive parameter was about 0.2 for the 1-mile distance band, meaning one-fifth of the house value could be explained by the values of the neighboring houses.

70. Knobeloch L, Salna B, Hogan A, Postle J, Anderson H. Blue babies and nitrate-contaminated well water. *Environ Health Perspect.* 2000;108(7):675-678.

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1638204/>

Two cases of infant methemoglobinemia associated with nitrate contaminated private well water were described in this paper. The case studies underscore the danger that this contaminated water poses to infants during the first six months of life, as well as the risks of long-term exposure, which include cancer, thyroid disease and diabetes. Steps to reduce nitrate inputs in groundwater and routine well water testing are recommended to protect health.

71. Knobeloch, L., Gorski, P., Christenson, M., & Anderson, H. (2013). Private drinking water quality in rural Wisconsin. *Journal of environmental health*, 75(7), 16–20.

Link: [Private drinking water quality in rural Wisconsin - PubMed \(nih.gov\)](#)

Between July 1, 2007, and December 31, 2010, Wisconsin health departments tested nearly 4,000 rural drinking water supplies for coliform bacteria, nitrate, fluoride, and 13 metals as part of a state-funded program that provides assistance to low-income families. The authors' review of laboratory findings found that 47% of these wells had an exceedance of one or more health-based water quality standards. Test results for iron and coliform bacteria exceeded safe limits in 21% and 18% of these wells, respectively. In addition, 10% of the water samples from these wells were high in nitrate and 11% had an elevated result for aluminum, arsenic, lead, manganese, or strontium. The high percentage of unsafe test results emphasizes the importance of water quality monitoring to the health of nearly one million families including 300,000 Wisconsin children whose drinking water comes from a privately owned well.

72. [Kravchenko J](#), [Rhew S](#), [Akushevich I](#), [Agarwal P](#), [Lyerly, HK](#): Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations. *NC Med J* Sep-Oct 2018;79(5):278-288.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/30228132>

Background Life expectancy in southeastern North Carolina communities located in an area with multiple concentrated animal feeding operations (CAFOs) after adjusting for socioeconomic factors remains low. We hypothesized that poor health outcomes in this region may be due to converging demographic, socioeconomic, behavioral, and access-to-care factors and are influenced by the presence of hog CAFOs.

Methods We studied mortality, hospital admissions, and emergency department (ED) usage for health conditions potentially associated with hog CAFOs-anemia, kidney disease, infectious diseases, and low birth weight (LBW)-in North Carolina communities located in zip codes with hog CAFOs (Study group 1), in zip codes with > 215hogs/km² (Study group 2), and without hog CAFOs (Control group). We compared

Harvest facilities serve as a source of contact between many swine farms with different health statuses. This study suggests that collection points, such as harvest facilities and livestock auction markets, can be an efficient source of contamination of transport vehicles that return to pig farms and likely played a role in rapidly disseminating PEDV across vast geographic regions shortly after PEDV was first identified in the United States. These data also suggest that the contamination of transport vehicles leaving the harvest facilities increased as the prevalence of PEDV-positive transport vehicles and virus load coming into the facility increased.

76. Ma W, Lager KM, Vincent AL, Janke BH, Gramer MR, Richt JA. The role of swine in the generation of novel influenza viruses. *Zoonoses Public Health*. 2009 Aug;56(6-7):326-37.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/19486316>

The ecology of influenza A viruses is very complicated involving multiple host species and viral genes. Avian species have variable susceptibility to influenza A viruses with wild aquatic birds being the reservoir for this group of pathogens. Occasionally, influenza A viruses are transmitted to mammals from avian species, which can lead to the development of human pandemic strains by direct or indirect transmission to man. Because swine are also susceptible to infection with avian and human influenza viruses, genetic reassortment between these viruses and/or swine influenza viruses can occur. The potential to generate novel influenza viruses has resulted in swine being labelled 'mixing vessels'. The mixing vessel theory is one mechanism by which unique viruses can be transmitted from an avian reservoir to man. Although swine can generate novel influenza viruses capable of infecting man, at present, it is difficult to predict which viruses, if any, will cause a human pandemic. Clearly, the ecology of influenza A viruses is dynamic and can impact human health, companion animals, as well as the health of livestock and poultry for production of valuable protein commodities. For these reasons, influenza is, and will continue to be, a serious threat to the wellbeing of mankind.

77. Malecki, K., Schultz, A. A., Severtson, D. J., Anderson, H. A., & VanDerslice, J. A. (2017). Private-well stewardship among a general population based sample of private well-owners. *The Science of the total environment*, 601-602, 1533–1543.

Link: <https://doi.org/10.1016/j.scitotenv.2017.05.284>

Private well stewardship, including on-going testing and treatment, can ensure private well users are able to maintain source-water quality and prevent exposures to potentially harmful constituents in primary drinking water supplies. Unlike municipal water supplies, private well users are largely responsible for their own testing and treatment and well stewardship is often minimal. The importance of factors influencing regular testing, and treatment behaviors, including knowledge, risk perception, convenience and social norms, can vary by geography and population characteristics. The primary goals of this study were to survey a general statewide population of private well users in Wisconsin in order to quantify testing and treatment patterns and gather data on motivations and barriers to well stewardship. The majority of respondents reported using and drinking well water daily but only about one half of respondents reported testing their wells in the last ten years and of these, only 10% reported testing in the last 12 months. Bacteria and nitrates were contaminants most often tested; and, a private laboratory most often conducted testing. The most commonly reported water treatment was a water softener. Living in a particular geographic region and income were the most significant predictors of water testing and treatment. Iron and hardness, which influence water aesthetics but not always safety, were the most commonly reported water quality problems. Health concerns or perceived lack thereof were, respectively, motivators and barriers to testing and treatment. Limited knowledge of testing and treatment options were also identified as barriers. Results confirm previous findings that well stewardship practices are minimal and often context specific. Understanding the target

81. Markham, Lynn. et.al. (2022). Wisconsin Anaerobic Digester Operations: Agricultural Industry Case Studies. *Wisconsin: Center for Land Use Education, University of Wisconsin-Stevens Point*

Three case studies focus on digester operations in the Wisconsin agricultural industry. Digesters can be integral to the operation of large dairy farms, providing electricity and heat production for the farm, cow bedding, more versatile separated fertilizers, odor reduction, etc. In 2022, Wisconsin had no small dairy farms producing RNG. The dairy farms producing RNG ranged from 1,700 to 9,100 cows per farm. Farms located farther from injection points on natural gas pipelines may also be less likely to benefit from renewable natural gas production.

82. May, J. Estimating Water Usage on Michigan Swine Farms. Michigan State University Extension.

Link: [Water Use for Swine Farms](#)

Swine farms use well water for watering animals, cleaning facilities, animal cooling and in some instances for moving manure from the barn to the storage structure. Most pigs are raised in an all-in/all-out environments where one group of pigs, at the same stage of production, is moved into a location and stays there until that group is ready to move to the next location or on to slaughter. Between groups the facility is thoroughly cleaned by pre-soaking and/or pressure washing.

83. Milligan, W. R., Fuller, Z. L., Agarwal, I., Eisen, M. B., Przeworski, M., & Sella, G. (2021). Impact of essential workers in the context of social distancing for epidemic control. *PloS one*, 16(8), e0255680.

Link: <https://doi.org/10.1371/journal.pone.0255680>

New emerging infectious diseases are identified every year, a subset of which become global pandemics like COVID-19. In the case of COVID-19, many governments have responded to the ongoing pandemic by imposing social policies that restrict contacts outside of the home, resulting in a large fraction of the workforce either working from home or not working. To ensure essential services, however, a substantial number of workers are not subject to these limitations, and maintain many of their pre-intervention contacts. To explore how contacts among such "essential" workers, and between essential workers and the rest of the population, impact disease risk and the effectiveness of pandemic control, we evaluated several mathematical models of essential worker contacts within a standard epidemiology framework. The models were designed to correspond to key characteristics of cashiers, factory employees, and healthcare workers. We find in all three models that essential workers are at substantially elevated risk of infection compared to the rest of the population, as has been documented, and that increasing the numbers of essential workers necessitates the imposition of more stringent controls on contacts among the rest of the population to manage the pandemic. Importantly, however, different archetypes of essential workers differ in both their individual probability of infection and impact on the broader pandemic dynamics, highlighting the need to understand and target intervention for the specific risks faced by different groups of essential workers. These findings, especially in light of the massive human costs of the current COVID-19 pandemic, indicate that contingency plans for future epidemics should account for the impacts of essential workers on disease spread.

84. Mirabelli MC, Wing S, Marshall SW, Wilcosky TC. Asthma symptoms among adolescents who attend public schools that are located near confined swine feeding operations. *Pediatrics*. 2006;118(1):e66-75.

Most of the waterborne disease outbreaks observed in North America are associated with rural drinking water systems. The majority of the reported waterborne outbreaks are related to microbial agents (parasites, bacteria and viruses). Rural areas are characterized by high livestock density and lack of advanced treatment systems for animal and human waste, and wastewater. Animal waste from livestock production facilities is often applied to land without prior treatment. Biosolids (treated municipal wastewater sludge) from large wastewater facilities in urban areas are often transported and applied to land in rural areas. This situation introduces a potential for risk of human exposure to waterborne contaminants such as human and zoonotic pathogens originating from manure, biosolids, and leaking septic systems. This paper focuses on waterborne outbreaks and sources of microbial pollution in rural areas in the US, characterization of the microbial load of biosolids and manure, association of biosolid and manure application with microbial contamination of surface and groundwater, risk assessment and best management practice for biosolids and manure application to protect water quality. Gaps in knowledge are identified, and recommendations to improve the water quality in the rural areas are discussed.

89. Paerl FIW, Fulton RS ,3rd, Moisander PH, Dyble J. Harmful freshwater algal blooms, with an emphasis on cyanobacteria. *Scientific World Journal*. 2001;1:76-113.

Link: <http://dx.doi.org/10.1100/tsw.2001.16>

This paper reviews the effects of harmful freshwater algal blooms, resulting from nutrient oversupply and eutrophication, on water quality. Algal blooms contribute to water quality degradation, including malodor and foul taste, fish kills, toxicity, and food web alterations, while algal bloom toxins can adversely affect human and animal health through exposure to contaminated recreational and drinking water. The control and management of blooms, and their negative outcomes, must include nutrient input constraints, particularly on nitrogen and phosphorus.

90. Paploski, IA, Corzo C, Rovira AI, et al. Temporal Dynamics of Co-circulating Lineages of Porcine Reproductive and Respiratory Syndrome Virus. *Frontiers in Microbiology*. 2019 Vol 10: 2486

Link: <https://www.frontiersin.org/article/10.3389/fmicb.2019.02486>

Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) is the most important endemic pathogen in the U.S. swine industry. Despite control efforts involving improved biosecurity and different vaccination protocols, the virus continues to circulate and evolve. One of the foremost challenges in its control is high levels of genetic and antigenic diversity. Here, we quantify the co-circulation, emergence and sequential turnover of multiple PRRSV lineages in a single swine-producing region in the United States over a span of 9 years (2009–2017) using the Morrison Swine Health Monitoring Project housed at the University of Minnesota.

91. Polaris Project. Recruitment, Human Trafficking, and Temporary Visa Workers. Sept 2021

Link: [Recruitment, Human Trafficking, and Temporary Visa Workers](#)

This report examines the roles recruitment practices, regulations, and enforcement play in the experiences of trafficking victims who are in the United States on temporary worker visas. Data from the U.S. National Human Trafficking Hotline identified 4,8163 likely victims from January 1, 2015 – December 31, 20204 who were in the United States and working under any of the visa categories listed at the time of their abuse.

92. Polaris Project. Human Trafficking on Temporary Work Visas: A Data Analysis 2015-2017.

Link: [Human Trafficking on Temporary Work Visas](#)

96. Raff, Zach, and Andrew Meyer. 2022. "CAFOs and Surface Water Quality: Evidence from Wisconsin." *American Journal of Agricultural Economics* 104(1):161–89.

Link: <http://dx.doi.org/10.2139/ssrn.3379678>

This research estimates the relationship between the growth in CAFOs and surface water quality using longitudinal data on a large spatial scale. It uses a panel dataset from 1995–2017 that links Wisconsin CAFO intensity with nearby surface water quality readings. Leveraging variation in CAFO intensity within hydrological regions over time, we find that increasing CAFO intensity increases the levels of nutrients, specifically total phosphorus and ammonia, in surface water. Adding one CAFO to a Hydrologic Unit Code-8 (HUC8) region leads to a 1.7% increase in total phosphorus levels and a 2.7% increase in ammonia levels, relative to sample mean levels. Results imply that the marginal CAFO in Wisconsin produces non-market surface water quality damages of at least \$203,541 per year.

97. Rasmussen SG, Casey JA, Bandeen-Roche K, Schwartz BS. Proximity to Industrial Food Animal Production and Asthma Exacerbations in Pennsylvania, 2005–2012. *International Journal of Environmental Research and Public Health*. 2017; 14(4):362.

Link: <https://doi.org/10.3390/ijerph14040362>

The research on industrial food animal production (IFAP) and asthma exacerbations in the United States has relied on small sample sizes and/or self-reported outcomes. We assessed associations of proximity to large-scale and densely stocked swine and dairy/veal IFAP with three types of asthma exacerbations: hospitalizations, emergency encounters, and oral corticosteroid (OCS) medication orders from Geisinger Clinic in Pennsylvania. We used a diagnosis code (*International Classification of Diseases, 9th Revision, Clinical Modification* code 493.x) and medication orders from electronic health records to identify these exacerbations among asthma patients ($n = 35,269$) from 2005–2012. We compared residential proximity to swine or dairy/veal IFAP (dichotomized as <3 miles (4.8 km) or ≥ 3 miles) among asthma patients with and without exacerbations and estimated odds ratios using multilevel logistic regression. In adjusted models, proximity to IFAP was associated (odds ratio (95% confidence interval)) with OCS orders (1.11 (1.04–1.19)) and hospitalizations (1.29 (1.15–1.46)), but not emergency encounters (1.12 (0.91–1.37)). This study contributes to growing evidence that IFAP may impact health, in this case clinically-documented asthma exacerbations. No prior study has evaluated the association of IFAP and clinically-documented asthma exacerbations in the United States.

98. Rinsky JL, Nadimpalli M, Wing S, Hall D, Baron D, Price LB, et al. Livestock-Associated Methicillin and Multidrug Resistant *Staphylococcus aureus* Is Present among Industrial, Not Antibiotic-Free Livestock Operation Workers in North Carolina. *PLoS One*. 2013;8(7).

Link: <https://www.ncbi.nlm.nih.gov/pubmed/23844044>

Objectives. Administration of antibiotics to food animals may select for drug-resistant pathogens of clinical significance, such as methicillin-resistant *Staphylococcus aureus* (MRSA). In the United States, studies have examined prevalence of MRSA carriage among individuals exposed to livestock, but prevalence of multidrug-resistant *S. aureus* (MDRSA) carriage and the association with livestock raised with versus without antibiotic selective pressure remains unclear. We aimed to examine prevalence, antibiotic susceptibility, and molecular characteristics of *S. aureus* among industrial livestock operation (ILO) and antibiotic-free livestock operation (AFLO) workers and household members in North Carolina.

Methods. Participants in this cross-sectional study were interviewed and provided a nasal swab for *S. aureus* analysis. Resulting *S. aureus* isolates were assessed for antibiotic susceptibility, multi-locus sequence type, and absence of the *sen* gene (a marker of livestock association).

shortcomings and the need to implement policy updates that would alleviate some of these environmental and human concerns.

102. Rostagno MH. Can stress in farm animals increase food safety risk? *Foodborne pathogens and disease*. 2009;6(7):767-776.

Link: <http://online.liebertpub.com/doi/pdf/10.1089/fpd.2009.0315>

This study reviewed current knowledge to assess the potential impact of stress—such as that from inadequate nutrition, deprivation of water and/or feed, heat, cold, overcrowding, handling and transport—in farm animals on food safety risk. The review focused on stress mechanisms influencing the colonization and shedding of enteric pathogens in food animals due to the potential for their dissemination into the human food chain, a serious public health and economic concern. The review concluded that there is a growing body of evidence that demonstrates the negative impact of stress on food safety through a variety of potential mechanisms, and recommends additional research to optimize animal welfare and minimize production losses and food safety risks.

103. Rule AM, Evans SL, Silbergeld EK. Food animal transport: A potential source of community exposures to health hazards from industrial farming (CAFOs). *Journal of Infection and Public Health*. 2008;1(1):33-39.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/20701843>

The results of this study support the hypothesis that current methods of food animal transport from farm to slaughterhouse result in the transfer of bacteria, including antibiotic-resistant bacteria, to the vehicles travelling the same road. Bacteria were isolated from air and surface samples from vehicles following open poultry trucks, suggesting a new route of exposure to pathogens and the further dissemination of these pathogens to the general environment.

104. Sanhueza, JM, Stevenson, MA, Vilalta, C, Kikuti, M, Corzo, C. Spatial relative risk and factors associated with porcine reproductive and respiratory syndrome outbreaks in United States breeding herds. *Preventive Veterinary Medicine*, Volume 183, 2020,

Link: <https://doi.org/10.1016/j.prevetmed.2020.105128>

Details of incident cases of porcine reproductive and respiratory syndrome (PRRS) in United States breeding herds were obtained from the Morrison's Swine Health Monitoring Project. Herds were classified as cases if they reported an outbreak in a given season of the year and non-cases if they reported it in a season other than the case season or if they did not report a PRRS outbreak in any season. The geographic distribution of cases and non-cases was compared in each season of the year. The density of farms that had a PRRS outbreak during summer was higher in Southern Minnesota and Northwest-central Iowa compared to the density of the underlying population of non-case farms. This does not mean that PRRS outbreaks are more frequent during summer in absolute terms, but that there was a geographical clustering of herds breaking during summer in this area. Similar findings were observed in autumn. In addition, the density of farms reporting spring outbreaks was higher in the Southeast of the United States compared to that of the underlying population of non-case farms. A similar geographical clustering of PRRS outbreaks was observed during winter in the Southeast of the United States. Pig dense areas were associated with a higher incidence rate throughout the year. However, this association tended to be stronger during the summer. Additionally, herds with ≥ 2500 sows had an increased incidence rate during all seasons except spring compared to those with < 2500 sows. PRRS incidence was lower in year-round air-filtered herds compared to non-filtered herds throughout the year. We showed that not only the spatial risk of PRRS varies regionally according to the season of the year, but also that the effect of swine density, herd size and air filtering on PRRS incidence may also vary according to the season of the year. Further studies should investigate regional and seasonal

found that groundwater volumes were sufficient to supply the needs of the dairy and the surrounding residential wells. Residential wells were tested for coliform bacteria and field-tested for nitrates and hydrogen sulfide gas, and some of the wells tested unsafe for bacteria. In these cases, homeowners were given instructions on how to disinfect their wells and advised to do follow-up testing. The narrative concludes that data obtained prior to operations can be very useful and that local health departments can work with neighbors and facility operators to ensure that appropriate preventive measures are in place before operation to protect the public.

109. Schultz, Amy A, Peppard, Paul, Ron E Gangnon, Kristen M C Malecki: Residential proximity to concentrated animal feeding operations and allergic and respiratory disease. *Environment International* 2019 Volume 130

Link: <https://doi.org/10.1016/j.envint.2019.104911>

Background: Air emissions from concentrated animal feeding operations (CAFO) have been associated with respiratory and allergic symptoms among farm workers, primarily on swine farms. Despite the increasing pre-valence of CAFOs, few studies have assessed respiratory health implications among residents living near CAFOs and few have looked at the health impacts of dairy CAFOs.

Objectives: The goal of this study was to examine objective and subjective measures of respiratory and allergic health among rural residents living near dairy CAFOs in a general population living in the Upper Midwest of the United States.

Methods: Data were from the 2008–2016 Survey of the Health of Wisconsin (SHOW) cohort (n= 5338), a re-presentative, population based sample of rural adults (age 18+). The association between distance to the nearest CAFO and the prevalence of self-reported physician-diagnosed allergies, asthma, episodes of asthma in the last 12 months, and asthma medication use was examined using logistic regression, adjusting for covariates and sampling design. Similarly, the association between distance to the nearest CAFO and lung function, measured using spirometry, was examined using multivariate linear regression. Restricted cubic splines accounted for nonlinear relationships between distance to the nearest CAFO and the aforementioned outcomes. **Results:** Living 1.5 miles from a CAFO was associated with increased odds of self-reported nasal allergies (OR = 2.08; 95% CI: 1.38, 3.14), lung allergies (OR = 2.72; 95% CI: 1.59, 4.66), asthma (OR = 2.67; 95% CI: 1.39, 5.13), asthma medication (OR = 3.31; 95% CI: 1.65, 6.62), and uncontrolled asthma, reported as an asthma episode in last 12 months (OR = 2.34; 95% CI: 1.11, 4.92) when compared to living 5 miles from a CAFO. Predicted FEV1 was 7.72% (95% CI: -14.63, -0.81) lower at a residential distance 1.5 miles from a CAFO when compared with a residence distance of 3 miles from a CAFO.

Conclusions: Results suggest CAFOs may be an important source of adverse air quality associated with reduced respiratory and allergic health among rural residents living in close proximity to a CAFO.

110. Schulz J, Friese A, Klees S, et al. Longitudinal study of the contamination of air and of soil surfaces in the vicinity of pig barns by livestock-associated methicillin-resistant *Staphylococcus aureus*. *Appl Environ Microbiol.* 2012;78(16):5666-5671.

Link: <https://www.ncbi.nlm.nih.gov/pubmed/22685139/>

This study examined the presence and concentration of MRSA in air and soil downwind from swine CAFOs. The results demonstrate regular transmission and deposition of airborne livestock-associated MRSA to areas up to **at least 300 meters** around pig barns that tested positive for MRSA, suggesting that swine CAFOs can expose other farm animals, wildlife, and people to MRSA.

114. Spencer JL, Guan J. Public health implications related to spread of pathogens in manure from livestock and poultry operations. *Public Health Microbiology: Methods and Protocols*. 2004:503-515.
Link: <https://www.ncbi.nlm.nih.gov/pubmed/15156064>
Objectionable odors, flies, excessive levels of nitrogen and phosphorus and the potential spread of human pathogens are among the public concerns with the disposal of animal manure and the spread of dust and manure blown from powerful building fans. The study also finds that importance of animal manure in the spread of infectious pathogens is often underestimated despite the linkages between livestock operations and gastroenteritis in humans.
115. Steinmann J. (2004). Surrogate viruses for testing virucidal efficacy of chemical disinfectants. *The Journal of hospital infection*, 56 Suppl 2, S49–S54.
Link: <https://doi.org/10.1016/j.jhin.2003.12.030>
Since important agents of viral nosocomial infections like hepatitis B and C viruses and norovirus do not replicate sufficiently in cell culture systems, disinfectants with suspected efficacy against these viruses must be evaluated by different methods. Besides molecular approaches and indirect tests, the use of surrogate viruses with similar biophysical properties and genomic structure allows the assessment of virucidal efficacy of chemical disinfectants in quantitative suspension tests. Furthermore, insights into the survival of these viruses in the environment are possible.
116. Thomas, C. Estimating Water Usage on Michigan Dairy Farms. Michigan State University Extension
Link: [Water Use for Large Dairies \(ashland.wi.us\)](http://WaterUseforLargeDairies.ashland.wi.us)
Water usage on dairy farms can be divided into two general categories: 1) direct usage by dairy animals, and 2) indirect usage required for the general operation of the dairy facility.
117. Thomas, PR, et. al. (2015) Methods for Inactivating PEDV in Hog Trailers. *Animal Industry Report*: AS 661, ASL R3028.
Link: https://lib.dr.iastate.edu/ans_air/vol661/iss1/91
Contaminated livestock trailers certainly represent a significant risk for movement of the virus between and within herds. Historically, this disease risk has been effectively mitigated in some cases with the use of trailer washing, disinfection protocols, and thermo-assisted drying and decontamination (TADD) systems. This paper summarizes four studies that evaluated individual aspects of trailer sanitation programs including TADD and multiple disinfectants alone, as well several protocols that include washing, disinfection and TADD.
118. Thompson, RW. (2001) Transmission of pathogens via transportation vehicles. Retrieved from the University of Minnesota Digital Conservancy.
Link: <https://hdl.handle.net/11299/147436>
Outbreaks of Foot and Mouth Disease (FMD) and Classical Swine Fever (CSF) in Europe and the United Kingdom, have raised our awareness of disease transmission. Realizing how rapidly these diseases spread, industry must restrict pathogen transmission at all production levels. Our focus in this presentation will be on transportation. Because of the increasing movement of pigs in multisite production, the economics of finishing pigs in the Midwest, plus location of the US packing industry, the chances of transmission of respiratory or enteric organisms have increased. All trucks, trailers, and other vehicles used for transporting animals, animal products, products, feed, offal, and contaminated equipment are a potential risk in the spread of disease.
119. Ting-Hui Lin *et al.* A single mutation in bovine influenza H5N1 hemagglutinin switches specificity to human receptors. *Science* **386**,1128-1134(2024).
Link: [A single mutation in bovine influenza H5N1 hemagglutinin switches specificity](#)

and Cancer Risk in Older Women: The Iowa Women's Health Study, *Epidemiology*: May 2001 - Volume 12 - Issue 3 - p 327-338

Link: [Municipal Drinking Water Nitrate Level and Cancer Risk](#)

Nitrate contamination of drinking water may increase cancer risk, because nitrate is endogenously reduced to nitrite and subsequent nitrosation reactions give rise to N-nitroso compounds; these compounds are highly carcinogenic and can act systemically. We analyzed cancer incidence in a cohort of 21,977 Iowa women who were 55–69 years of age at baseline in 1986 and had used the same water supply more than 10 years (87% >20 years); 16,541 of these women were on a municipal supply, and the remainder used a private well. We assessed nitrate exposure from 1955 through 1988 using public databases for municipal water supplies in Iowa (quartile cutpoints: 0.36, 1.01, and 2.46 mg per liter nitrate-nitrogen). As no individual water consumption data were available, we assigned each woman an average level of exposure calculated on a community basis; no nitrate data were available for women using private wells. Cancer incidence (N = 3,150 cases) from 1986 through 1998 was determined by linkage to the Iowa Cancer Registry. For all cancers, there was no association with increasing nitrate in drinking water, nor were there clear and consistent associations for non-Hodgkin lymphoma; leukemia; melanoma; or cancers of the colon, breast, lung, pancreas, or kidney. There were positive associations for bladder cancer [relative risks (RRs) across nitrate quartiles = 1, 1.69, 1.10, and 2.83] and ovarian cancer (RR = 1, 1.52, 1.81, and 1.84), and inverse associations for uterine cancer (RR = 1, 0.86, 0.86, and 0.55) and rectal cancer (RR = 1, 0.72, 0.95, and 0.47) after adjustment for a variety of cancer risk/protective factors, agents that affect nitrosation (smoking, vitamin C, and vitamin E intake), dietary nitrate, and water source. Similar results were obtained when analyses were restricted to nitrate level in drinking water from 1955 through 1964. The positive association for bladder cancer is consistent with some previous data; the associations for ovarian, uterine, and rectal cancer were unexpected.

127. Wichmann F, Udikovic-Kolic N, Andrew S, Handelsman J. Diverse antibiotic resistance genes in dairy cow manure. *MBio*. 2014; 5(2):e01017-13.

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3993861/>

Application of manure from antibiotic-treated animals to crops facilitates the dissemination of antibiotic resistance determinants into the environment. However, our knowledge of the identity, diversity, and patterns of distribution of these antibiotic resistance determinants remains limited. We used a new combination of methods to examine the resistome of dairy cow manure, a common soil amendment. Metagenomic libraries constructed with DNA extracted from manure were screened for resistance to beta-lactams, phenicols, aminoglycosides, and tetracyclines. Functional screening of fosmid and small-insert libraries identified 80 different antibiotic resistance genes whose deduced protein sequences were on average 50 to 60% identical to sequences deposited in GenBank. The resistance genes were frequently found in clusters and originated from a taxonomically diverse set of species, suggesting that some microorganisms in manure harbor multiple resistance genes. Furthermore, amid the great genetic diversity in manure, we discovered a novel Glade of chloramphenicol acetyltransferases. Our study combined functional metagenomics with third-generation PacBio sequencing to significantly extend the roster of functional antibiotic resistance genes found in animal gut bacteria, providing a particularly broad resource for understanding the origins and dispersal of antibiotic resistance genes in agriculture and clinical settings. The increasing prevalence of antibiotic resistance among bacteria is one of the most intractable challenges in 21st-century public health. The origins of resistance are complex, and a better understanding of the impacts of antibiotics used on farms would produce a more robust platform for public policy. Microbiomes of farm animals are reservoirs of antibiotic resistance genes, which may affect distribution of antibiotic resistance genes in human pathogens. Previous studies have focused on antibiotic resistance genes in manures of animals subjected to intensive antibiotic use, such as pigs and chickens. Cow manure has received less attention, although it is commonly used in crop production. Here, we report the

agencies. Fifty-nine percent of the accidents occurred during the early morning hours from midnight to 9:00 am and 80% involved a single vehicle. Driver error was blamed for 85% of the wrecks. In 83% of the accidents, the vehicle rolled over and 84% of the truckers tipped over on their right side. In North America, vehicles travel on the right-hand side of the road and if a driver falls asleep at the wheel he usually drifts off toward the right. Driver fatigue is the most likely explanation for many of these accidents.

132. Zhang, Yu. et al. Characterization of Volatile Organic Compound (VOC) Emissions from Swine Manure Biogas Digestate Storage. *Atmosphere* 2019, 10, 411.

Link: [Characterization of Volatile Organic Compound \(VOC\) Emissions from Swine Manure...](#)

Livestock manure is one of the major sources of volatile organic compound (VOC) emissions; however, characteristics of VOCs emitted from digestate storage, which is a common manure practice, remain unclear. The objective of this study was to characterize VOC emissions during storage through the dynamic emission vessel method, to identify the VOC emissions that have potential odor and/or toxic effects. The results revealed the detection of 49 VOCs with seven classes.

University Programs

133. Chippewa Valley Technical College. Schwartz, Mark. Course Questions. *Email: September 20, 2024*

Link: [Schwartz, Mike email on firefighting training.pdf \(wsimg.com\)](#)

134. Drake University Agricultural Law Center. Manure Agreement Decision Making Tool

Link: [Drake Decision Making Tool](#)

135. Center for Food Security and Public Health, Iowa State University. Prepare for animal disease threats.

Link: [CFSPH - Center for Food Security and Public Health \(iastate.edu\)](#)

African Swine Fever was confirmed for the first time in recent years in samples from pigs in the Dominican Republic on July 28. Keeping this transboundary disease out is key.

136. Iowa State University, Center for Food Security and Public Health, 2021 *Protecting Your Herd/Flock Biosecurity Tip Sheet*.

Link: <https://www.cfsph.iastate.edu/Assets/tip-sheet-protecting-your-herd-flock.pdf>

This sheet describes basic biosecurity practices to keep disease out of a facility, and to avoid transport of disease within a facility or to the outside of a facility

137. Mississippi State University Extension. Composting Poultry Mortality: A Critical Daily Management Chore. Publication 2960 (POD-05-19)

Link: [Compositing Poultry Mortality: A Critical Daily Management Chore](#)

In most cases, daily mortality losses are small but continuous throughout the flock grow-out period. Therefore, dead bird disposal is a daily chore associated with chicken production. In addition to producing a usable end product, composting this daily mortality is cost-effective, environmentally sound, and bio secure.

138. Penn State Extension. Anaerobic Digestion: Biogas Production and Odor Reduction. March 9, 2023a

Link: [Anaerobic Digestion: Biogas Production and Odor Reduction](#)

I think until we have more willingness by the industry and the ability of the USDA to actually really address this in a much more vigorous way, everybody's just kind of hoping it's going to burn out. And it might, but it might not. And if it doesn't, we will all be asked the question, what did we do to actually address this? And I can tell you, and I say this very carefully and very thoughtfully, I worry that one day we could wake up and have everyone look to us and say, if you thought they did a bad job in Wuhan with COVID, look what you guys did. And they would be right. I know this is harsh, but I really feel very strongly that this, in fact, is a real challenge before us that we need to get off the dime and provide a much different approach."

143. University of Minnesota. Enhanced Passive Surveillance for ASF and CSF. *Swine in Minnesota*. September 24, 2021

Link: [Enhanced Passive Surveillance for ASF and CSF](#)

Center for Animal Health and Food Safety at the University of Minnesota shares preliminary results regarding a project looking at enhanced surveillance for two Foreign Animal Diseases: African Swine Fever and Classical Swine Fever.

144. University of Minnesota. Operation Guidance Manual for Harvest Facilities during FAD/EDI Investigations. October 2015

Link: [Operation Guidance Manual for Harvest Facilities](#)

This document provides guidance for livestock harvesting facilities operating during a foreign animal disease (FAD) or an emerging disease incident (EDI) investigation. Includes Issues for Consideration and General Recommendations for Facilities. Outlines actions that a facility can take to better prepare for a potential FAD/EDI, while considering individual facility needs and continuity of business concerns, as well as concerns about potential disease spread.

145. University of Minnesota. Risk Assessment for the Transmission of Foot and Mouth Disease via Movement of Swine and Cattle Carcasses from FMD-infected Premises to a Disposal Site. February 18, 2014.

Link: [Carcass Movement RA Final UMN](#)

Time for disease detection was estimated by a disease spread model to be between 4-10 days for swine and beef cattle and 3-9 days for dairy cattle premises of different sizes. Total time from infection to depopulation (including detection and confirmation) for the first FMD infected case was estimated to be between 10-15 days for swine, 8-12 days for dairy and 10-14 days for beef cattle premises. The average concentration of FMDv in a carcass in experimental inoculation studies was 103 Plaque Forming Unit per gram (PFU/g) for a pig carcass and 106 PFU/g for a cattle carcass. The total amount of infected carcasses moved to the disposal site (relative to the size of the animal carcass and the capacity of the truck trailer) was between 23-390 cattle carcasses and 117-780 pig carcasses per truck. Any small amount of body fluids (1 mL) would contain virus that is equal and greatly exceeds the infective dose by oral and inhalation route for pigs and cattle. The likelihood that swine and cattle carcasses moved from FMD positive premises will contain an infective dose was high. The use of a Bio-Zip™ bag in a standard rendering truck (tailgate sealed and tarp cover) reduces the likelihood of leakage, spillage and aerosolization to negligible.

146. University of Minnesota. Newly funded: Investigating swine industry biocontainment strategies for airborne diseases. August 27, 2021

Link: [Swine industry biocontainment strategies for airborne diseases](#)

Airborne animal diseases in today's agricultural settings are difficult to contain. Let's say a pig raised in confinement with other swine contracts porcine reproductive and respiratory syndrome virus (PRRS); more than likely, the swine are in a controlled ventilated environment, where exhaust fans move airborne particles to the outdoors. In short order, air containing PRRS virus

electricity generation. Are California's subsidies for digesters set at the right value? In this article, I answer that question. In the process, I make three points.

1. The cost of an anaerobic digester is 10 times the market value of the gas it produces
2. Anaerobic digesters are valuable because they prevent methane emissions, but they are expensive
3. Profit from digesters changes dramatically over time due to fluctuations in the value of credits in California's low carbon fuel standard

151. Washington State University. *Dairy Cow Mortality Management: The dairy cow certificate of death* December 21, 2023

Link: [Dairy cow mortality data management](#)

Dairy cow mortality levels in the United States have been increasing over time. This is both a financial concern and an important animal welfare issue. Summary studies of dairy cow removal have been in the literature for decades but information specifically related to dairy cow mortality has been sparse. The increase in dairy cow mortality has generated concern within the industry, yet no standard exists by which to define what might be considered the 'natural' or 'normal' level of mortality in dairy cow production. Historical data suggest that dairy cow mortality ranged between 1 and 5% of rolling herd inventory per year into the 1970's, while current estimates suggest an average of 8 to 10% mortality in dairy herds across the U.S. with a range between 2 and 15%.

Regulatory & Court Documents

152. California Department of Food and Agriculture. Proposition 12 Implementation Plan.

Link: [CDFA - Proposition 12 Implementation \(ca.gov\)](#)

153. California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, 2010, *Groundwater Quality Protection Strategy Central Valley Region "Roadmap"*

Link: https://www.waterboards.ca.gov/centralvalley/water_issues/groundwater_quality/2010aug_gwq_protect_strat_approved.pdf

Section 4.1 Confined Animal Facilities Page 34-35, Dairy General Order established a schedule for dischargers to develop and implement measures protective of water quality and confirm protection of groundwater quality through monitoring. Requirements of the General Order were phased to allow a systematic approach for implementation of regulatory measures recognizing available resources on behalf of dischargers, consultants, and the Central Valley Water Board. Measures required by the General Order are for both the dairy production area and land application area and include development of a Nutrient Management Plan by July 2009 with full implementation by 2012 and development of a Waste Management Plan by July 2010 and full implementation by 2012. The Dairy General Order requires each Discharger to immediately begin sampling each of the domestic and agricultural wells present at the dairy and discharges from any subsurface (tile) drains. Groundwater monitoring at existing dairies is necessary to: determine background groundwater quality; determine existing groundwater conditions near retention ponds, corrals, and land application areas; determine the effect of the improved management practices required in the Dairy General Order On groundwater quality.

154. Food & Water Watch. Octo 26, 2021. *Petition to Rescind the Air Consent Agreement and Enforce Clean Air Laws Against Animal Feeding Operations.*

Link: [FINAL EPA Petition re 2005 Air Consent Agreement.docx \(foodandwaterwatch.org\)](#)

Over sixteen years ago, the Environmental Protection Agency (EPA), announced an Agreement and Final Order it had secretly negotiated with the National Pork Producers Council. In the agreement, EPA refrained from enforcing key air pollution control and public disclosure laws

needed reduction in the loading of phosphorus from its contributing basin in order to achieve water quality standards.

159. National Fire Protection Agency. Hawes, Meredith. Questions about Fire Training and CAFOS, Manure Digesters. *Email: April 5, 2023*
Link: [Hawes, Meredith NPFA fire fighting.pdf](#)
160. National Fire Protection Association. NFPA 1141 Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas. 2017
Link: [NFPA 1141: Standard for Fire Protection for Wildland, Rural, and Suburban Areas](#)
Provides requirements for the development of fire protection and emergency services infrastructure to make sure that wildland, rural, and suburban areas undergoing land use changes or land development have the resources and strategies in place to protect people and property from fire dangers, and allow fire fighters to do their jobs safely and effectively.
161. National Fire Protection Association. NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting. 2022
Link: [NFPA 1142: Standard on Water Supplies for Suburban and Rural Firefighting](#)
An adequate and reliable municipal-type water supply is sufficient every day of the year to control and extinguish anticipated fires in the jurisdiction. NFPA 1142 identifies minimum standards to assist rural and suburban fire departments in developing sufficient water supplies where no in-ground hydrant system, or an inadequate one, exists. Provides methods for determining water supply requirements based on occupancy and construction classifications. Also provides information regarding apparatus construction for water tankers.
162. National Fire Protection Association. NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fires. 2018
Link: [NFPA 1144: Standard for Reducing Structure Ignition Hazards from Wildland Fire](#)
This standard provides a methodology to assess wildland fire ignition hazards around existing structures and new structures located in wildland interface areas. Also provides minimum requirements for new construction to reduce the potential of structure ignition from wildland fires.
163. National Fire Protection Association. NFPA 150 Fire and Life Safety in Animal Housing Code. 2022
Link: <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=150>
This code provides the minimum requirements for the design, construction, fire protection, and classification of animal housing facilities.
164. North Carolina Department of Environmental Quality. Title VI: Increasing Equity, Transparency, and Environmental Protection in the Permitting of Swine Operations. Attachment C: Updated Odor Control Checklist May 4, 2020
Link: [Updated Odor Control Checklist.pdf](#)
165. Pierce County, Wisconsin - Land Use Permit Required Information Form.
Link: [Pierce County - Land Use Permit Required Information Form](#)
166. Polk County Extension - University of Wisconsin. Sample Manure Management Agreement.
Link: [Manure Management Agreement \(wisc.edu\)](#)

As a result, DATCP staff issued a letter to the county that the ordinance is vulnerable to legal challenge.

170. St. Croix County, Wisconsin Community Development Committee (CDC). February 20, 2020 letter to Wisconsin DNR

Link: [SCC-CDC-letter-to-DNR-ESD-2020.pdf](#)

The documented violations and citizen concerns together are the reason this letter was prepared. Along with close scrutiny of the WPDES re-authorization application, CDC asks that additional measures and accountability be included in WPDES Permit 00593315-04-0 if the DNR chooses to re-issue the permit to Emerald Sky Dairy. The CDC requests full and quick enforcement of manure application rules and statutes for CAFO's located in St. Croix County. According to the Wisconsin Land and Water Conservation Association, loss of nutrients from cropland and pastures is the largest source of nonpoint source nutrient pollution in surface and groundwater in Wisconsin.

171. St. Croix County, Wisconsin Zoning Board of Adjustment. Findings, Conclusions and decisions. September 26, 2019

Link: [Findings Of Fact Pleasant Valley Digester.pdf](#)

Denial of a Conditional Use Permit to a digester developer in 2019 based on nine reasons it would be substantially adverse to property values in the neighborhood affected.

172. Town of Laketown, Polk County, Wisconsin. Town of Laketown Comprehensive Plan. October 27, 2009

Link: [Town of Laketown Comprehensive Plan](#)

In July of 2007 Polk County, along with twenty-five of its municipalities, was awarded a multi-jurisdictional Comprehensive Planning Grant through the Wisconsin Department of Administration to develop Comprehensive Plans. The Town of Laketown participated in the grant and began working on the plan in September of 2007. In order to review the issues and opportunities unique to the Town of Laketown, the following will be addresses.

173. Town of Laketown, Polk County, Wisconsin. Moratorium on Livestock Facility Licensing Committee Report. December 22, 2020

Link: [Laketown Livestock Facility Report](#)

Study, review, consider and determine whether amendments to the Large Scale Development Ordinance or the creation of a Livestock Facilities Licensing Ordinance or other ordinances are required to protect the environment, public health or safety and property in Laketown Township in light of the unique environment and the key concerns identified in the Town of Laketown Comprehensive Plan.

174. United Nations Food and Agriculture Organization. 2020 Global control of African swine fever - 2020 to 2025. Paris

Link: [Global control of African swine fever \(fao.org\)](#)

175. United States Center for Disease Control. *Avian Influenza (Bird Flu) Situation Summary for Mammals*

Link: [Avian Influenza \(Bird Flu\) Situation Summary for Mammals](#)

This site provides regular updates and information on the impact of avian flu on humans, dairy cows and other mammals. There are also safety factsheets in English, Spanish, K'iche', and Nahuatl for the largely immigrant dairy workers.

the infected wild boar was found. Samples taken from bones of the decomposing carcass of the wild boar suggest that ASF entered Germany several weeks ago, indicating that additional ASF detections are likely. Search parties are looking for more dead boar carcasses in the area.

183. United States Department of Agriculture Foreign Agriculture Service. 2020 U.S. Agricultural Export Yearbook.

Link: [2020-ag-export-yearbook.pdf \(usda.gov\)](https://www.usda.gov/media/press-releases/2021/01/2020-ag-export-yearbook.pdf)

Provides a statistical summary of U.S. agricultural commodity exports to the world. The 16 product groups or commodity aggregations, displayed in the Yearbook, are based on the United States' largest export categories. The United States' top 15 export destinations are included as well as a page for the United Kingdom (UK). The European Union (EU27+UK), a customs union comprised of 28 member states, is included as a single trading partner. The only exception is that the UK has its own yearbook page given the importance of its withdrawal from the EU-28. The top 14 export markets represent 80 percent of total U.S. agricultural exports in 2020.

184. United States Department of Agriculture - Secretary Vilsack Message on African Swine Fever.

Link: [African Swine Fever Message from USDA Secretary Tom Vilsack](#)

African swine fever (ASF) is a highly contagious and deadly viral disease affecting both domestic and feral swine of all ages. ASF has never been found in the United States – and we want to keep it that way. ASF is a devastating, deadly disease that would have a significant impact on U.S. livestock producers, their communities and the economy if it were found here. There is no treatment or vaccine available for this disease.

185. United States Department of Agriculture - *HPAI Response, Cleaning and Disinfecting Basics* October 5, 2022

Link: [Cleaning & Disinfection Basics \(Virus Elimination\)](#)

All previously highly pathogenic avian influenza (HPAI) Infected Premises must be both CLEANED and DISINFECTED. Cleaning and disinfection practices during an outbreak will focus on virus elimination in a cost-effective manner.

186. United States Department of Agriculture - *2024 Highly Pathogenic Avian Influenza (H5N1) - Michigan Dairy Herd and Poultry Flock Summary* June 9, 2024

Link: [2024 Highly Pathogenic Avian Influenza \(H5N1\)](#)

In early April 2024, the Michigan Department of Agriculture and Rural Development (MDARD) invited a USDA Epidemiological Strike Team into Michigan to investigate the links between HPAI affected dairy premises and evidence of spillover into poultry premises. This report summarizes the findings from field epidemiological investigations of disease spread between premises for 15 dairy herds and 8 poultry flocks confirmed with HPAI genotype B3.13 in Michigan.

187. United States Department of Transportation, Federal Highway Administration, *Developing Safety Plans, A Manual for Local Rural Road Owners*. March 2012

Link: https://safety.fhwa.dot.gov/local_rural/training/fhwas12017/

Over three-fourths of all road miles in the U.S. are in rural areas. Of those three million miles of rural roads, almost 80 percent are owned and operated by local entities. In 2009, rural roads accounted for approximately 33 percent of the vehicle miles traveled in the U.S., but 56 percent of fatalities. Local roads in rural areas may have design elements that increase the risk of fatalities or serious injuries, such as inappropriately high speed limits, narrow lane widths and shoulders, steep ditches, or trees close to the roadway. Additionally, the low population density and sparse land use of rural communities can increase detection, response, and travel times for emergency

Evaluation of livestock carcass management options following a foreign animal disease outbreak. This assessment helps to inform a scientifically-based selection of environmentally protective methods. If carcasses cannot be managed immediately after death, the temporary carcass storage pile appears to be the most likely source to possibly expose nearby livestock. This assessment estimates livestock exposure to FMDv released from a temporary storage pile where carcasses are placed for 48 hours while further management is prepared. The assessment also considers seven well-established carcass management options with sufficient capacity for a large-scale mortality: on-site open burning (pyre), on-site air-curtain burning, on-site unlined burial, on-site composting, off-site fixed-facility incineration, off-site landfilling, and off-site carcass rendering

193. United States Environmental Protection Agency. *Handbook Groundwater and Well Head Protection*. EPA/625/R-94/001 September 1994

Link: [30004NCA.PDF \(epa.gov\)](#)

Anyone responsible for delineating the boundaries of a wellhead protection area, Identifying and evaluating potential contaminants, and Identifying wellhead management options Will find the handbook useful. Most of this handbook does not require specialized training in hydrogeology. Basic math skills, including high school-level algebra, are required.

194. United States Environmental Protection Agency. *Handbook Groundwater and Well Head Protection*. EPA/625/R-94/001 September 1994

Link: [30004NCA.PDF \(epa.gov\)](#)

Anyone responsible for delineating the boundaries of a wellhead protection area, Identifying and evaluating potential contaminants, and Identifying wellhead management options Will find the handbook useful. Most of this handbook does not require specialized training in hydrogeology. Basic math skills, including high school-level algebra, are required.

195. United States Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019*.

Link: [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015 | US EPA](#)

View the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015* (published 2017), developed by the U.S. Government to meet U.S. commitments under the United Nations Framework Convention on Climate Change (UNFCCC).

196. United States Environmental Protection Agency. *Literature review of contaminants in livestock and poultry manure and implications for water quality*. July 2013:1-137.

Link: <http://ow.ly/mTDw308qwbZ>

This EPA report on the environmental occurrence and potential effects of livestock and poultry manure related contaminants on water quality found that 60-70% of manure nitrogen and phosphorus may not be assimilated by the farmland where it was generated due to the increasing concentration of industrial animal production. The report also notes the variety of pathogens contained in livestock and poultry manure, as well as the potential for their spread to humans when surface and groundwater and food crops come into contact with manure through runoff, spills, and land-application of manure. It also refers to research indicating that antimicrobial use in livestock and poultry production has contributed to the occurrence of anti-microbial resistant pathogens in animal operations and nearby environments. The report also presents that manure discharge to surface waters can occur by various means and have deleterious effects on aquatic life and contribute to toxic algal blooms harmful to animals, and to humans when exposed via contact with contaminated drinking water or recreational use of contaminated water.

201. United States Environmental Protection Agency. April 19, 2013. *SAB Review of Emissions-Estimating Methodologies for Broiler Animal Feeding Operations and for Lagoons and Basins at Swine and Dairy Animal Feeding Operations*.
Link: [EPA-SAB-13-003](#)
This Science Advisory Board (SAB) report responds to a request from the EPA's Office of Air and Radiation (OAR) to review and provide advice on scientific issues associated with development of Emissions-Estimating Methodologies (EEMs) at two types of animal feeding operations (AFOs): EEMs for barns or buildings at confined broiler AFO facilities and an EEM for open lagoons and basins at swine and dairy AFO facilities. EEMs are tools for estimating air pollutant emissions from industries where site-specific emissions data are not available.
202. United State House of Representatives - Select Subcommittee on Coronavirus Crisis. Coronavirus Infections and Deaths Among Meatpacking Workers at Top Five Companies Were Nearly Three Times Higher than Previous Estimate. October 27, 2021
Link: [2021.10.27 Meatpacking Report.Final .pdf \(house.gov\)](#)
Newly obtained documents from five of the largest meatpacking conglomerates, which represent over 80 percent of the market for beef and over 60 percent of the market for pork in the United States—JBS USA Food Company (JBS), Tyson Foods, Inc. (Tyson), Smithfield Foods (Smithfield), Cargill Meat Solutions Corporation (Cargill), and National Beef Packing Company, LLC (National Beef)—reveal that coronavirus infections and deaths among their meatpacking workers were substantially higher than previously estimated.
203. Wisconsin Attorney General. AG Kaul Announces \$86,000 Agreement with Jon-De Capital, Inc. for Violations of Wisconsin's Wastewater Laws. October 1, 2021
Link: [AG Kaul Announces \\$86,000 Agreement with Jon-De Capital](#)
204. Wisconsin Circuit Court - St. Croix County Case no. 2019-000002. State of Wisconsin vs Emerald Sky Dairy. May 3, 2019.
Link: [Circuit court St. Croix 2019-000002](#)
205. Wisconsin Department of Agriculture Trade and Consumer Protection. Livestock Facility Siting Technical Expert Committee Four-Year Review of ATCP 51, April 23, 2019
Link: [LivestockSitingTECReport2019.pdf \(wi.gov\)](#)
The 2019 Technical Expert Committee (TEC) was convened as part of the Department of Agriculture Trade, and Consumer Protection's required four year review of the livestock facility siting standards under ch. ATCP 51, Wis. Admin. Code. The recommendations in this report reflect the consensus of the TEC on the issues presented for their consideration. The committee's recommendations are arranged according to the following issues: Odor Management and Setbacks, Manure and Other Waste Storage, Runoff Management, Monitoring, Completeness Determinations and Permit Modifications, and Groundwater Protections.
206. Wisconsin Department of Agriculture Trade and Consumer Protection. Chapter ATCP 10. Animal Disease and Movement.
Link: [Wisconsin Legislature: Chapter ATCP 10](#)
207. Wisconsin Department of Agriculture Trade and Consumer Protection. Chapter ATCP 93.90 Livestock Facility Siting and Expansion
Link: [Wisconsin Legislature: Chapter ATCP 93.90](#)

on reasonable and scientifically defensible findings of fact adopted by the county's governing authority and clearly show that those standards are needed to protect public health or safety.

213. Wisconsin Department of Health Services. Drinking Water: Nitrate.
Link: [Drinking Water: Nitrate | Wisconsin Department of Health Services](#)
214. Wisconsin Department of Natural Resources. Beneficial Management Practices for Mitigating Hazardous Air Emissions. December 13, 2010
Link: [Recommended Beneficial Management Practices](#)
Report from the Agricultural Waste Air Emissions Advisory Group identifies and recommends suitable best management practices (BMPs) for the reduction of emissions of hazardous air pollutants from various types of livestock operations in Wisconsin. Report focuses on two hazardous air contaminants: ammonia and hydrogen sulfide. As part of the development of 30 BMPs specific to ammonia and hydrogen sulfide, air quality co-benefits and potential impacts to water quality were identified.
215. Wisconsin Department of Natural Resources. CAFO Applications within Surface Water Quality Management Areas (SWQMA) NR 243 – CAFO Factsheet #1
Link: [NR 243 – CAFO Factsheet #1](#)
CAFO permits do not prohibit applications of manure and process wastewater within the SWQMA. However, CAFOs must take additional precautions when applying manure or process wastewater within the SWQMA. One option when applying manure within the SWQMA is to maintain a 100-foot setback from navigable waters and their conduits. Another option is to implement practices equal to or better than the 100-foot setback. There are other options which an operation can use to reduce the 100-foot setback to 25 feet on fields that have been in long-term no-till.
216. Wisconsin Department of Natural Resources Employee - Runoff Management Northwest Team
Link: [Contact Details](#)
217. Wisconsin Department of Natural Resources. Fisheries Survey Report for Rush River, Pierce and St. Croix County, Wisconsin 2021
Link: [Rush River 2021 Rotation Survey.pdf](#)
The Rush River watershed encompasses approximately 290 sq. miles in St. Croix and Pierce counties. There are 31.8 miles of Class I trout water and 6.1 miles of Class II trout water. Fourteen stations were sampled on the Rush River from upstream of the town of Centerville in St. Croix County downstream to Maiden Rock, Wisconsin. The Rush River supports a high-quality, high-density Brown Trout population fully supported by natural reproduction. Stocking was discontinued in 2007 because of increased natural reproduction. Natural reproduction and adult survival remain strong today, and densities are some of the highest within the state.
218. Wisconsin Department of Natural Resources. Impaired Water Condition List
Link: [Impaired Water Condition List](#)
Every two years, Sections 303(d) and 305(b) of the Clean Water Act (CWA) require states to publish a list of all waters not meeting water quality standards and an overall report on surface water quality status of all waters in the state.
219. Wisconsin Department of Natural Resources. Impaired Water Condition List - Eau Galle River
Link: [Impaired Waters Detail - Eau Galle River](#)
220. Wisconsin Department of Natural Resources. Impaired Water Condition List - Missouri Creek

The Wisconsin DNR struggles to keep up with the growth of CAFOs in Wisconsin from 135 in 2005 to 319 in 2020. For example, a 2016 study by the Legislative Audit Bureau of the WPDES program found that one-third of the CAFOs were operating under expired permits. In 2020, 91 (28%) CAFOs are operating under expired permits.

229. Wisconsin State Legislature. Chapter NR 151 Runoff Management

Link: [Wisconsin Legislature: Chapter NR 151](#)

230. Wisconsin Supreme Court Case No.: 2018AP59, July 8, 2021

Link: [WI Supreme Court - Clean WI vs WI DNR - High Capacity Wells](#)

Court ruled that the DNR must exercise its authority to protect Wisconsin's water resources. Case looked at the impact of a controversial 2011 law known as Act 21 on the DNR's ability to use its permitting process to protect water resources. Centered around eight high-capacity well permits issued by the DNR in the Central Sands region of the state for large-scale agriculture irrigation. Clean Wisconsin and co-litigant Pleasant Lake Management District challenged those permits, pointing to DNR's own statements that the wells would harm nearby lakes and streams. The Wisconsin Legislature and industry groups intervened, arguing that Act 21 prevented the DNR from taking steps through its permitting process to keep groundwater and waterways from harm. DNR changed its position shortly after the election of Governor Tony Evers to support Clean Wisconsin's challenges.

231. Wisconsin Supreme Court Case No.: 2016AP1688, July 8, 2021

Link: [WI Supreme Court - Clean WI & MEA vs WI DNR & Kinnard - Groundwater Monitoring](#)

Court ruled that the DNR must exercise its authority to protect Wisconsin's water resources. Case looked at the impact of a controversial 2011 law known as Act 21 on the DNR's ability to use its permitting process to protect water resources. Case involved a wastewater discharge permit issued by the DNR in 2012 for Kinnard Farms, a large dairy operation in Kewaunee County. Clean Wisconsin and co-litigant Midwest Environmental Advocates (MEA) argued the DNR should have required offsite groundwater monitoring and imposed an animal unit limit as conditions of its wastewater permit renewal to reduce the risk of manure contamination of nearby drinking water wells. The Wisconsin Legislature and Kinnard Farms dairy intervened, arguing that Act 21 prevented the DNR from taking steps through its permitting process to keep groundwater and waterways from harm. DNR changed its position shortly after the election of Governor Tony Evers to support Clean Wisconsin and MEA's challenges.

232. Wisconsin Supreme Court Case No.: 2016AP1688, July 8, 2021

Link: [WI Supreme Court - Clean WI & MEA vs WI DNR & Kinnard - Groundwater Monitoring](#)

233. Wisconsin Towns Association. Comments on Wisconsin Livestock Facility Siting – Draft Rule ATCP 51. 2019 pages 1-8.

Link: [DATCP Documents](#)

The proposed rules bring consistency and clarity to the law and ensure that standards are based on current scientific research and findings. We applaud the Board for demonstrating a willingness to engage the public and for its efforts at serving the broad needs of all Wisconsinites.

Media Articles

234. Agweek TV. JBS Pork Plant Euthanizing Market Hogs. April 29, 2020

Link: [AgweekTV: JBS Pork Plant Euthanizing Market Hogs - YouTube](#)

previous ownership, which culminated in a bankruptcy filing after accruing \$187,000 in fines for manure management failures and other environmental breaches.

242. Douglas, Leah. et al. US farmers call for vaccine option to fight bird flu as wildfowl migration begins. *Reuters September 27, 2024*

Link: [US farmers call for vaccine option to fight bird flu as wildfowl migration begins.](#)

U.S. farmers are increasing pressure on the Biden administration to allow vaccinations for chickens, turkeys and cows to protect them from bird flu infections that have devastated flocks for three years... However, USDA Secretary Vilsack said in a previously unreported March letter to members of Congress that a vaccine campaign would face challenges including potential barriers to exports. Many countries ban imports of vaccinated poultry because of concerns that the vaccine could mask the presence of the virus.

243. Egan, Dan. Changes in America's dairy land foul the waters of Green Bay. *Milwaukee Journal Sentinel*. September 2, 2021

Link: [Changes in America's Dairyland foul the waters of Green Bay \(jsonline.com\)](#)

244. Figuerosa, Alejandro. Controversial mega-dairy in Eastern Oregon Decommissioned. *OPB July 8, 2024*

Link: [Controversial mega-dairy in Eastern Oregon decommissioned](#)

Six years after Lost Valley Farm in Eastern Oregon shut down following more than 200 violations, the farm's current owner, Canyon Farms, has asked to decommission the site as a Confined Animal Feeding Operation, or CAFO. But the area still remains contaminated, and agriculture regulators are seeking public comment as they look to remediate the site.

245. Goldstein, Bennet. Wisconsin landowners criticize plans to spread pig manure *Wisconsin Watch* December 13, 2023

Link: [Wisconsin landowners criticize plans to spread pig manure](#)

State rules require CAFO owners to have a sufficient land base on which to apply livestock manure, but several property owners, who had permitted use of their fields for farming, discovered their property had been designated for manure spreading without their consent. They informed the Wisconsin Department of Natural Resources they opposed the proposed fertilizer source.

In March, Wisconsin Watch verified the discrepancies were more pronounced than opponents initially understood. Owners of more than 11% of the designated spreading acres forbid the use of their properties. Several Cumberland critics called the inclusion of unauthorized land in the plan the latest deception they have encountered since the farm was pitched. The practice might extend beyond Cumberland.

246. Goldstein, Nora. Insights into AD Developer Acquisition. *Biocycle* August 9, 2022

Link: [Insights into AD Developer Acquisition](#)

BlackRock Real Assets acquired Vanguard Renewables from Vision Ridge Partners in 2022. The deal, valued at \$700 million, will lead to BlackRock investing an estimated \$2 billion in growing Vanguard's portfolio of facilities.

247. Jervis, Rick. In Texas, nearly 18,000 cows in a single barn fire. Here's how it happened. *USA Today* December 27, 2023

Link: [<https://www.usatoday.com/story/news/investigations/2023/12/27/18000-cows-dead-fire-south-fork-dairy-dimmit-texas/72005659007/fire>](#)

days before it's determined. Farming experts in the area have said the lack of rain, coupled with high winds, have caused other farm building fires, KEYC reported.

254. Narishkin, A, Cameron, S, Barranco, V. Why 1 million pigs could be euthanized due to COVID-19-related supply chain issues. *Business Insider*. June 25, 2020

Link: [Why 1 Million Pigs May Be Euthanized](#)

Beginning in April 2020, the US experienced a meat shortage and unprecedented meat prices. That's because COVID-19 outbreaks in at least 167 meat-processing plants forced almost 40 plants to close. In an already compact industry, any one plant closure strands millions of pigs at farms. Could this break in the supply chain been avoided? Agricultural economist Jayson Lusk says automation in meat-processing plants could be one solution. Another? Smaller, vertically integrated farms, like Belcampo Meat Co. in Northern California.

255. National Pork Producers Council. Statement on Implementation of Defense Production Act. April 29, 2020.

Link: [NPPC Statement on Implementation of Defense Production Act](#)

President Trump last night invoked the Defense Production Act (DPA) to extend much-needed federal support to the U.S. pork production system. By triggering the DPA, the federal government will prioritize the continuity of pork processing plant operations. Howard "A.V." Roth, NPPC president and a producer from Wauzeka, Wisconsin.

256. Neeley, Todd. Farms Exempt from Emissions Reporting. *Ohio Country Journal* June 5, 2019

Link: [Farms Exempt From Emissions Reporting – Ohio Ag Net](#)

Farms are now exempt from reporting air emissions from animal waste after the EPA on Tuesday finalized a new rule amending the emergency release notification regulations under the Emergency Planning and Community Right-to-Know Act, or EPCRA.

257. Physician's Weekly. Second Health Care Worker Linked to Missouri Bird Flu Case Also Had Symptoms: CDC. *Physician's Weekly* September 24, 2024

Link: [Second health Care Worker Linked to Missouri Bird Flu Case Also Had Symptoms: CDC](#)

Another health care worker who was exposed to a Missouri patient who tested positive for bird flu developed respiratory symptoms but wasn't tested for the flu, U.S. health officials reported Friday. The news is rekindling worries of person-to-person transmission of the H5N1 bird flu strain

258. Redman, Harry. DNR sends back CAFO expansion application after accusations of false manure spreading agreements. *Wisconsin Examiner* August 26, 2024

Link: [DNR sends back CAFO expansion application after accusations of false...](#)

The Wisconsin Department of Natural Resources has sent back a factory farming operation's application to expand a Pierce County farm after local residents raised concerns that properties listed in the application as sites where manure would be spread on fields had never agreed to that arrangement.

259. Steenson, Bob. Iowa culls over a million chickens *Charles City Press* Oct 26, 2024

Link: [Iowa culls over a million chickens in aftermath of Pure Prairie Poultry closure](#)

The Iowa Department of Agriculture and Land Stewardship has confirmed the euthanizing of about 1.3 million broiler chickens left stranded on 13 Iowa farms following the closure of Pure Prairie Poultry in Charles City earlier this month. This marks the latest chapter in a month-long saga that began when the company notified state officials on Sept. 30 that it could no longer

**TOWN OF ROCK ELM
PIERCE COUNTY, WISCONSIN**

ORDINANCE NUMBER 2024-XX

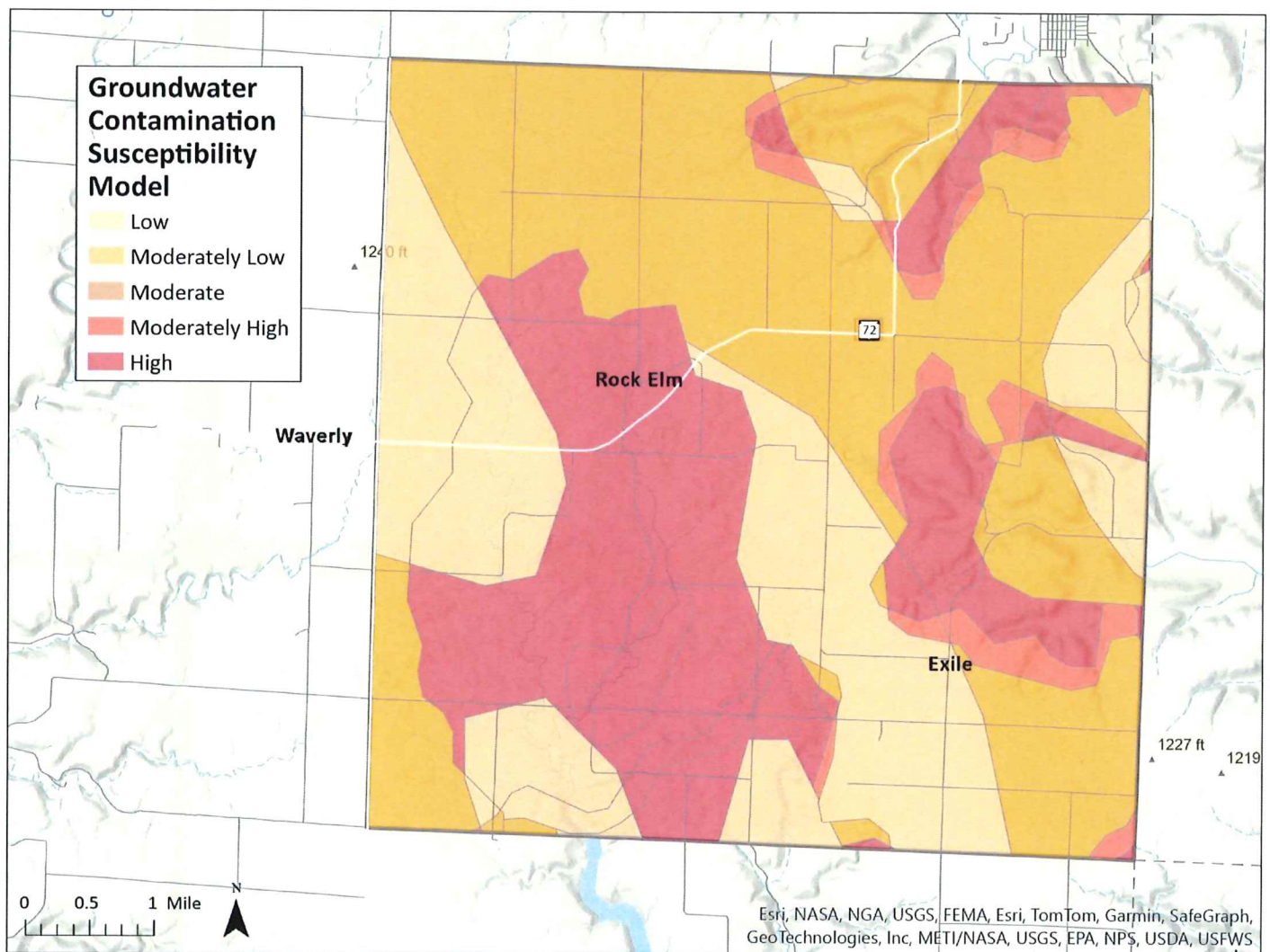
**CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO)
ORDINANCE**

APPENDIX B.

Map 1. Groundwater Susceptibility to Contamination Model - Local Finding 9

Five factors contribute to groundwater susceptibility, including: type of soil, bedrock and materials between soil and bedrock; depth to bedrock; and depth to groundwater. Data from the Wisconsin Department of Natural Resources Groundwater Susceptibility Model was divided into five evenly spread categories ranging from high to low. Of the town's total acreage approximately 28% is ranked high susceptibility to contamination, 4% moderately high, 41% moderate, 28% moderately low, and 0% ranked low susceptibility.

Groundwater Susceptibility to Contamination	Percent of Total
High	28%
Moderately High	4%
Moderate	41%
Moderately Low	28%
Low	0%



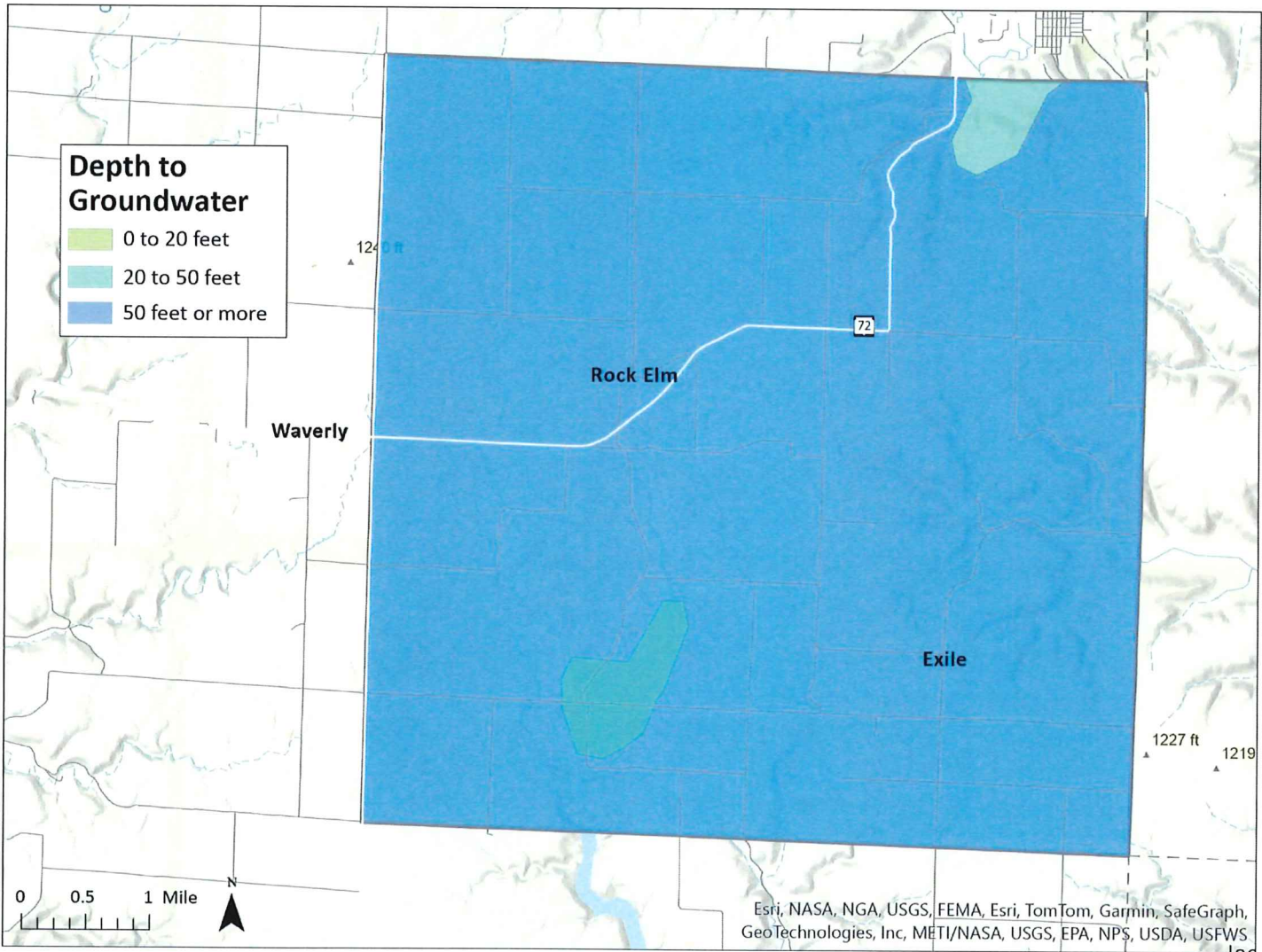
Source: Wisconsin Department of Natural Resources (DNR)

<https://geodata.wisc.edu/catalog/CF9E8298-63E5-43C7-9E8A-DEDCB93C1519>

Map 2. Depth to Groundwater - Local Finding 10

Approximately 0% of Rock Elm's total acres have groundwater within 20 feet of the land surface, 3% is 20 to 50 feet and 97% is over 50 feet from the land surface.

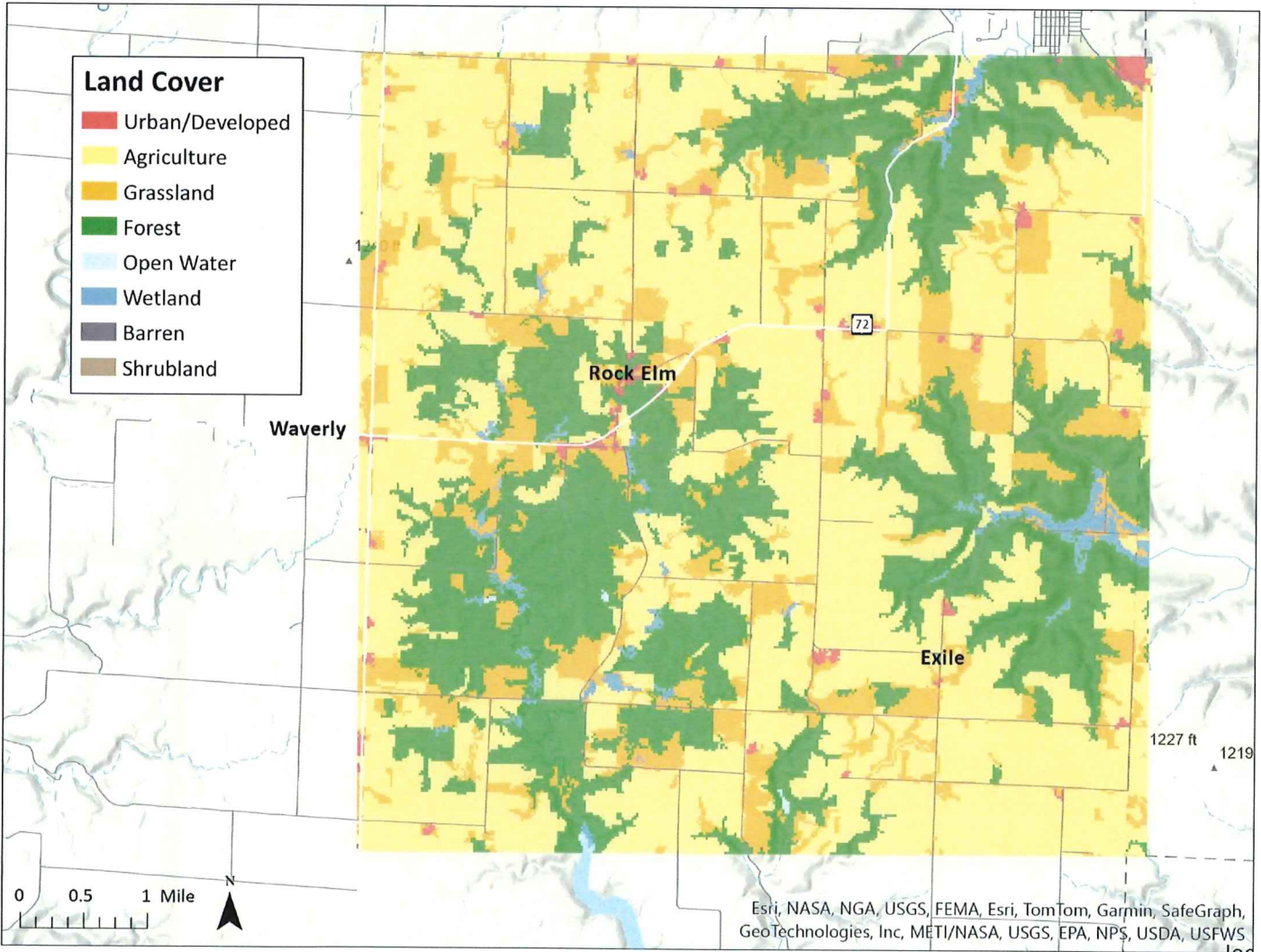
Depth to Groundwater	
1-20ft	0%
20ft - 50ft	3%
Over 50ft	97%



Source: Wisconsin DNR Groundwater Susceptibility Model, Depth to Groundwater
<https://data-wi-dnr.opendata.arcgis.com/datasets/wi-dnr::gcs-m-water-table-depth/about>

Map 3. Land Cover - Local Finding 11

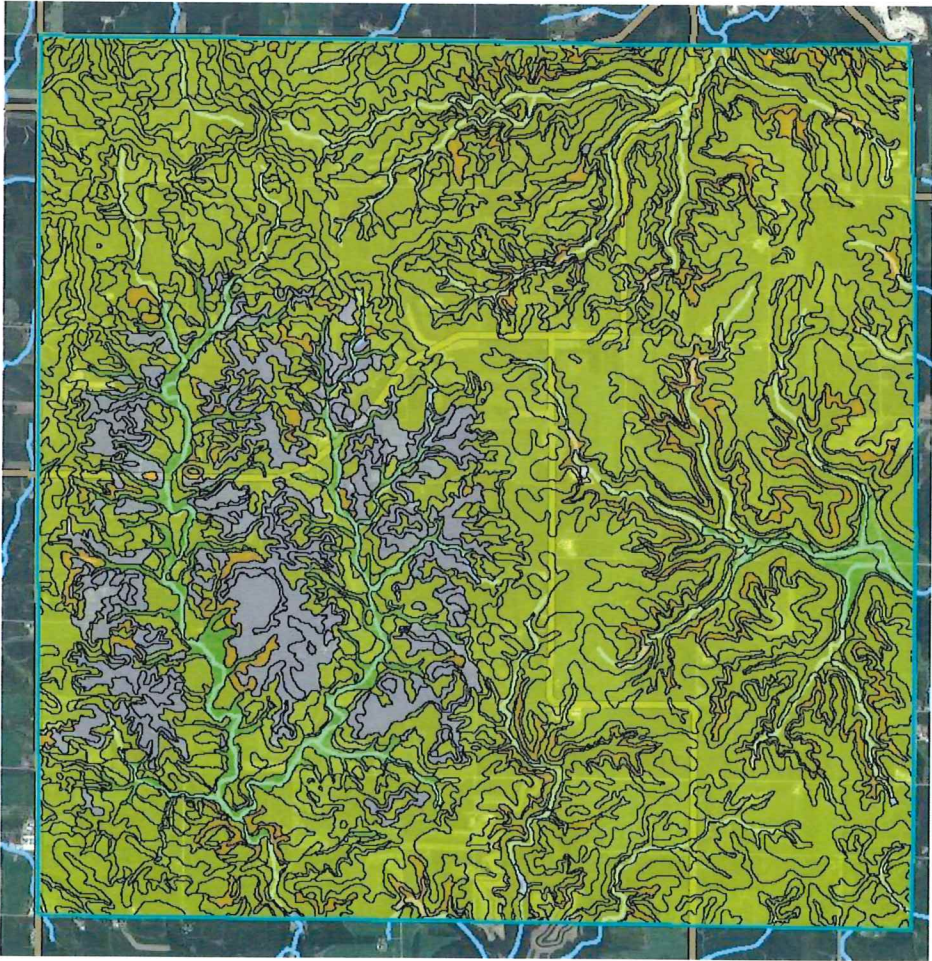
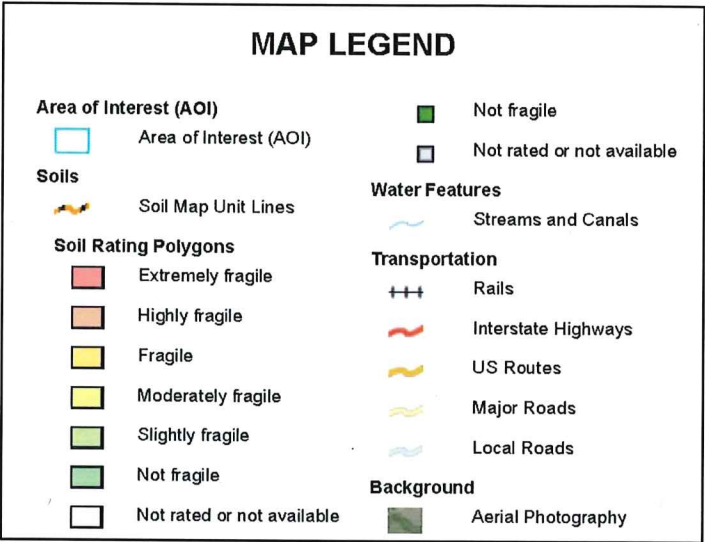
Land Cover - WiscLand (Not land use)	Percent
Agriculture	53%
Barren	0%
Forest	30%
Grassland	15%
Open Water	<1%
Shrubland	0%
Urban/Developed	1%
Wetland	1%



Source: Wisconsin Land Cover Data (WISCLAND 2.0)
<https://dnr.wisconsin.gov/maps/WISCLAND>

Map 4. Fragile Soil Index - Local Finding 12

Fragile soils are those that are most vulnerable to degradation. They are easily degraded and are highly susceptible to erosion with low resilience. They are characterized as having low organic matter contents, low water-stable aggregates and low soil structure. Fragile soils are generally located on sloping ground, have sparse plant cover and tend to be in arid and semiarid regions. A fragile soil index interpretation was developed to rate soils based on their fragility. The index can be used in conservation and watershed planning to assist in identifying soils and areas with greater vulnerability to degradation.



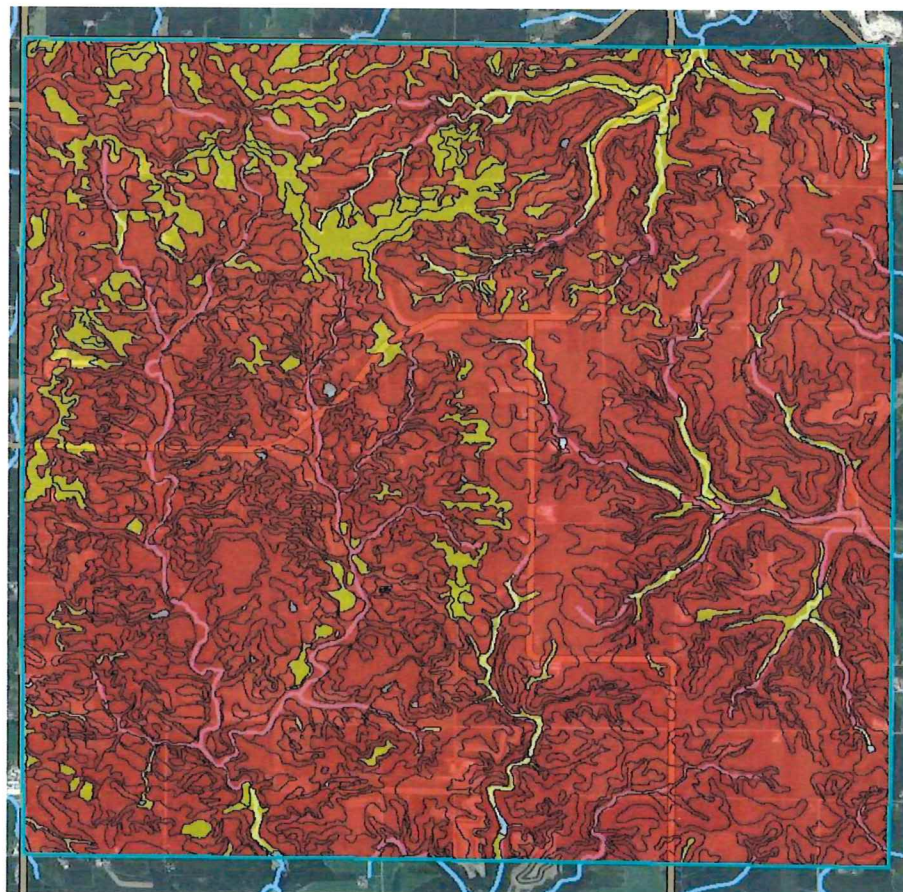
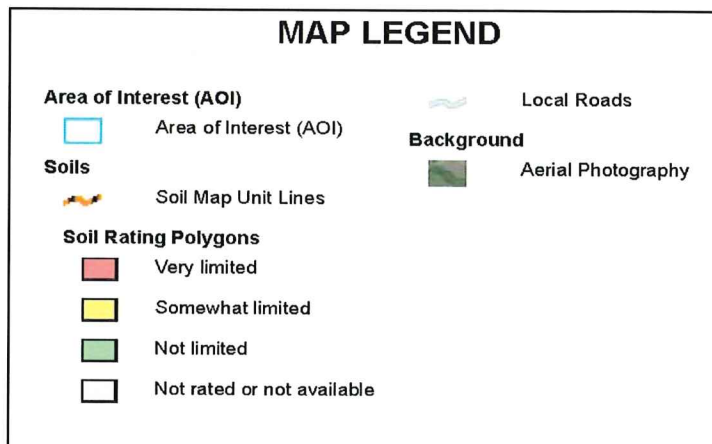
Fragile Soils	
Moderately Fragile	81%
Fragile	6%
Slightly Fragile	4%
Null or Not Rated	9%

Source: National Cooperative Soil Survey, USDA – NRCS
<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Map 5. Manure and Food-Processing Waste - Local Finding 13

These ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include saturated hydraulic conductivity (Ksat), depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

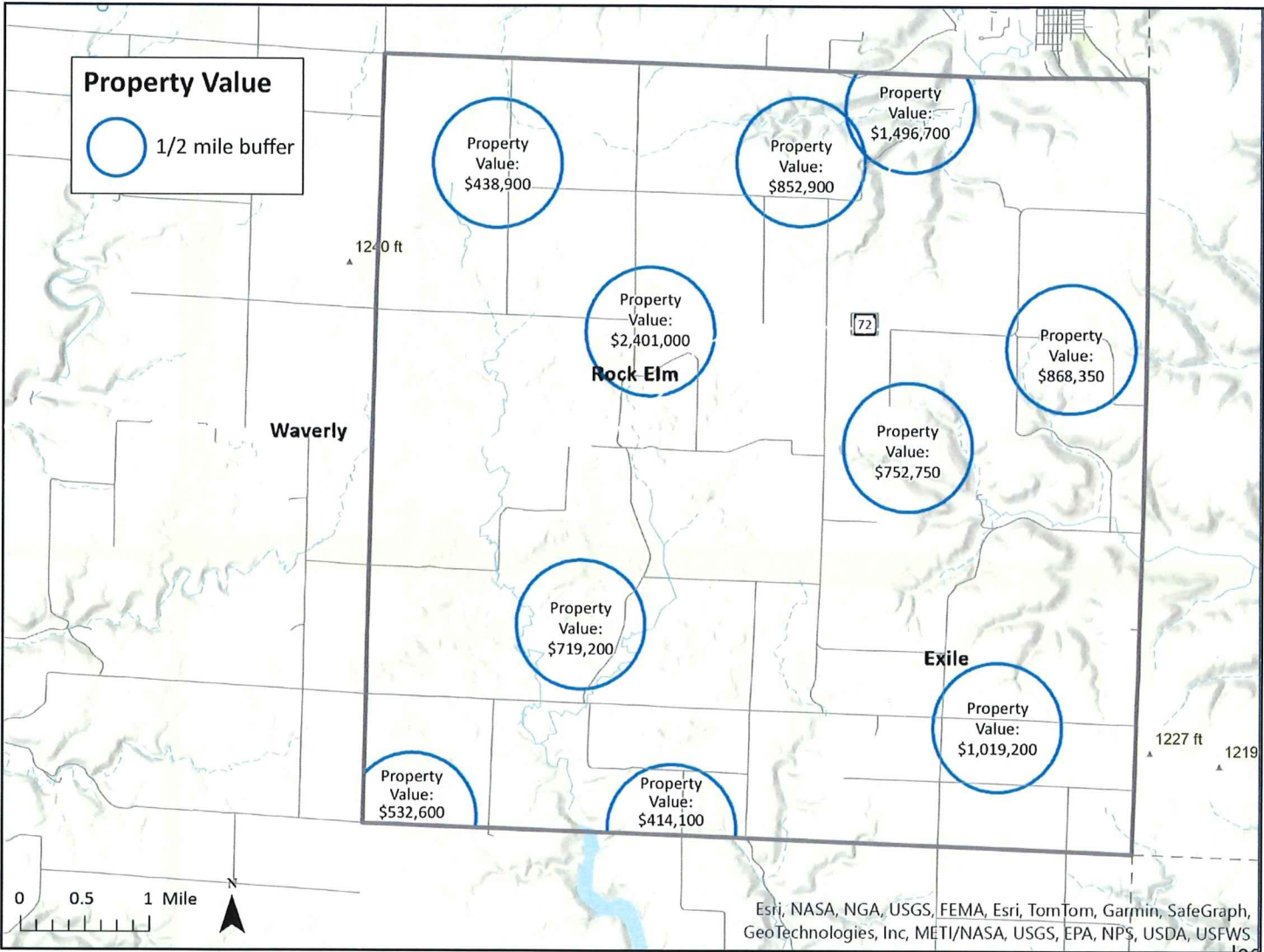
- **89% Very Limited** – indicates that soil has one or more features that are unfavorable for the specific use. Limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.
- **11% Somewhat Limited** – indicates that the soil has features that are moderately favorable for specified use. Limitations can be overcome or minimized by special planning, design, or installation.
- **<1% Not Limited or Not Rated**



Source: National Cooperative Soil Survey, USDA <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Map 6. Property Tax Values Within 1/2-mile radius of 10 theoretical CAFO Sites
Local Finding 20

Property values within 1/2 mile of 10 sites range in value from \$414,100 to \$2.4 million.

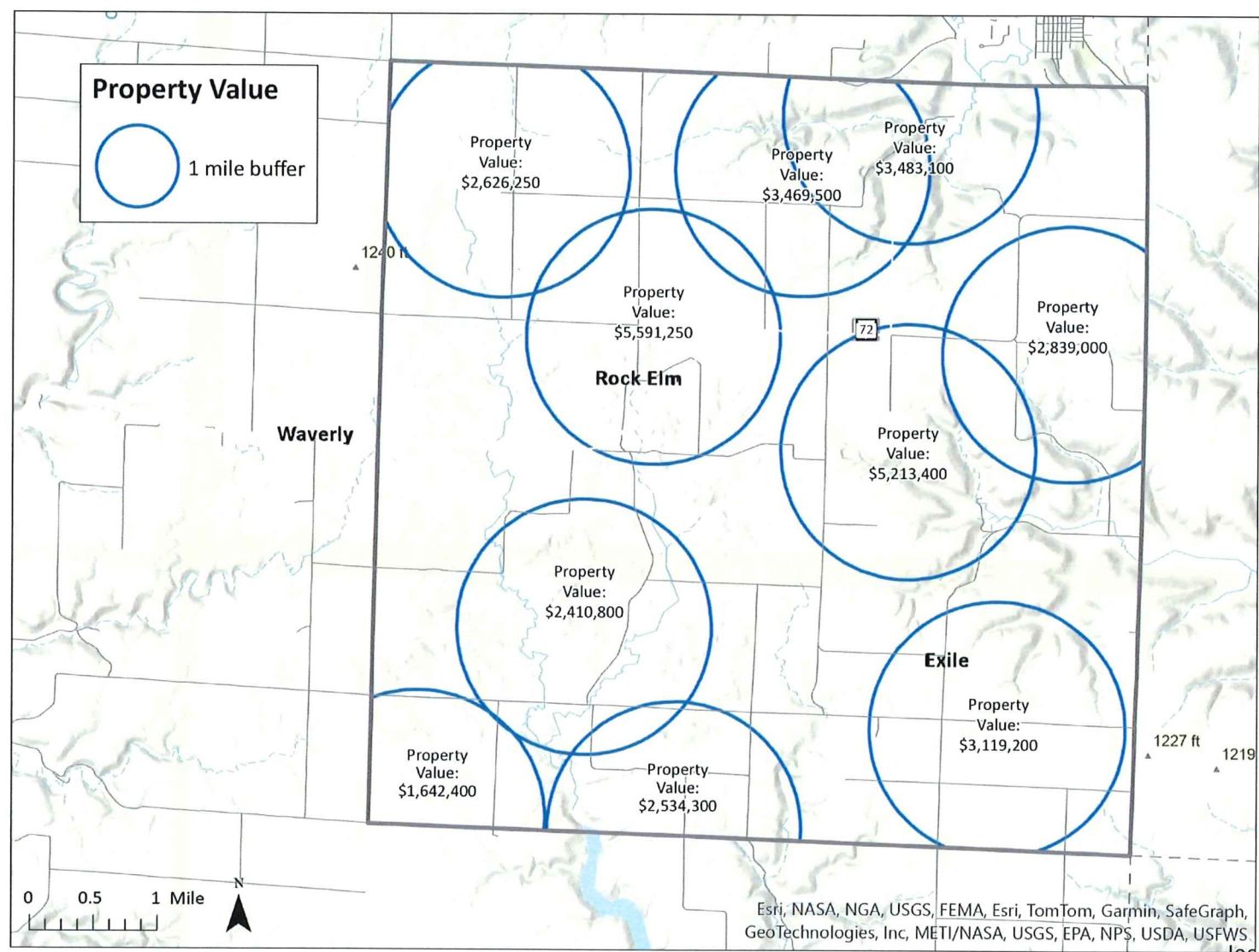


Source: 2023 Wisconsin County Parcel Data Pierce County, WI

<https://www.sco.wisc.edu/parcels/data-county/>

Map 7. Property Tax Values Within 1-mile radius of 10 theoretical CAFO Sites
Local Finding 20

Property values within 1-mile of 8 randomly selected sites would range in value of \$1.6 million and \$5.5 million.



Source: 2023 Wisconsin County Parcel Data – Pierce County, WI

<https://www.sco.wisc.edu/parcels/data-county/>

Concentrated Animal Feeding Operations (CAFO)
Permit Application
Town of Rock Elm, Pierce County, Wisconsin
Appendix C

Authority

The Applicant submitting this Application must be an owner of the entity proposing to operate the CAFO and sign the Application. The Application must also be signed by the property owner, who agrees to be bound by the same standards as the operator, and by one or more qualified and professionally licensed third party engineers or geoscientists who attest that they have prepared or have reviewed the plans and certify that the plans will meet the performance requirements in Section 8: Application Procedure.

Town Compensation

Upon executing and submitting a CAFO Permit Application to the Town Clerk, the Applicant shall include and sign a statement that the Applicant agrees to fully compensate the Town for all legal services, expert consulting services, and other expenses which may be reasonably incurred by the Town in reviewing and considering the Application, regardless of whether or not the Application for a permit is subsequently approved, with or without conditions, or denied by the Town Board. The Applicant statement shall also state that the Applicant agrees to fully compensate the Town for all legal services, expert consulting services and other expenses, for verifying and enforcing compliance with the terms of the permit, with or without conditions, if approved by the Town Board,

Application Fee

1. A non-refundable Application Fee of Three Dollars (\$3.00) per proposed animal unit up to 2000 animal units and One Dollar (\$1) per animal unit thereafter payable to the Town of Rock Elm shall accompany an Application for the purpose of offsetting all reasonable Town costs to review and process the Application.

Application Fee, Legal Name & Type of Business

Application Filing Fee: # _____ of Animal Units x \$1.00 per Animal Unit =
\$_____ (CAFO Ordinance Section 3.1 & Section 7.)

Date of Application: _____

Application for _____New, _____Modification, _____ Expanded animal housing or waste storage.

**Rock Elm Concentrated Animal Feeding Operations (CAFO)
Permit Application**

Authorized Contact Person

Name: _____

Phone: _____ E-mail: _____

Address: _____

City: _____ State _____ Zip _____

Print or type operator's name:

Legal Name of company:

Legal address of company:

Street _____

City: _____ State _____ Zip _____

Email: _____

Owner Signature

_____ Date: _____

Note: Signature of the Applicant authorizes the Town and its designees to enter upon the property to perform needed inspections at any time and on as many occasions as the town or it's a designee deems necessary without prior notice to Applicant.

Property Owner Signature

_____ Date: _____

Third Party Reviewer of Plans Signature:

_____ Date: _____

Rock Elm Concentrated Animal Feeding Operations (CAFO)

Permit Application

Land use

Describe current land uses within and immediately adjacent to the proposed CAFO site, including aerial photographs. For lands being used for crop production, include a description of crops currently being grown with an estimate of acreage of each crop.

Permits

The Applicant must obtain all required state and county permits and attach them to this Application. The Town will not proceed with Application procedure until all required state and county permits are complete.

Required Financial Assurance (CAFO Ordinance Section 9.)

1. Attach documentation, as detailed in the CAFO Ordinance - Section 9, that the Applicant and all contractors, subcontractors, agents and representatives can assure sufficient funds will be available for pollution clean-up, nuisance abatement, and proper closure of the operation if it is abandoned or otherwise ceases to operate. Applicants defined as CAFOs under Section 3 3. b. are not required to provide financial assurance.

Required Plans (CAFO Ordinance Section 8.)

The Application must be signed by the property owner, who agrees to be held by the same standards as the operator, and by one or more qualified and professionally licensed third party engineers or geoscientists who attest that they have prepared or have reviewed the plans and certify that they will meet the following performance requirements.

A. Infectious Disease Plan to prevent the spread to other animals, livestock and humans.

B. Waste Management Plan to detail how storage and management of waste and nutrients will prevent contamination of surface and groundwater. At a minimum, it must include:

1. Scientifically significant baseline data on the water quality of local human drinking and agricultural wells. (CAFO Ordinance Section 10.2.a.)
2. If applicable, an existing Nutrient Management Plan.
3. Explain how the waste management plan will attain state requirements under Wis. Stat. 281.16 (3)
 - a. No overflow of manure storage structures.
 - b. No unconfined manure pile in a water quality management area.
 - c. No direct runoff from a feedlot or stored manure into the waters of the state.
 - d. Limited access by livestock to waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod cover.

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E. Animal Transportation Plan in combination with Biosecurity and Animal Health plan, must provide for and demonstrate:

1. Safe transportation of all livestock to and from the CAFO in compliance with the USDA "28-hour rule under 49 USC Ch. 805.
2. Disinfection of transport trailers prior to loading and treatment of water used to disinfect trailers. All vehicles leaving CAFO premises must be thoroughly sanitized.
3. Ability to contact drivers and owners of previous livestock shipments.
4. Coordination with local traffic and road authorities to assure safe transport of the animals to prevent traffic accidents and provide the necessary emergency response measures in the event of an accident.
5. Traffic study that includes:
 - a. Identification of all roads used for delivery of supplies, food, and livestock to the facility including interstate, federal, state and county highways, town roads and private roads.
 - b. Traffic counts on all local non-interstate roads/highways, and projected traffic counts with special attention to less used roads.
 - c. Identification and evaluation of impact on congestion points, risk factors such as school traffic and high risk times of day.
 - d. Identification of tight turns that may need additional signage or improvements for safety.

F. Water Use Plan based on hydrogeological characterization study, including:

1. Estimated water use for drinking, cleaning, cooling and manure movement.
2. Pumping tests to assess whether groundwater levels and volumes are sufficient.
3. Identification of all onsite and nearby wells:
 - a. Identify and locate on a map all wells within five (5) miles of proposed facility.
 - b. Depth, date of installation of each well.
 - c. Pump rates, and hydraulic unit pumped from for each well.
4. Identification of all springs and artesian fed streams and water bodies within five (5) miles, including:
 - a. ponds
 - b. wetlands
 - c. single source aquifers
 - d. regional aquifers
 - e. lakes
5. Location on a map and characterization of artesian features, including:
 - a. size
 - b. depth
 - c. estimated flow rates for springs
 - d. geological formation(s) water comes from and is found in

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- a. Analysis of all RFDs in the county as well as the two nearest adjacent counties.
 - b. Meetings shall be held with these RFDs to discuss the current availability and future requirements necessary to fight a fire. At a minimum, discussion and documentation of the following items will be completed. Other items should be addressed if either the owner/operator or the rural fire departments identify a need:
 - i. Dispatching - Ability of current system and staff able to handle the increased call volume likely to be generated by the CAFO.
 - ii. Fire Station Locations - Current fire stations distribution, design and ability to service the changing demands related to the CAFO building and operations.
 - iii. Personnel - Any increased need for positions.
 - iv. Equipment - Ability of trucks, pumps, ladder trucks, etc. to address CAFO fires.
 - v. Personal Protective Equipment (PPE):
 - Portable Radios - enough to equip all responders on a shift.
 - Self-Contained Breathing Apparatus (SCBA)
 - Personal Alert Safety System (PASS) Devices as needed in an Immediately Dangerous to Health or Life (IDHL) environment
 - Personal Protective Clothing (PPC) - percentage of fire fighters equipped with PPC and what percentage over 10 years old?
 - c. Review of RFD's Community Risk Reduction Capacity:
 - Fire Prevention or Code Enforcement Program.
 - Inspections performance and permit approval process.
 - Hazard Mitigation Planning and Risk Assessment.
 - d. Potential funding needed to address items identified in number a. to c.
 - e. Coordination agreements as needed between RFDs.
- 3. Fire Water Supply Needs Analysis** to determine and ensure that there will be sufficient water supply to effectively contain a structural fire at the CAFO facility. The NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting, 2017 requirements are incorporated by reference. These requirements are summarized below.
- a. Determine minimum requirements for alternative water supplies for structural fire-fighting purposes in areas where the Town determines that adequate and reliable water supply systems for fire-fighting purposes do not otherwise exist.
 - b. Define an adequate and reliable municipal-type water supply as one that is sufficient every day of the year to control and extinguish anticipated fires.
 - c. Survey CAFO structures to obtain the following information:
 - Occupancy hazard
 - Type of construction (Per NFSA 150, 7.2.2 animal housing facilities will be Type II construction)

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automatic sprinkler system that fully meets the requirements of NFPA 13, NFPA 13D, or NFPA 13R (See Annex F of NFPA 1142)

- j. Automatic sprinkler systems that do not fully meet the requirements of NFPA 13, NFPA 13D, or NFPA 13R shall provide a water supply in accordance with Section 16.3.5.1.1 of the NFPA 150 Fire and Life Safety in Animal Housing Facilities Code.
- k. Minimum water supply shall be delivered in accordance with Table 9-1.
- l. Water delivery rate may be adjusted by the Town giving consideration to local conditions and need. The minimum water delivery rate shall not be less than 250 gpm (950 L/min).

Table 9-1 Minimum Water Delivery Rate to Fire Scene

Total Water Supply Required		Water Delivery Rate	
Gallons	Liters	GPM	L/min
<2,500	9,459	250	950
2,500-9,999	9,460-37,849	500	1,900
10,000-19,999	37,850-75,699	750	2,850
>20,000	>75,000	1,000	3,850

- m. Water supplies developed to meet this standard shall be permitted to be used for fighting fires in other structures or for use during other emergency activities.

4. Road Plan - Traffic study and road improvement needs analysis and road improvement construction plans will include:

- a. Identification of all roads used for delivery of supplies, food, and livestock to the facility including interstate, federal, state and county highways, town roads and private roads.
- b. Traffic counts on all local non-interstate roads/highways, and projected traffic counts with special attention to less used roads.
- c. Identification and evaluation of impact on congestion points as well as weight restrictions due to thawing.
- d. Identification of tight turns that may need additional signage or improvements for safety.
- e. Improvement needs analysis and road traffic and roadway improvement plans.
- f. Signed engineering approval for a. to f.
- g. Letters of conformance, on agency letterhead, stating that Application-submitted plans are complementary with and are in conformance with the associated traffic