TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 2022-10

AN ORDINANCE AMENDING TOWN OF TRADE LAKE ORDINANCE NO. 2021-07 AMENDED CONCENTRATED ANIMAL FEEDING OPERATIONS PERMIT MORATORIUM

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

WHEREAS, on November 11, 2021, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 2021-07 Concentrated Animal Feeding Operations Permit Moratorium (the "Permit Moratorium"). A copy of the adopting ordinance, as amended, is attached as **Exhibit A** and incorporated by reference;

WHEREAS, the Town's study of the possible impacts that the issuance of permits under Ordinance No. 01-2020 - Concentrated Animal Feeding Operations Ordinance (the "CAFO Permitting Ordinance") may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy remains ongoing;

WHEREAS, the Permit Moratorium expires by its terms on November 18, 2022; and

WHEREAS, to allow sufficient time to complete the study, the Town Board desires to extend the Permit Moratorium; and

NOW, THEREFORE, in consideration of the above Recitals, which are incorporated herein by reference, the Town Board of the Town of Trade Lake ordains as follows:

Section 1 -- AMENDMENT:

1.1 The language of Section 4—DURATION OF MORATORIUM, shall stricken in its entirety and replaced with the following:

~~The Moratorium shall expire at the end of one year following the effective date of this ordinance unless the Moratorium is extended by the Town Board.~~

The Moratorium shall expire December 31, 2023, unless the Moratorium is extended by the Town Board.

Section 2 -- EFFECTIVE DATE AND PUBLICATION:

2.1 This Ordinance shall be effective upon adoption and publication as required by law.

2.2 The Town Clerk shall properly publish this Ordinance as a Class 1 Notice or post this Ordinance in three locations as required under Wis. Stat. §60.80(1).

PASSED AND ADOPTED by the Town Board of the Town of Trade Lake, Wisconsin, this 13th day of October, 2022.

Ramona Moody, Chairperson

Scott Doornink, Supervisor

Adam Lesak, Supervisor

ATTEST:

Town Clerk

Posted 10/13/2022

EXHIBIT A

CONCENTRATED ANIMAL FEEDING OPERATIONS PERMIT MORATORIUM ORDINANCE

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 02-2020
CONCENTRATED ANIMAL FEEDING OPERATIONS PERMIT MORATORIUM

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

WHEREAS, on January 9, 2020, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 01-2020 - Concentrated Animal Feeding Operations Ordinance ("CAFO Permitting Ordinance"). A copy of the adopting ordinance is attached as **Exhibit A** and incorporated by reference;

WHEREAS, the purpose of the CAFO Permitting Ordinance is to effectively, efficiently and comprehensively regulate the operation of Large-Scale Concentrated Animal Feeding Operations of 1,000 animal units or greater in the Town of Trade Lake, 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, and to preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town of Trade Lake and to achieve water quality standards within the Town of Trade Lake.

WHEREAS, the Town and its residents have invested a substantial amount of time, money and effort in the development of the CAFO Permitting Ordinance, and it is in the best interests of the Town and the public health, safety and general welfare of its residents to continue to study the possible impacts of the issuance of permits under the CAFO Permitting Ordinance;

WHEREAS, the Town Board finds that a moratorium is necessary to allow the Town adequate time to complete its study of the possible impacts that the issuance of permits under the CAFO Permitting Ordinance may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy;

WHEREAS, the Town Board finds that a moratorium is necessary to allow Town residents and other members of the public an opportunity to fully participate in the study of these impacts;

WHEREAS, given the irreparable and unknown harm that may be caused by operation of CAFOs as defined by the CAFO Permitting Ordinance and the authorities referenced within the CAFO Permitting Ordinance as evidenced by Appendix A to the said Ordinance, the Town Board finds that immediate action is warranted; and,

WHEREAS, the Town Board wishes to impose a moratorium for only such time as is prudent and necessary to allow the Town to complete this phase of its study, and;

WHEREAS, the Town Board expects this moratorium will need to be in place for at least one year from its effective date;

NOW, THEREFORE, in consideration of the above Recitals, which are incorporated herein by reference, the Town Board of the Town of Trade Lake ordains as follows:

Section 1 -- TITLE AND PURPOSE:

1.1 Title. The title of this Ordinance is the Town of Trade Lake **Ordinance To Impose A Moratorium On Issuance Of Concentrated Feeding Operation Permits ("Moratorium" or "Ordinance").**

1.2 Purpose. The purpose of the Moratorium is to promote meaningful implementation of the Town's CAFO Permitting Ordinance. A Moratorium is necessary for this phase of the study of the possible impacts that the issuance of permits under the CAFO Permitting Ordinance may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy as set forth in the Recitals and Appendix A of the CAFO Permitting Ordinance consistent with the findings made by the Town Board in the Recitals, each and all of which are incorporated herein by reference.

Section 2 **- AUTHORITY:**

The Town Board relies on Wis. Stat. § 61.34, the general police powers of a village board, which have been conferred on the Town Board pursuant to Wis. Stat. §§ 60.10 (2)(c) and 60.22(3), and Wis. Stat. §§ 60.23.

Section 3 -- MORATORIUM IMPOSED:

3.1 For the duration of the Moratorium, the Town Board shall not consider or process any new applications or requests for the issuance of permits under the CAFO Permitting Ordinance unless expressly approved by the Town prior to enactment of this Moratorium.

3.2 The Town Board prohibits Town officials, employees, and/or consultants, from accepting, reviewing or acting upon applications or other similar requests for approval of activities that are or are likely to result in violation(s) of this Moratorium.

3.3 The Town Board withdraws the authority of any official or independent contractor to accept, review and/or act upon applications, other similar requests for approval of activities that are or are likely to result in violation(s) of this Moratorium.

Section 4 -- DURATION OF MORATORIUM:

The Moratorium shall expire at the end of one year following the effective date of this ordinance unless the Moratorium is extended by the Town Board.

Section 5 -- ACTION ANTICIPATED DURING MORATORIUM:

5.1 The Town Board shall complete a comprehensive review of the possible impacts of the issuance of permits under the CAFO Permitting Ordinance.

5.2 The Town Board may, at its discretion, retain experts, including but not limited experts in the fields of geology, hydrogeology, soils, immunology, public health, engineering, law, real estate, environmental protection and air quality.

5.3 The Town Board shall provide opportunities for public participation throughout the process, and consider the public health, safety, and general welfare of Town residents during its review process.

5.4 The Town Board shall report its findings and recommendations to the public prior to the expiration of the Moratorium.

5.5 In accordance with applicable statutes and ordinances, the Town Board shall act upon its findings and the recommendations from Town residents and the Town's consultants.

Section 6 -- EFFECTIVE DATE AND PUBLICATION:

6.1 This Ordinance shall be effective upon adoption and publication as required by law.

6.2 The Town Clerk shall properly publish this Ordinance as a Class 1 Notice or post this Ordinance in three locations as required under Wis. Stat. §60.80(1).

By signing below, we affirm that this Ordinance was adopted at a duly noticed meeting of the Town Board held on this 9th day of January, 2020.

Roger Hinrichs

Jeff Lade

ATTESTED BY:

By: Melissa McCoy, Clerk

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 03-2020

AN ORDINANCE AMENDING THE TOWN OF TRADE LAKE ORDINANCE NO. 02-2020 CONCENTRATED ANIMAL FEEDING OPERATIONS ORDINANCE MORATORIUM

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

WHEREAS, on January 9, 2020, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 01-2020 Concentrated Animal Feeding Operations Ordinance ("CAFO Permitting Ordinance"). A copy of the adopting ordinance is attached as Exhibit A and incorporated by reference;

WHEREAS, on January 9, 2020, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 02-2020 Concentrated Animal Feeding Operations Ordinance Moratorium ("CAFO Permitting Ordinance Moratorium"). A copy of the adopting ordinance is attached as Exhibit A and incorporated by reference; and

WHEREAS, the purpose of this Ordinance is to extend to the CAFO Permitting Ordinance Moratorium.

NOW, THEREFORE, in consideration of the above Recitals, which are incorporated herein by reference, the Town Board of the Town of Trade Lake ordains as follows:

Section 1 -- TITLE AND PURPOSE:

1.1 Title. The title of this Ordinance is the Town of Trade Lake Ordinance To Extend The Moratorium On Issuance Of Concentrated Feeding Operation Permits ("CAFO Permitting Ordinance Moratorium Extension").

1.2 Purpose. The purpose of the CAFO Permitting Ordinance Moratorium Extension is to allow additional time for review and study of the possible impacts that the issuance of permits under the CAFO Permitting Ordinance may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy as set forth in the Recitals and Appendix A of the CAFO Permitting Ordinance consistent with the findings made by the Town Board in the Recitals, each and all of which are incorporated herein by reference.

Section 2 -AUTHORITY:

The Town Board relies on Wis. Stat. § 61.34, the general police powers of a village board, which have been conferred on the Town Board pursuant to Wis. Stat. §§ 60.10 (2)(c) and 60.22(3), and Wis. Stat. §§ 60.23.

Section 3-- MORATORIUM EXTENSION IMPOSED:

3.1 For the duration of the CAFO Permitting Ordinance Moratorium Extension, the Town Board shall not consider or process any new applications or requests for the issuance of permits under the CAFO Permitting Ordinance.

3.2 The Town Board prohibits Town officials, employees, and/or consultants, from accepting, reviewing or acting upon applications or other similar requests for approval of activities that are or are likely to result in violation(s) of this CAFO Permitting Ordinance Moratorium Extension.

3.3 The Town Board withdraws the authority of any official or independent contractor to accept, review and/or act upon applications, other similar requests for approval of activities that are or are likely to result in violation(s) of this CAFO Permitting Ordinance Moratorium Extension.

Section4--DURATION OFMORATORIUM:

The CAFO Permitting Ordinance Moratorium Extension shall be effective for twelve (12) months from the CAFO Permitting Ordinance Moratorium expiration date of January 8, 2021, unless otherwise extended by the Town Board.

Section 5--ACTION ANTICIPATED DURING MORATORIUM:

5.1 The Town Board shall complete a comprehensive review of the possible impacts of the issuance of permits under the CAFO Permitting Ordinance.

5.2 The Town Board may, at its discretion, retain experts, including but not limited experts in the fields of geology, hydrogeology, soils, immunology, public health, engineering, law, real estate, environmental protection and air quality.

5.3 The Town Board shall provide opportunities for public participation throughout the process, and consider the public health, safety, and general welfare of Town residents during its review process.

5.4 The Town Board shall report its findings and recommendations to the public prior to the expiration of the CAFO Permitting Ordinance Moratorium Extension.

5.5 In accordance with applicable statutes and ordinances, the Town Board shall act upon its findings and the recommendations from Town residents and the Town's consultants.

Section 6-- EFFECTIVE DATE AND PUBLICATION:

6.1 This Ordinance shall be effective upon adoption and publication as required by law.

6.2 The Town Clerk shall properly publish this Ordinance as a Class 1 Notice or post this Ordinance in three locations as required under Wis. Stat. §60.80(1).

PASSED AND ADOPTED by the Town Board of the Town of Trade Lake, Wisconsin, this 12th day of November, 2020.

Roger Hinrichs

Jeff Lade

ATTEST:

Melissa McQuay
Town Clerk

Posted on 11/19/2020

[31721-33677/2768539/1]

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 2021-07
CONCENTRATED ANIMAL FEEDING OPERATIONS PERMIT MORATORIUM

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

WHEREAS, on January 9, 2020, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 01-2020 - Concentrated Animal Feeding Operations Ordinance ("CAFO Permitting Ordinance"). A copy of the adopting ordinance is attached as **Exhibit A** and incorporated by reference;

WHEREAS, the purpose of the CAFO Permitting Ordinance is to effectively, efficiently and comprehensively regulate the operation of Large-Scale Concentrated Animal Feeding Operations of 1,000 animal units or greater in the Town of Trade Lake, 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, and to preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town of Trade Lake and to achieve water quality standards within the Town of Trade Lake.

WHEREAS, the Town and its residents have invested a substantial amount of time, money and effort in the development of the CAFO Permitting Ordinance, and it is in the best interests of the Town and the public health, safety and general welfare of its residents to continue to study the possible impacts of the issuance of permits under the CAFO Permitting Ordinance;

WHEREAS, the Town Board finds that a continued moratorium is necessary to allow the Town adequate time to complete its study of the possible impacts that the issuance of permits under the CAFO Permitting Ordinance may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy;

WHEREAS, the Town Board finds that a moratorium is necessary to allow Town residents and other members of the public an opportunity to fully participate in the study of these impacts;

WHEREAS, given the irreparable and unknown harm that may be caused by operation of CAFOs as defined by the CAFO Permitting Ordinance and the authorities referenced within the CAFO Permitting Ordinance as evidenced by Appendix A to the said Ordinance, the Town Board finds that immediate action is warranted; and,

WHEREAS, the Town Board wishes to impose a moratorium for only such time as is prudent and necessary to allow the Town to complete this phase of its study, and;

WHEREAS, the Town Board expects this moratorium will need to be in place for at least one year from its effective date;

NOW, THEREFORE, in consideration of the above Recitals, which are incorporated herein by reference, the Town Board of the Town of Trade Lake ordains as follows:

Section 1 -- TITLE AND PURPOSE:

1.1 Title. The title of this Ordinance is the Town of Trade Lake **Ordinance To Impose A Moratorium On Issuance Of Concentrated Feeding Operation Permits ("Moratorium" or "Ordinance").**

1.2 Purpose. The purpose of the Moratorium is to promote meaningful implementation of the Town's CAFO Permitting Ordinance. A Moratorium is necessary for this phase of the study of the possible impacts that the issuance of permits under the CAFO Permitting Ordinance may have on the health, safety, and general welfare of the residents of the Town, including impacts on air quality, water quality, public infrastructure, property values, and the local economy as set forth in the Recitals and Appendix A of the CAFO Permitting Ordinance consistent with the findings made by the Town Board in the Recitals, each and all of which are incorporated herein by reference.

Section 2 **- AUTHORITY:**

The Town Board relies on Wis. Stat. § 61.34, the general police powers of a village board, which have been conferred on the Town Board pursuant to Wis. Stat. §§ 60.10 (2)(c) and 60.22(3), and Wis. Stat. §§ 60.23.

Section 3 -- MORATORIUM IMPOSED:

3.1 For the duration of the Moratorium, the Town Board shall not consider or process any new applications or requests for the issuance of permits under the CAFO Permitting Ordinance unless expressly approved by the Town prior to enactment of this Moratorium.

3.2 The Town Board prohibits Town officials, employees, and/or consultants, from accepting, reviewing or acting upon applications or other similar requests for approval of activities that are or are likely to result in violation(s) of this Moratorium.

3.3 The Town Board withdraws the authority of any official or independent contractor to accept, review and/or act upon applications, other similar requests for approval of activities that are or are likely to result in violation(s) of this Moratorium.

Section 4 -- DURATION OF MORATORIUM:

The Moratorium shall expire at the end of one year following the effective date of this ordinance unless the Moratorium is extended by the Town Board.

Section 5 -- ACTION ANTICIPATED DURING MORATORIUM:

5.1 The Town Board shall complete a comprehensive review of the possible impacts of the issuance of permits under the CAFO Permitting Ordinance.

5.2 The Town Board may, at its discretion, retain experts, including but not limited experts in the fields of geology, hydrogeology, soils, immunology, public health, engineering, law, real estate, environmental protection and air quality.

5.3 The Town Board shall provide opportunities for public participation throughout the process, and consider the public health, safety, and general welfare of Town residents during its review process.

5.4 The Town Board shall report its findings and recommendations to the public prior to the expiration of the Moratorium.

5.5 In accordance with applicable statutes and ordinances, the Town Board shall act upon its findings and the recommendations from Town residents and the Town's consultants.

Section 6 -- EFFECTIVE DATE AND PUBLICATION:

6.1 This Ordinance shall be effective upon adoption and publication as required by law.

6.2 The Town Clerk shall properly publish this Ordinance as a Class 1 Notice or post this Ordinance in three locations as required under Wis. Stat. §60.80(1).

By signing below, we affirm that this Ordinance was adopted at a duly noticed meeting of the Town Board held on this 11th day of November, 2021.

Ramona Moody

Ramona Moody, Town Board Chair

ATTESTED BY:

By: Mary Gravelle

Posted November 18, 2021

EXHIBIT A
CONCENTRATED ANIMAL FEEDING OPERATIONS ORDINANCE

See Attached.

EXHIBIT A

CONCENTRATED ANIMAL FEEDING OPERATIONS PERMIT MORATORIUM ORDINANCE

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 01-2020
CONCENTRATED ANIMAL FEEDING OPERATIONS ORDINANCE

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

Section 1. Authority

This Ordinance is adopted pursuant to the powers granted under 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 and Findings

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 Trade Lake, 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, and to preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town of Trade Lake and to achieve water quality standards within the Town of Trade Lake. This Ordinance sets forth the procedures for obtaining and maintaining a CAFO Operations Permit for the operation of new and expanded livestock facilities in the Town of Trade Lake (sometimes referred to as "the Town").

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 CAFO's 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 below and in Appendix A.

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 recommending a complete halt until additional scientific data has been collected and public health concerns associated with CAFOs are addressed.

CAFOs confine large numbers of animals of the same species—such as beef and dairy cattle, swine, broilers (poultry raised for meat consumption) and laying hens—on a small area of land. The scale, density, and practices associated with these operations present a range of public health and ecological hazards, including large volumes of untreated animal waste, the release of environmental contaminants to air, water, and soil, and the generation and spread of antibiotic-

resistant pathogens. There is a significant body of evidence which shows CAFOs are directly associated with occupational and community health risks, as well as the social and economic decline of rural communities.

In 2010, the National Association of Local Boards of Health published a report identifying the following Environmental Heath Effects of CAFOs:

1. Groundwater
2. Surface Water
3. Air Quality
4. Greenhouse Gas and Climate Change
5. Odors
6. Insect Vectors
7. Pathogens
8. Antibiotics
9. Property Values

Pollutants commonly found in air surrounding CAFOs include the following:

CAFO Emissions	Source	Traits	Health Risks
Ammonia	Formed when microbes decompose undigested organic nitrogen compounds in manure	Colorless, sharp pungent odor	Respiratory irritant, chemical burns to the respiratory tract, skin, and eyes, severe cough, chronic lung disease
Hydrogen Sulfide	Anaerobic bacterial decomposition of protein and other sulfur containing organic matter	Odor of rotten eggs	Inflammation of the moist membranes of eye and respiratory tract, olfactory neuron loss, death
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 include the following:

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

Researchers at the Johns Hopkins Center for a Livable Future have found that the primary human health concerns related to industrial food animal production (IFAP) (also referred to as concentrated animal feeding operations (CAFOs)) include: infections resulting from transmission of harmful microorganisms from animal operations to nearby residents; respiratory effects from increased exposure to air pollution from animal operations; and multiple negative health impacts due to increased exposure to ground and/or surface waters that can be contaminated by manure from animal operations.

Disease Transmission

The poor conditions, including crowding, characteristic of industrial animal operations present opportunities for disease transmission among animals, and between animals and humans. [1-2] (Footnotes refer to sources listed in Appendix A, References.) Nearby residents may have an increased risk of infection from the transmission of harmful microorganisms from operations via flies or contaminated air and water. [3-9]

Of additional concern is exposure to pathogens that are resistant to antibiotics used in human medicine. Administering antibiotics to animals at levels too low to treat disease (non-therapeutic use) fosters the proliferation of antibiotic-resistant pathogens, and this practice is common in CAFOs. Resistant infections in humans are more difficult and expensive to treat [10] and more often fatal [11] than infections with nonresistant strains. A growing body of evidence provides support that antibiotic-resistant pathogens are found on animal operations that administer antibiotics for non-therapeutic purposes [12-13] and are also found in the environment in and around production facilities, [13-15] specifically in the manure, [16-18] air, [13] and flies. [19]

Manure runoff from CAFO operations may introduce these harmful microorganisms into

nearby water sources. [20] Land application of manure presents an opportunity for pathogens contained in the manure to leach into the ground or run off into recreational water and drinking water sources, potentially causing a waterborne disease outbreak. [17] This is of particular concern for residents who rely on private wells for drinking water and household use; [21] private wells are not monitored by government agencies to ensure safe levels of pathogens.

Air Pollution

Community members living near CAFO operations also face increased exposure to air pollution from these operations, which can cause or exacerbate respiratory conditions including asthma [22-24]; eye irritation, difficulty breathing, wheezing, sore throat, chest tightness, nausea [25]; and bronchitis and allergic reactions. [23] Air emissions include particulates, volatile organic compounds, and gases such as nitrous oxide, hydrogen sulfide, and ammonia. [22,26] 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 [22, 27-29] and contribute to stress and acute increased blood pressure. [29-30]

Contaminated Ground and Surface Water

The increase in concentration of livestock and poultry and transition to large, high-density, confined animal feeding operations over the last several decades has resulted in the concentration of animal waste over small geographic areas. [17] Although animal manure is an invaluable fertilizer, waste quantities of the magnitude produced by CAFO operations represent a public health and ecological hazard through the degradation of surface and ground water resources.[17] (For example a CAFO application recently submitted to Burnett County, WI indicated that the proposed operator expected a single facility to generate in excess of 9 million gallons of manure per year and that it intended to dispose of that waste by spreading it on local farm fields.)

Manure from these operations can contaminate ground and surface waters with nitrates, drug residues, and other hazards, [6, 31-33] and studies have demonstrated that humans can be exposed to waterborne contaminants from livestock and poultry operations through the recreational use of contaminated surface water and the ingestion of contaminated drinking water. [32-34] Exposure to elevated levels of nitrates in drinking water is associated with adverse health effects, including cancer, [35-38] birth defects and other reproductive problems, [34,35,39,40] thyroid problems, [34-35] and methemoglobinemia. [34, 41]

Nutrient runoff (including nitrogen and phosphorus) has also been implicated in the growth of harmful algal blooms, [17, 42] which may pose health risks for people who swim or fish in recreational waters, or who consume contaminated fish and shellfish. Exposure to algal toxins has been linked to neurological impairments, liver damage, gastrointestinal illness, severe dermatitis, and other adverse health effects. [43-44]

Given the impacts to health, safety and general welfare, the Town has an obligation to enact reasonable regulations on the operations of CAFOs.

In addition to the general impacts, the Town of Trade Lake has also determined that this Ordinance is necessary to achieve water quality standards under Wis. Stat. 281.15 which are

defined to protect the public interest including the present and prospective future use of the Town's water for public and private water systems, propagation of fish and aquatic life and wildlife, domestic and recreational purposes and agricultural, commercial, industrial and other legitimate uses.

The waters of the Town of Trade Lake are vitally important to its residents and the impacts of CAFOs on water systems, fish and aquatic life, agricultural, commercial and industrial uses require the Town's protection and regulation. Water contamination and impairment may result in detected levels of veterinary antibiotics, elevated levels of nitrates and the presence of pathogenic organisms.

Elevated nitrates in drinking water can be harmful to infants leading to various syndromes and the possibly of death. Low blood oxygen in adults can also lead to birth defects, miscarriages and poor general health.

Before a CAFO may begin operation within the Town of Trade Lake, it is imperative that the operational risks be analyzed, base lines be established to control medical risks and the monitoring of each risk be established for evaluation and appropriate review.

It is for these reasons the Town of Trade Lake enacts this Ordinance.

Section 3. Definitions

1. "Large-Scale Concentrated Animal Feeding Operation" or "CAFO" means 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) The operations are adjacent; (2) The operations utilize common systems for the land spreading of manure or wastes; (3) Animals are transferred between the lots or facilities; (4) The lots or facilities share staff, vehicles, or equipment; or (5) Manure, barnyard runoff or other wastes are comingled in a common storage facility at any time.

2. "Operations" means a course of procedure or productive activity for purposes of conducting and carrying on the business of a CAFO including populating animal housing facilities, storing and managing animal and other waste materials, and conducting any other business activities.

3. "Pollution" means degradation that results in any violation of any environmental law as determined by an administrative proceeding, civil action, criminal action or other legal or administrative action investigation or proceeding.

4. "Private Nuisance" means a nontrespassory invasion of another's interest in the private use and enjoyment of land, and the invasion is either: (1) intentional und

unreasonable, or (2) unintentional and otherwise actionable under the rules of controlling liability for negligent or reckless conduct, or for abnormally dangerous conditions or activities.

5. "Public Nuisance" means a thing, act, occupation, condition or use of property which shall continue for such length of time as to " (1) substantially annoy, injure or endanger the comfort, health, repose or safety of the public; (2) in any way render the public insecure in life, health or in the use of property; or (3) unreasonably and substantially interfere with, obstruct or tend to obstruct or render dangerous for passage or public use any street, alley, highway, navigable body of water or other public way or the use of public property or other public rights.

Section 4. License Required

Regardless of siting, a livestock facility with 1,000 or more animal units shall be allowed to conduct operations within the Town of Trade Lake only as provided under this Ordinance. Applicants shall apply for a CAFO Operations Permit to operate in the Town of Trade Lake under this Ordinance prior to conducting any operations.

1. General

A CAFO Operations Permit issued by the Town of Trade Lake is required for a.) new or b.) expanded livestock facilities that will operate with 1,000 or more animal units.

2. Licenses for Existing Livestock Facilities

A CAFO Operations Permit is required for the expansion of a pre-existing or previously approved livestock facility if the number of animal units kept at the expanded livestock facility will exceed 1,000 animal units.

Section 5. Licensing Administration

The Town Board shall administer this Ordinance and related matters thereto and shall have the authority to issues licenses under this Ordinance.

Section 6. License Application and Standards

The applicant shall apply for a CAFO Operations Permit prior to conducting any operations associated with a Large-Scale Concentrated Animal Feeding Operation in the Town of Trade Lake. The application shall be submitted on a form provided by the Town Clerk.

The Town Board shall decide whether to approve and issue a CAFO Operations Permit to an applicant that has submitted a complete application and paid the required application fee, after holding a public hearing on the application and considering any evidence concerning the application and the proposed operation presented by the applicant and any other interested persons or parties, including members of the public and other governmental agencies or entities,

and special legal counsel and expert consultants who may be hired by the Town Board to review the application and advise the Town Board.

The Town Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it is determined by a majority vote of all members, supported by clear and convincing evidence presented by the applicant, that the operations as proposed, with or without conditions, will 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 of Trade Lake, and that the applicant and the application meets all other requirements of this Ordinance.

Section 7. License Application Fee

A non-refundable application fee of One Dollar ($1.00) per proposed animal unit payable to the Town of Trade Lake shall accompany an application for the purpose of offsetting the Town costs to review and process the application.

Section 8. Application Procedure

1. An applicant for a CAFO Operations Permit shall complete a Town of Trade Lake CAFO Operations Permit Application and pay the required application fee. The applicant must be an authorized representative of the corporate entity proposing to operate the CAFO and provide written certification of such authorization in conjunction with the execution of the application.

2. Upon signing and submitting a CAFO Operations Permit Application to the Town Clerk, the applicant shall unconditionally agree 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 shall submit an administrative fee deposit as required by the Town Clerk.

3. After receiving the application and the application fee, the Town Clerk shall mail a notice that a CAFO Operations Permit Application has been received to all landowners within 3 miles of the proposed CAFO with the date and time of a Town Board meeting at which the application will be considered. The notice shall provide information on how interested persons and parties may inspect and obtain a copy of the application.

4. The Town Clerk shall place the application on the agenda for the next regular Town Board meeting for which required notice can be provided.

5. At a formal public hearing held by the Town Board on the application at least sixty (60) days after it has been determined to be complete, the Town Board shall consider any evidence concerning the application and the proposed CAFO presented by the applicant and any other interested persons or parties, including members of the public

and other governmental agencies or entities, and special legal counsel and expert consultants who may be hired by the Town to review the application and advise the Town Board.

6. In its review and consideration of a CAFO Operations Permit Application, the Town Board shall act in a quasi-judicial capacity, and its final decision on whether to approve and issue a CAFO Operations Permit, either with or without conditions, shall be based on written findings of fact and conclusions of law consistent with the provisions of this Ordinance, which shall be filed with the Town Clerk and served on the applicant by regular U.S. Mail.

7. The Town Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it determines by a majority vote of all members of the Town Board, supported by clear and convincing evidence presented by the applicant, that the operations of the proposed CAFO, with or without conditions, will protect health (including human and animal), 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 and that the application meets all other requirements of this Ordinance.

Section 9. Financial Surety

A CAFO Operations Permit shall require the applicant and all contractors, subcontractors, agents and representatives, to ensure that 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 as planned and permitted, based on the following provisions:

1. A determination shall be made required the financial assurance level required by the scale of the operation. As a condition of the license, the required financial assurance shall be filed with the Town of Trade Lake in an amount sufficient to clean up environmental contamination if the same were to occur, to abate public nuisances caused by the operation, including but not limited to the testing and replacement of any potentially contaminated private and public wells and water supplies within the areas subject to operations, and to ensure proper closure of the operations should the applicant elect to close or should closure occur for some other reason. Upon notification of the required financial assurance, but prior to commencing operations, the applicant shall file with the Town Clerk the financial assurance conditioned on faithful performance of all requirements for the license. Upon notification of finance assurance or deposit approval and conformance with license conditions, the applicant may commence operations.

2. The applicant may deposit cash or irrevocable letters of credit established with a bank acceptable to the Town as the required financial assurance.

3. The Town may reevaluate and adjust accordingly the amount of the financial assurance required on an annual basis.

Section 10. Conditions of Approval

A CAFO Operations Permit may be approved with conditions 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. To the extent not expressly or otherwise preempted by Wis. Stat. 93.90, and Wis. Admin. Code Ch. ATCP 51 or any other provision of state or federal law, such conditions may include, but are not limited to:

1. Conditions relating to the operational characteristics of the proposed operation, to protect public health, prevent point and non-point sources of air and water pollution, and prevent private nuisances and public nuisances;

2. Conditions relating to the management of animal and other waste that may be generated as part of an operations' ongoing operation, to protect public health, prevent point and non-point sources of air and water pollution, and prevent private nuisances and public nuisances;

3. Conditions relating to the population and depopulation of individual animal housing facilities, to protect public health and prevent the spread of animal-borne and vector-borne disease, to assure a safe level of sanitation, and to assure human health hazard control or health protection for the community;

4. Conditions relating to biosecurity and the maintenance of animal health and welfare, to prevent the spread of animal-borne and vector-borne disease, to protect public health, and provide for animal safety and welfare;

5. Conditions relating to transportation of animals as part of the ongoing operations, to protect public health, prevent pollution, and prevent private nuisances and public nuisances;

6. Conditions relating to protection of private and public drinking and agricultural wells, and other public water supplies, as part of an ongoing operation to protect public health, prevent pollution, and prevent private nuisances and public nuisances;

7. Conditions relating to air emissions and dust control as part of an ongoing operation, to protect public health, prevent pollution and prevent private nuisances and public nuisances;

8. Conditions relating to protection of the private and public property rights and property values of affected property owners, as part of an ongoing operation, to protect the general welfare of the Town's residents and property owners, and to prevent private nuisances and public nuisances;

9. Conditions relating to permit compliance, enforcement and monitoring, including establishment of fees that may be assessed against the permittee to cover the costs of hiring, training, and maintain Town personnel, or for contracting with private consultants, to conduct permit compliance, enforcement and monitoring activities for the Town.

10. Conditions relating to the monitoring of surface water, ground water, air quality and all other environmental factors and considerations.

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.

These conditions may apply not only to the CAFO facility itself, but also to any 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 14.

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 or any conditions contained within a duly approved CAFO Operations Permit.

Upon change of ownership of the livestock facility, the new owner of the facility shall file information with the Town Clerk providing pertinent information, including but not limited to such information as the name and address of the new owner and date of transfer of ownership.

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 livestock operator exercises the full authority granted by the approval. However, the Town may treat a CAFO Operations Permit as lapsed and withdraw the license if the license holder fails to do all of the following within 2 years after issuance of license:

1. Begin populating the CAFO.

2. Begin constructing all of the new or expanded livestock housing or waste storage structures proposed in the application for local approval.

3. Pay the renewal fee on or before January 1 of each calendar year as required by Section 14 of this Ordinance.

Section 14. License Terms and Modifications

A CAFO Operations Permit and the privileges granted by a CAFO Operations Permit issued under this Ordinance is conditioned on the livestock operator's compliance with the standards in this Ordinance, and with commitments made in the application for a CAFO Operations Permit. The operator may make reasonable changes that maintain compliance with the standards in this Ordinance, and the Town Board shall not withhold authorization for those changes. A violation of the Permit or a failure to comply with the commitments made in the application may result in suspension and/or termination of the Permit.

The Town Board, or its designee, shall work to ensure on an ongoing basis that all requirements and conditions of any permit issued under this Ordinance are followed by the permitee. To assist in accomplishing this task, any permit issued pursuant to this Ordinance shall be subject to an annual renewal fee in the amount of One Dollar ($1.00) per animal unit.

Section 15. Penalties

Any person who violates any of the provisions of this Ordinance, or who fails, neglects or refuses to comply with the provisions of this Ordinance, or who knowingly makes any material false statement or knowing omission in any document required to be submitted under the provisions hereof, shall be subject to the following penalties:

1. Upon conviction by a court of law, pay a forfeiture of not less than $100 nor more than
   $1,000, plus the applicable surcharges, assessments, and costs for each violation.

2. Each day a violation exists or continues shall be considered a separate offense under this Ordinance.

3. In addition, the Town Board may seek injunctive relief from a court of record to enjoin further violations.

4. In addition, the Town Board may suspend or revoke the local approval of a CAFO Operations Permit under this Ordinance after due notice to the livestock facility owner and a public hearing to determine whether the license should be suspended or revoked.

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

If a CAFO Operations Permit issued under this Ordinance is later suspended or revoked, all operations of the CAFO shall cease within thirty (30) days after such suspension or revocation. The sole remedy for reinstating a suspended or revoked CAFO Operations Permit shall be for the owner or operator of a facility under such permit to re-apply for a CAFO Operations Permit pursuant to this Ordinance.

In addition to any other penalty imposed by this Ordinance, the cost of abatement of any public

nuisance on the licensed premises by the Town may be collected under this Ordinance or Sec. 823.06 of Wis. Statutes against the owner of the real estate upon which the public nuisance exists. Such costs of abatement may be recovered against the real estate as a special charge under Sec. 66.0627 of Wis. Statutes unless paid earlier.

Section 16. Appeals

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

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

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

Section 17. Severability

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

Section 18. Effective Date

This Ordinance is effective the day after publication or posting as required by law.

Adopted this 9th day of January, 2020 by the Town Board of Supervisors.

Roger Harrison
Acting Town Chairman

Attested:

Melissa M Quay, Clerk
Town Clerk

APPENDIX A

References

1. 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.

2. 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 loses and food safety risks.

3. 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.

4. Price LB, Graham JP, Lackey LG, Roess A, Vailes R, Silbergeld E. Elevated risk of carrying gentamicin-resistant *Escherichia coli* among US poultry workers. *Environ Health Perspect.* 2007:1738-1742.
Link: https://www.ncbi.nlm.nih.gov/pubmed/18087592
Occupational and environmental pathways of human exposure to antimicrobial-resistant bacteria were explored in this study by comparing the relative risk of antimicrobial-resistant *E. coli* among poultry workers compared with community referents. The study concluded that occupational exposure to antimicrobial-resistant bacteria may be an important route of entry for the bacteria into the community, as poultry workers had 32 times the odds of carrying resistant *E. coli* compared to the community referents.

5. 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.

6. 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.

7. Graham JP, Leibler JH, Price LB, et al. The animal-human interface and infectious disease in industrial food animal production: Rethinking biosecurity and biocontainment. *Public Health Rep.* 2008:282-299. Link: https://www.ncbi.nlm.nih.gov/pubmed/19006971

The transition of food animal production from small-scale methods to industrial-scale operations has been accompanied by substantial evidence of the transfer of pathogens between and among industrial food animal facilities, the environment, and exposure to farm workers. This challenges the notion that modem animal production is more biosecure than smaller operations in regards to the introduction and release of pathogens. The study concludes that industrialized food animal production risk factors must be included in strategies to mitigate or prevent the emergence of pandemic avian influenza.
Refer to page 17 of this document for the complete article abstract.

8. 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

The risk of human gastrointestinal infection associated with exposure to airborne pathogens following the land application of dairy manure was explored in this study. It was concluded that bioaerosol emissions from manure application sites may present significant public health risks to downwind receptors, and improved manure management practices that include better controls for bioaerosols were recommended to reduce the risk of disease transmission.
Refer to page 12 of this document for the complete article abstract.

9. 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

This study assessed the association between exposure to swine and dairy/veal industrial agriculture and the risk of methicillin-resistant *Staphylococcus aureus* (MRSA) infection. The study found that proximity to livestock operations and crop fields treated with swine manure were each associated with MRSA, skin and soft-tissue infection.
Refer to page 16 of this document for the complete article abstract.

10. Roberts RR, Hota B, Ahmad I, et al. Hospital and societal costs of antimicrobial-resistant infections in a Chicago teaching hospital: Implications for antibiotic stewardship. *Clin Infect Dis.* 2009;49(8):11751184.
Link: https://academic.oup.com/cid/article/49/8/1175/425330/Hospital-and-Societal-Costs-of-Antimicrobial

Medical and societal costs attributable to antimicrobial-resistant infections are considerable, and important factors in understanding the potential benefits of prevention programs. Medical costs attributable to antimicrobial-resistant infections range from $18,588 to $29,069 per patient, hospital stay durations from 6.4-12.7 days, and mortality of 6.5%. Societal costs were estimated at $10.7-$15 million.

11. Filice GA, Nyman JA, Lexau C, et al. Excess costs and utilization associated with methicillin resistance for patients with *Staphylococcus aureus* infection. *Infection Control & Hospital Epidemiology.* 2010;31(04):365-373.
Link: https://www.ncbi.nlm.nih.gov/pubmed/20184420

Healthcare costs of methicillin-resistant *S. aureus* (MRSA) infections and methicillin-susceptible *S. aureus* (MSSA) were compared in this study. MRSA infections were found to be independently associated with higher costs, more comorbidities, and higher likelihood of death than MSSA infections.

12. Price LB, Lackey LG, Vailes R, Silbergeld E. The persistence of fluoroquinolone-resistant *Campylobacter* in poultry production. *Environ Health Perspect.* 2007:1035-1039.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/F'MC1913601/

Halting fluoroquinolone use was not found to have an impact on the proportion of fluoroquinolone-resistant *Campylobacter* on products from the conventional producers, indicating that antibiotic-resistant bacteria may persistently contaminate poultry products even after on-farm use of the antibiotic has ceased. Also, *Campylobacter* strains from the conventional producers were more likely to be resistant to fluoroquinolone than those from the antibiotic-free producers, indicating that antibiotic use in food animal production contributes to the develop of antibiotic-resistant pathogens.

13. 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.

Refer to page 21 of this document for the complete article abstract.

14. Burgos J, Ellington B, Varela M. Presence of multidrug-resistant enteric bacteria in dairy farm topsoil. *J Dairy Sci.* 2005;88(4):1391-1398.
Link: https://www.ncbi.nlm.nih.gov/pubmed/15778307

This study was conducted to better understand how widespread antibiotic-resistant bacteria are in agricultural settings, particularly in dairy farm environments. The study concluded that dairy farm topsoil contains multidrug resistant enteric bacteria and antibiotic-resistant plasmids, and suggests that dairy topsoils serve as a reservoir for the development of bacterial resistance to antibiotics relevant in clinical medicine.
Refer to page 12 of this document for the complete article abstract.

15. Sapkota AR, Curriero FC, Gibson KE, Schwab KJ. Antibiotic-resistant enterococci and fecal indicators in surface water and groundwater impacted by a concentrated swine feeding operation. *Environ Health Perspect.* 2007:1040-1045.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1913567/

Surface and groundwater located up and down gradient from a swine facility was analyzed for the presence of antibiotic-resistant enterococci and other fecal indicators in this study. Both were detected at elevated levels in down gradient water sources relative to the swine facility compared to up-gradient sources, providing evidence that water contaminated with swine manure can contribute to the spread of antibiotic resistance.
Refer to page 20 of this document for the complete article abstract.

16. 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

This study examined the survival of anti-microbial resistant enterococci and staphylococci and resistance genes in poultry litter to better understand how land application of poultry litter can affect the surrounding populations environment. The study found that poultry litter storage practices do not eliminate drug-resistant bacterial strains, thus allowing the spread of these drug-resistant pathogens into and through the environment via land application of poultry litter.

17. 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.

18. 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/

This study was conducted to better understand the cow microbiome and the role of the land application of cow manure in the spread of antibiotic resistance. The study reports the discovery of new and diverse antibiotic resistant genes in the cow microbiome, and provides evidence that it is a significant reservoir of antibiotic resistant genes.
Refer to page 14 of this document for the complete article abstract.

19. Graham JP, Price LB, Evans SL, Graczyk TK, Silbergeld EK. Antibiotic resistant enterococci and staphylococci isolated from flies collected near confined poultry feeding operations. *Sci Total Environ.* 2009;407(8):2701-2710.
Link: https://www.ncbi.nlm.nih.gov/pubmed/19157515

This study examined if and how antibiotic resistant bacteria are transferred from poultry operations to nearby communities, and found that flies caught near poultry operations carried the same drug-resistant pathogens as those found in poultry litter. The study concludes that flies may be an important vector in the spread of drug resistant bacteria from poultry operations and may increase human exposure to these resistant pathogens.

20. Heaney CD, Myers K, Wing S, Hall D, Baron D, Stewart JR. Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. *Sci Total Environ.* 2015;511:676-683.
Link: https ://www .ncbi.nlm.nih .gov/pubmed/25600418

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.
Refer to page 17 of this document for the complete article abstract.

21. United States Geological Survey (USGS). USGS water use data for the nation. http://waterdata.usgs.gov/nwis/wu. Updated June 8, 2016. Accessed January 31, 2017.

This United States Geological Survey website provides national water use data by area type (aquifer, watershed, county, state), source (rivers or groundwater), and category such as irrigation or public supply.

22. 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.

23. 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.

24. 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.
Link: http://pediatrics .aappublications .org/content/118/1/e66

The relationship between exposure to airborne effluent from swine CAFOs and asthma symptoms in adolescents age 12-14 years old was assessed in this study to better understand the health effects of living near industrial swine facilities. The study found that estimated exposure to swine CAFO air-pollution was associated with wheezing symptoms in adolescents.
Refer to page 19 of this document for the complete article abstract.

25. Schinasi L, Horton RA, Guidry VT, Wing S, Marshall SW, Morland KB. Air pollution, lung function, and physical symptoms in communities near concentrated swine feeding operations. *Epidemiology.* 2011 ;22(2):208-215 .
Link: https://www .ncbi .nlm .nih .gov/pubmed/21228696

This study examined the associations between reported malodor and monitored air pollutants with lung function and physical symptoms in people residing within 1.5 miles of hog operations to better understand the effect of CAFO air pollutants on human health. The study reported that acute physical symptoms, including eye irritation, respiratory symptoms, difficulty breathing, wheezing, declined forced expiratory volume, sore throat, chest tightness, and nausea were related to pollutants measured near hog operations.
Refer to page 21 of this document for the complete article abstract.

26. Hribar C, Schultz M. Understanding concentrated animal feeding operations and their impact on communities. *Bowling Green, **OH:** National Association of Local Boards of Health.* 2010.
Link: https://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf

The National Association of Local Boards of Health produced this report with the support of the Centers for Disease Control and Prevention and the National Center for Environmental Health to assist local board of health members better understand their role in mitigating potential issues with CAFOs. The report concludes that 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. Suggested actions include passing ordinances and regulations, and increasing water and air quality monitoring and testing. The report also concludes that local boards of health, in collaboration with state and local agencies, are an appropriate body for instituting these actions due to the local nature of CAFO concerns and risks.

27. 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.
Refer to page 16 of this document for the complete article abstract.

28. Wing S, Wolf S. Intensive livestock operations, health, and quality of life among eastern North Carolina residents. *Environ Health Perspect.* 2000;108(3):233-238.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637983/

Reports of decreased health and quality of life from people who live near industrial animal operations were explored in this study through community surveys in three rural communities, one located near a large swine operation, one near two intensive cattle operations, and one area without nearby livestock operations using liquid waste management systems. Residents near the swine operation reported increased occurrences of poor health, such as headaches, diarrhea, sore throat, excessive coughing and burning eyes and reduced quality of life compared to those in the other two communities.

29. Horton RA, Wing S, Marshall SW, Brownley KA. Malodor as a trigger of stress and negative mood in neighbors of industrial hog operations. Am *J Public Health.* 2009;99(S3):S610-S615.
Link: https://www.ncbi.nlm.nih.gov/pubmed/19890165

The association between malodor and air pollutants from nearby hog CAFOs and reported stress and negative mood was evaluated in this study to better understand the role of CAFOs in human health. The study found that malodor and air pollutants acted as environmental stressors and triggers of negative mood and recommended their inclusion in studies of the health impacts of environmental injustice.
Refer to page 18 of this document for the complete article abstract.

30. Wing S, Horton RA, Rose KM. Air pollution from industrial swine operations and blood pressure of neighboring residents. *Environmental Health Perspectives (Online).* 2013;121(1):92.
Link: https://ehp.niehs.nih.gov/1205109/

The association of air pollution and malodor with stress and blood pressure were assessed in this study to improve understanding of the effects of industrial swine operations on human health. Malodor and some air pollutants were found to be associated with blood pressure increases and reported stress, which could contribute to the development of chronic hypertension.
Refer to page 22 of this document for the complete article abstract.

31. Graham JP, Nachman KE. Managing waste from confined animal feeding operations in the United States: The need for sanitary reform. *Journal of Water and Health.* 2010;8(4):646-670.
Link: https://www.ncbi.nlm.nih.gov/pubmed/20705978

Trends affecting food animal waste production, risks associated with food-animal wastes, and differences between food-animal waste and human biosolid management practices were examined in this study. The study found that no standards exist for the 335 million tons of food animal waste applied to land in the US, while human biosolids, which make up just 1% of all land-applied wastes, are subject to standards. Hormones, arsenicals, high nutrient loads, antibiotics, and pathogens, including antibiotic-resistant pathogens, are often present in animal waste. The authors made recommendations for improving management of food-animal waste through existing and new policies.

32. Showers WJ, Genna B, McDade T, Bolich R, Fountain JC. Nitrate contamination in groundwater on an urbanized dairy farm. *Environ Sci Technol.* 2008;42(13):4683-4688.
Link: https://www.ncbi.nlm.nih.gov/pubmed/18677991

This study sought to identify sources of drinking water well nitrate contamination in a housing development built on a dairy farm site using isotopic compositions of nitrate, ammonia, groundwater and chemical ratios. The results indicate that the elevated nitrate levels were due to the leaching of animal waste from pastures into groundwater during the 35 years of dairy operations. The study suggests enacting statutes requiring well water tests prior to the sale of homes built on urbanized farmland to protect the health of homeowners.
Refer to page 13 of this document for the complete article abstract.

33. Relation between nitrates in water wells and potential sources in the lower Yakima Valley, Washington state. U.S. Environmental Protection Agency, Washington, D.C., 2012. Link: Https://Www3.epa.gov/region10/pdf/sites/yakimagw/nitrate_in_water_wells_study_9-27-2012.pdf.

This study examined the effectiveness of various techniques to identify specific sources of high nitrate levels in residential drinking water well. Dairy waste was concluded to be a likely source of nitrate contamination in the wells due to isotopic data and contextual evidence such as the historical and current volumes of dairy waste in the area, lack of other potential sources of nitrogen in the area, and soil indicators.
For more detail on this report, refer to page 14 of this document.

34. Burkholder J, Libra B, Weyer P, et al. Impacts of waste from concentrated animal feeding operations on water quality. *Environ Health Perspect.* 2007:308-312.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/F'MC1817674/

This work-group, part of the Conference on Environmental Health Impacts of Concentrated Animal Feeding Operations: Anticipating Hazards—Searching for Solutions, found that current 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.

35. Ward MH. Too much of a good thing? Nitrate from nitrogen fertilizers and cancer. *Rev Environ Health.* 2009;24(4):357-363.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3068045/

Nitrate, the breakdown product of nitrogen fertilizers, accumulates in groundwater under agricultural land and can spread through waterways due to agricultural field runoff. Nitrates are associated with a range of adverse health effects, including methemoglobinemia, various cancers, negative reproductive outcomes, diabetes, and thyroid conditions. Additional research is needed to further evaluate the health effects of nitrate exposure, especially as environmental exposure to nitrates has increased over the last 50 years and 90% of rural Americans depend on groundwater for drinking water, many relying on private wells, which are not regulated by the Safe Drinking Water Act.

36. 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.

37. Ward MH, Kilfoy BA, Weyer PJ, Anderson KE, Folsom AR, Cerhan JR. Nitrate intake and the risk of thyroid cancer and thyroid disease. *Epidemiology.* 2010;21(3):389-395.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2879161/

This study examined the association between nitrate intake through public water and diet with the risk of thyroid cancer and hypo- and hyperthyroidism. The study found an increased risk of thyroid cancer with high water nitrate levels and with longer consumption of water containing nitrates. The increased intake of dietary nitrate was associated with an increased risk of thyroid cancer, and with the prevalence of hypothyroidism.

38. Gulis G, Czompolyova M, Cerhan JR. An ecologic study of nitrate in municipal drinking water and cancer incidence in Trnava district, Slovakia. *Environ Res.* 2002;88(3):182-187.
Link: https://www.ncbi.nlm.nih.gov/pubmed/12051796

This ecologic study was conducted to assess the association between nitrate levels in drinking water with non-Hodgkin lymphoma and cancers of the digestive and urinary tracts in an agricultural district. The study found is that a higher incidence of some cancers was associated with higher levels of nitrate in drinking water. The trend was found in women for overall cancer cases, stomach cancer, colorectal cancer and non-Hodgkin lymphoma, and in men for non-Hodgkin lymphoma and colorectal cancer.

39. Manassaram DM, Backer LC, Moll DM. A review of nitrates in drinking water: Maternal exposure and adverse reproductive and developmental outcomes. *Environmental Health Perspectives.* 2006. Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1392223/

The relationship between maternal exposure to nitrates through drinking water and adverse reproductive and developmental outcomes was reviewed in this study. Animal studies support the association between nitrate exposure and adverse reproductive effects, and some studies report an association between nitrates in drinking water and spontaneous abortion, intrauterine growth restriction and various birth defects, though a direct exposure-response relationship remains unclear and there is insufficient evidence to establish a causal relationship.

40. 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.

41. 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.

42. 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.

43. 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.

44. 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.

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.

45. Fry JP, Laestadius LI, Grechis C, Nachman KE, Neff RA. Investigating the role of state and local health departments in addressing public health concerns related to industrial food animal production sites. *PloS one.* 2013;8(1):e54720.
Link: http://j ournals .plos .org/plosone/article?id=10 .1371/journal .pone .0054720

The role of local and state health departments in responding to and preventing community concerns with industrial food animal production are explored in this study through qualitative interviews with state and county health department staff and community members in eight states. Political barriers, lack of jurisdiction, and limited resources, expertise and staff all limit health departments' ability to respond to IFAP concerns, while community members reported difficulty in engaging with health departments. These limitations and difficulties contribute to limited health department engagement on these issues.

46. 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.

Research Articles Related to Dairy Production

Burgos, J. M., B. A. Ellington, and M. F. Varela. "Presence of multidrug-resistant enteric bacteria in dairy farm topsoil." *Journal of Dairy Science* 88.4 (2005): 1391-1398.
Link: https://www.ncbi.nlm.nih.gov/pubmed/15778307

> In addition to human and veterinary medicine, antibiotics are extensively used in agricultural settings, such as for treatment of infections, growth enhancement, and prophylaxis in food animals, leading to selection of drug and multidrug-resistant bacteria. To help circumvent the problem of bacterial antibiotic resistance, it is first necessary to understand the scope of the problem. However, it is not fully understood how widespread antibiotic-resistant bacteria are in agricultural settings. The lack of such surveillance data is especially evident in dairy farm environments, such as soil. It is also unknown to what extent various physiological modulators, such as salicylate, a component of aspirin and known model modulator of multiple antibiotic resistance (mar) genes, influence bacterial multi-drug resistance. We isolated and identified enteric soil bacteria from local dairy farms within Roosevelt County, NM, determined the resistance profiles to antibiotics associated with mar, such as chloramphenicol, nalidixic acid, penicillin G, and tetracycline. We then purified and characterized plasmid DNA and detected mar phenotypic activity. The minimal inhibitory concentrations (MIC) of antibiotics for the isolates ranged from 6 to >50 microg/mL for chloramphenicol, 2 to 8 microg/mL for nalidixic acid, 25 to >300 microg/mL for penicillin G, and 1 to >80 microg/mL for tetracycline. On the other hand, many of the isolates had significantly enhanced MIC for the same antibiotics in the presence of 5 mM salicylate. Plasmid DNA extracted from 12 randomly chosen isolates ranged in size from 6 to 12.5 kb and, in several cases, conferred resistance to chloramphenicol and penicillin G. It is concluded that enteric bacteria from dairy farm topsoil are multidrug resistant and harbor antibiotic-resistance plasmids. A role for dairy topsoil in zoonoses is suggested, implicating this environment as a reservoir for development of bacterial resistance against clinically relevant antibiotics.

Jahne, Michael A., et al. "Emission and Dispersion of Bioaerosols from Dairy Manure Application Sites: Human Health Risk Assessment." *Environmental Science & Technology* 49.16 (2015): 9842-9849. Link: http://pubs.acs.org/doi/pdfplus/10.1021/acs.est.5b01981

> In this study, we report the human health risk of gastrointestinal infection associated with inhalation exposure to airborne zoonotic pathogens emitted following application of dairy cattle manure to land. Inverse dispersion modeling with the USEPA's AERMOD dispersion model was used to determine bioaerosol emission rates based on edge-of-field bioaerosol and source material samples analyzed by real-time quantitative polymerase chain reaction (qPCR). Bioaerosol emissions and transport simulated with AERMOD, previously reported viable manure pathogen contents, relevant exposure pathways, and pathogen-specific dose-response relationships were then used to estimate potential downwind risks with a quantitative microbial risk assessment (QMRA) approach. Median 8-h infection risks decreased exponentially with distance from a median of 1:2700 at edge-of-field to 1:13 000 at 100 m and 1:200 000 at 1000 m; peak risks were considerably greater (1:33, 1:170, and 1:2500, respectively). These results indicate that bioaerosols emitted from manure application sites following manure application may present significant public health risks to downwind receptors. Manure management

practices should consider improved controls for bioaerosols in order to reduce the risk of disease transmission.

Schmalzried, Hans D., and L. Fleming Fallon Jr. "Proposed Mega-Dairies and Quality-of-Life Concerns: Using Public Health Practices to Engage Neighbors." *Public Health Reports* 125.5 (2010): 754.
Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2925014/

> This article describes the steps taken by the Henry County Health Department (Ohio) to engage with concerned community members by collaborating in baseline data collection prior to the arrival of a large-scale dairy operation. Data collection included water quality testing of residential wells neighboring the dairy operation, a fly trapping and counting program, and a review of local property values. As a dairy with 690 cows will have average water requirements of 35,000 gallons/day, the Health Department coordinated a pumping test to assess groundwater levels and 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.

Showers, William J., et al. "Nitrate contamination in groundwater on an urbanized dairy farm." *Environmental Science & Technology* 42.13 (2008): 4683-4688.
Link: http://pubs.acs.org/doi/full1/10.1021/es071551t

> Urbanization of rural farmland is a pervasive trend around the globe, and maintaining and protecting adequate water supplies in suburban areas is a growing problem. Identification of the sources of groundwater contamination in urbanized areas is problematic but will become important in areas of rapid population growth and development. The isotopic composition of NO3(815NNO3 and M80 NO3), NH4 (815NNH4), groundwater (62Hwt and 8180wt) and chloride/bromide ratios were used to determine the source of nitrate contamination in drinking water wells in a housing development that was built on the site of a dairy farm in the North Carolina Piedmont, U.S. The 615NNO3 and 6180 NO3 compositions imply that elevated nitrate levels at this site in drinking well water are the result of waste contamination, and that denitrification has not significantly attenuated the groundwater nitrate concentrations. 615NNO3 and 6180NO3compositions in groundwater could not differentiate between septic effluent and animal waste contamination. Chloride/bromide ratios in the most contaminated drinking water wells were similar to ratios found in animal waste application fields and were higher than Cl/Br ratios observed in septic drain fields in the area. 6180wt was depleted near the site of a buried waste lagoon without an accompanying shift in 62Hwt suggesting water oxygen exchange with CO2. This water—0O2 exchange resulted from the reduction of buried lagoon organic matter, and oxidation of the released gases in aerobic soils. 6180wt is not depleted in the contaminated drinking water wells, indicating that the buried dairy lagoon is not a source of waste contamination. The isotope and Cl/Br ratios indicate that nitrate contamination in these drinking wells are not from septic systems, but are the result of animal waste leached from pastures into groundwater during 35 years of dairy operations which

did not violate any existing regulations. Statutes need to be enacted to protect the health of the homeowners that require well water to be tested prior to the sale of homes built on urbanized farmland.

Wichmann, Fabienne, et al. "Diverse antibiotic resistance genes in dairy cow manure." *MBio* 5.2 (2014): e01017-13.
Link: http://mbio.asm.org/content/5/2/e01017-13.short

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 discovery of novel and diverse antibiotic resistance genes in the cow microbiome, demonstrating that it is a significant reservoir of antibiotic resistance genes. The genomic resource presented here lays the groundwork for understanding the dispersal of antibiotic resistance from the agroecosystem to other settings.

Relation between Nitrates in Water Wells and Potential Sources in the Lower Yakima Valley, Washington State. U.S. Environmental Protection Agency, Washington, D.C., 2012.
Link: https://www3.epa.gov/region10/pdf/sites/yakimagw/nitrate in water wells study 9-27-2012.pdf

Several investigations relating to nitrate contamination in the Lower Yakima Valley in Washington State have shown nitrate levels in drinking water above the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 10 mg/L. From February through April 2010, EPA conducted sampling of drinking water wells and potential sources of nitrate contamination in the Lower

Yakima Valley, in central Washington State. This report presents the results of these sampling efforts. EPA collected over 331 samples from residential drinking water wells for nitrate and bacteria, and multi-parameter sampling on 29 water wells (26 residential drinking water wells and three dairy supply wells), 12 dairy lagoons (15 samples), 11 soil samples (five at dairy application fields and six at irrigated and fertilized crop fields), five dairy manure pile samples, and three wastewater treatment plant (WWTP) influent samples. EPA's data provide some indication of the likely nitrate sources for seven of the 25 residential wells tested--animal waste was determined to be the source for six of the wells, and synthetic fertilizer the source for one of the wells. Given the historic and current volumes of wastes generated and stored by dairies, and the application of nitrogen-rich fertilizers including dairy waste in the Lower Yakima Valley, it is expected that dairies are a likely source of high nitrate levels in downgradient drinking water wells. The total nitrogen, major ions, alkalinity and barium data provide strong evidence that the dairies evaluated in this study are likely sources of the high nitrate levels in the drinking water wells downgradient of the dairies. Additional information that supports this conclusion includes: there are few potential sources of nitrogen located upgradient of the dairies; the dairy lagoons are likely leaking large quantities of nitrogen-rich liquid into the subsurface; and Washington State Department of Agriculture inspectors have reported elevated levels of nitrogen in application fields of the dairies in the study. Evaluating actions to reduce nitrate concentrations in residential drinking water wells was beyond the scope of the EPA's report. EPA concluded that actions to reduce nitrate levels are needed, although it may take many years to reduce nitrates in residential drinking water wells to safe levels because of the extent of the nitrate contamination in the Lower Yakima Valley and the persistence of nitrate in the environment.

Research Articles Related to Swine Production

Casey JA, Curriero FC, Cosgrove SE, Nachman ICE, Schwartz BS. High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant *Staphylococcus aureus* Infection in Pennsylvania. JAMA Intern Med. 2013 Sep 16; 21205(21):1980-90.
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% CI, 1.13-1.69], 1.30 [95% CI, 1.05-1.61], and 1.37 [95% CI, 1.18-1.60], respectively); and there was a trend of increasing odds across quartiles for each outcome ($P \leq .01$ for trend in all comparisons). There were similar but weaker associations of swine operations with community-associated MRSA and skin and soft-tissue infection. Molecular testing of 200 isolates identified 31 unique *spa* types, none of which corresponded to CC398 (clonal complex 398), but some have been previously found in swine. Proximity to swine manure application to crop fields and livestock operations each was associated with MRSA and skin and soft-tissue infection. These findings contribute to the growing concern about the potential public health impacts of high-density livestock production.

Donham KJ, Wing S, Osterberg D, al et, Flora JL, Hodne C, et al. Community health and socioeconomic issues surrounding concentrated animal feeding operations. Environ Health Perspect. 2007 Feb;115(2):317-20.
Link: https ://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817697/

> A consensus of the Workgroup on Community and Socioeconomic Issues was that improving and sustaining healthy rural communities depends on integrating socioeconomic development and environmental protection. The workgroup agreed

that 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," applies to rural communities. These principles are embodied in the following main points agreed upon by this workgroup. Healthy rural communities ensure a) the physical and mental health of individuals, b) financial security for individuals and the greater community, c) social well-being, d) social and environmental justice, and e) political equity and access. This workgroup evaluated impacts of the proliferation of concentrated animal feeding operations (CAFOs) on sustaining the health of rural communities. Recommended policy changes include a more stringent process for issuing permits for CAFOs, considering bonding for manure storage basins, limiting animal density per watershed, enhancing local control, and mandating environmental impact statements.

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.

Heaney CD, Myers K, Wing S, Hall D, Baron D, Stewart JR. Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. Sci Total Environ. Elsevier; 2015; 511:676-83.
Link: http : //www . sciencedirect. com/science/article/pii/S0048969714017641

Swine farming has gone through many changes in the last few decades, resulting in operations with a high animal density known as confined animal feeding operations (CAFOs). These operations produce a large quantity of fecal waste whose environmental impacts are not well understood. The purpose of this study was to investigate microbial water quality in surface waters proximal to swine CAFOs including microbial source tracking of fecal microbes specific to swine. For one year, surface water samples at up- and downstream sites proximal to swine CAFO lagoon waste land application sites were tested for fecal indicator bacteria (fecal coliforms, Escherichia coli and Enterococcus) and candidate swine-specific microbial source-tracking (MST) markers (Bacteroidales Pig-l-Bac, Pig-2-Bac, and Pig-Bac-2, and methanogen P23-2). Testing of 187 samples showed

high fecal indicator bacteria concentrations at both up- and downstream sites. Overall, 40%, 23%, and 61% of samples exceeded state and federal recreational water quality guidelines for fecal coliforms, E. coli, and Enterococcus, respectively. Pig-1 -Bac and Pig-2-Bac showed the highest specificity to swine fecal wastes and were 2.47 (95% confidence interval [CI] = 1.03, 5.94) and 2.30 times (95% CI = 0.90, 5.88) as prevalent proximal down- than proximal upstream of swine CAFOs, respectively. Pig-l-Bac and Pig-2-Bac were also 2.87 (95% CI = 1.21, 6.80) and 3.36 (95% CI = 1.34, 8.41) times as prevalent when 48-hour antecedent rainfall was greater than versus less than the mean, respectively. Results suggest diffuse and overall poor sanitary quality of surface waters where swine CAFO density is high. Pig-1 -Bac and Pig-2-Bac are useful for tracking off-site conveyance of swine fecal wastes into surface waters proximal to and downstream of swine CAFOs and during rain events.

Horton RA, Wing S, Marshall SW, Brownley KA. Malodor as a trigger of stress and negative mood in neighbors of industrial hog operations. Am J Public Health. 2009 Nov;99 Suppl 3:S610-5.
Link: https://www.ncbi.nlm.nih.gov/pubmed/19890165

Objectives. We evaluated malodor and air pollutants near industrial hog operations as environmental stressors and negative mood triggers.
Methods. We collected data from 101 nonsmoking adults in 16 neighborhoods within 1.5 miles of at least 1 industrial hog operation in eastern North Carolina. Participants rated malodor intensity, stress, and mood for 2 weeks while air pollutants were monitored.
Results. Reported malodor was associated with stress and 4 mood states; odds ratios (ORs) for a 1-unit change on the 0-to-8 odor scale ranged from 1.31 (95% confidence interval [CI] = 1.16, 1.50) to 1.81 (95% CI = 1.63, 2.00). ORs for stress and feeling nervous or anxious were 1.18 (95% CI = 1.08, 1.30) and 1.12 (95% CI = 1.03, 1.22), respectively, for a 1 ppb change in hydrogen sulfide and 1.06 (95% CI = 1.00, 1.11) and 1.10 (95% CI = 1.03, 1.17), respectively, for a 1 $\mu g/m^3$ change in semivolatile particulate matter less than 10 μm in aerodynamic diameter (PM_{10}).
Conclusions. Hog odor, hydrogen sulfide, and semivolatile PK◦ are related to stress and negative mood in disproportionately low-income communities near industrial hog operations in eastern North Carolina. Malodor should be considered in studies of health impacts of environmental injustice.

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.

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 Jul;118(1):e66-75.
Link: http://pediatrics.aappublications.org/content/118/1/e66

Objectives. Little is known about the health effects of living in close proximity to industrial swine operations. We assessed the relationship between estimated exposure to airborne effluent from confined swine feeding operations and asthma symptoms among adolescents who were aged 12 to 14 years.
Methods. During the 1999-2000 school year, 58,169 adolescents in North Carolina answered questions about their respiratory symptoms, allergies, medications, socioeconomic status, and household environments. To estimate the extent to which these students may have been exposed during the school day to air pollution from confined swine feeding operations, we used publicly available data about schools (n = 265) and swine operations (n = 2343) to generate estimates of exposure for each public school. Prevalence ratios and 95% confidence intervals for wheezing within the past year were estimated using random-intercepts binary regression models, adjusting for potential confounders, including age, race, socioeconomic status, smoking, school exposures, and household exposures.
Results. The prevalence of wheezing during the past year was slightly higher at schools that were estimated to be exposed to airborne effluent from confined swine feeding operations. For students who reported allergies, the prevalence of wheezing within the past year was 5% higher at schools that were located within 3 miles of an operation relative to those beyond 3 miles and 24% higher at schools in which livestock odor was noticeable indoors twice per month or more relative to those with no odor.
Conclusions. Estimated exposure to airborne pollution from confined swine feeding operations is associated with adolescents' wheezing symptoms.

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).
Results. Among 99 ILO and 105 AFLO participants, *S. aureus* nasal carriage prevalence was 41% and 40%, respectively. Among ILO and AFLO *S. aureus* carriers, MRSA was detected in 7% (3/41) and 7% (3/42), respectively. Thirty seven percent of 41 ILO versus 19% of 42 AFLO *S.* aureus-positive participants carried MDRSA. *S. aureus* clonal complex (CC) 398 was observed only among workers and predominated among ILO (13/34) compared with AFLO (1/35) *S.* aureus-positive workers. Only ILO workers carried scn-negative MRSA CC398 (2/34) and scn-negative MDRSA CC398 (6/34), and all of these isolates were tetracycline resistant.
Conclusions. Despite similar *S. aureus* and MRSA prevalence among ILO and AFLO-exposed individuals, livestock-associated MRSA and MDRSA (tetracycline-resistant, CC398, scn-negative) were only present among ILO-exposed individuals. These findings support growing concern about antibiotics use and confinement in livestock production, raising questions about the potential for occupational exposure to an opportunistic and drug-resistant pathogen, which in other settings including hospitals and the community is of broad public health importance.

Sapkota AR, Curriero FC, Gibson KE, Schwab KJ. Antibiotic-resistant enterococci and fecal indicators in surface water and groundwater impacted by a concentrated swine feeding operation. Environ Health Perspect. 2007 Jul;115(7):1040-5.
Link: https://www.ncbi.nlm.nih.gov/pubmed/17637920

Background. The nontherapeutic use of antibiotics in swine feed can select for antibiotic resistance in swine enteric bacteria. Leaking swine waste storage pits and the land-application of swine manure can result in the dispersion of resistant bacteria to water sources. However, there are few data comparing levels of resistant bacteria in swine manure—impacted water sources versus unaffected sources.
Objectives. The goal of this study was to analyze surface water and groundwater situated up and down gradient from a swine facility for antibiotic-resistant enterococci and other fecal indicators.
Methods. Surface water and groundwater samples (n = 28) were collected up and down gradient from a swine facility from 2002 to 2004. Fecal indicators were isolated by membrane filtration, and enterococci (n = 200) were tested for susceptibility to erythromycin, tetracycline, clindamycin, virginiamycin, and vancomycin.
Results. Median concentrations of enterococci, fecal coliforms, and Escherichia coli were 4- to 33-fold higher in down-gradient versus up-gradient surface water and groundwater. We observed higher minimal inhibitory concentrations for four antibiotics in enterococci isolated from down-gradient versus up-gradient surface water and groundwater. Elevated percentages of erythromycin- ($p = 0.02$) and tetracycline-resistant ($p = 0.06$) enterococci were detected in down-gradient surface waters, and higher percentages of tetracycline- ($p = 0.07$) and clindamycin-resistant ($p < 0.001$) enterococci were detected in down-gradient groundwater.
Conclusions. We detected elevated levels of fecal indicators and antibiotic-resistant enterococci in water sources situated down gradient from a swine facility compared with up-gradient sources. These findings provide additional evidence that water

contaminated with swine manure could contribute to the spread of antibiotic resistance.

Schinasi L, Horton RA, Guidry VT, Wing S, Marshall SW, Morland KB. Air pollution, lung function, and physical symptoms in communities near concentrated swine feeding operations. Epidemiology. 2011 Mar;22(2):208-15.
Link: https://www.ncbi.nlm.nih.gov/pubmed/21228696

Background. Concentrated animal feeding operations emit air pollutants that may affect health. We examined associations of reported hog odor and of monitored air pollutants with physical symptoms and lung function in people living within 1.5 miles of hog operations.
Methods. Between September 2003 and September 2005, we measured hydrogen sulfide (H2S), endotoxin, and particulate matter (PM10, PM2.5, and PM2.5-10) for approximately 2-week periods in each of 16 eastern North Carolina communities. During the same time periods, 101 adults sat outside their homes twice a day for 10 minutes, reported hog odor and physical symptoms, and measured their lung function. Conditional fixed-effects logistic and linear regression models were used to derive estimates of associations.
Results. The log odds (±1 standard error) of acute eye irritation following 10 minutes outdoors increased by 0.53 (±0.06) for every unit increase in odor, by 0.15 (±0.06) per 1 ppb of H2S, and by 0.36 (+0.11) per 10 μg/m3 of PM10. Odor and H2S were also associated with irritation and respiratory symptoms in the previous 12 hours. The log odds of difficulty breathing increased by 0.50 (±0.15) per unit of odor. A 10 μg/m3 increase in mean 12-hour PM2.5 was associated with increased log odds of wheezing (0.84 ± 0.29) and declines in forced expiratory volume in 1 second (-0.04 ± 0.02 L). A 10 EU/mg increase in endotoxin was associated with increased log odds of sore throat (0.10 ± 0.05), chest tightness (0.09 ± 0.04), and nausea (0.10 ± 0.05).
Conclusions. Pollutants measured near hog operations are related to acute physical symptoms in a longitudinal study using analyses that preclude confounding by time-invariant characteristics of individuals.

Schulz J, Friese A, Klees S, Tenhagen BA, Fetsch A, Rosier U, 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 Aug;78(16):5666-71.
Link: http://aem.asm.org/content/78/16/5666.full

During 1 year, samples were taken on 4 days, one sample in each season, from pigs, the floor, and the air inside pig barns and from the ambient air and soil at different distances outside six commercial livestock-associated methicillin-resistant *Staphylococcus aureus* (LA-MRSA)-positive pig barns in the north and east of Germany. LA-MRSA was isolated from animals, floor, and air samples in the barn, showing a range of airborne LA-MRSA between 6 and 3,619 CFU/m(3) (median, 151 CFU/m(3)). Downwind of the barns, LA-MRSA was detected in low concentrations (11 to 14 CFU/m(3)) at distances of 50 and 150m; all upwind air samples were negative. In contrast, LA-MRSA was found on soil surfaces at distances of 50, 150, and 300m downwind from all barns, but no statistical differences could be observed between the proportions of positive soil surface samples at the three different distances. Upwind of the barns, positive soil surface samples were found only sporadically. Significantly more positive LA-MRSA

samples were found in summer than in the other seasons both in air and soil samples upwind and downwind of the pig barns. spa typing was used to confirm the identity of LA-MRSA types found inside and outside the barns. The results show that there is regular airborne LA-MRSA transmission and deposition, which are strongly influenced by wind direction and season, of up to at least 300m around positive pig barns. The described boot sampling method seems suitable to characterize the contamination of the vicinity of LA-MRSA-positive pig barns by the airborne route.

Wing S, Horton RA, Rose KM. Air pollution from industrial swine operations and blood pressure of neighboring residents. Environ Health Perspect. 2013 Jan;121(1):92-6.
Link: https://ehp.niehs.nih.gov/1205109/

Background. Industrial swine operations emit odorant chemicals including ammonia, hydrogen sulfide (H2S), and volatile organic compounds. Malodor and pollutant concentrations have been associated with self-reported stress and altered mood in prior studies.
Objectives: We conducted a repeated-measures study of air pollution, stress, and blood pressure in neighbors of swine operations.
Methods. For approximately 2 weeks, 101 nonsmoking adult volunteers living near industrial swine operations in 16 neighborhoods in eastern North Carolina sat outdoors for 10 min twice daily at preselected times. Afterward, they reported levels of hog odor on a 9-point scale and measured their blood pressure twice using an automated oscillometric device. During the same 2- to 3-week period, we measured ambient levels of H2S and PM10 at a central location in each neighborhood. Associations between systolic and diastolic blood pressure (SBP and DBP, respectively) and pollutant measures were estimated using fixed-effects(conditional) linear regression with adjustment for time of day.
Results. PM10 showed little association with blood pressure. DBP [13 (SE)] increased 0.23 (0.08) mmHg per unit of reported hog odor during the 10 min outdoors and 0.12 (0.08) mmHg per 1-ppb increase of H2S concentration in the same hour. SBP increased 0.10 (0.12) mmHg per odor unit and 0.29 (0.12) mmHg per 1-ppb increase of H2S in the same hour. Reported stress was strongly associated with BP; adjustment for stress reduced the odor—DBP association, but the H2S—SBP association changed little.
Conclusions. Like noise and other repetitive environmental stressors, malodors may be associated with acute blood pressure increases that could contribute to development of chronic hypertension.

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 2022-04

AMENDED CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) ORDINANCE

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

Section 1. Authority

This Ordinance is adopted pursuant to the powers granted under 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 and Sec. 66.0415 of Wis. Statutes, which allows a town to regulate "any industry, thing or place where any nauseous, offensive or unwholesome business is carried on."

Section 2. Purpose and Findings

Purpose: The purpose of this Ordinance is to effectively, efficiently and comprehensively regulate the operation of Large-Scale Concentrated Animal Feeding Operations of 500 animal units or greater ("CAFO") in the Town of Trade Lake (also referred to as "the Town"), 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, and to preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of the Town of Trade Lake and to achieve water quality standards within the Town of Trade Lake. This Ordinance sets forth the procedures for obtaining and maintaining a CAFO Operations Permit for the operation of new and expanded livestock facilities in the Town of Trade Lake (sometimes referred to as "the Town").

Findings: 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.

By Resolution No. 20-04 the Board authorized the creation of the "CAFO Permitting Study Committee" (the "Committee") to evaluate and review the potential effects of CAFO's on health, safety, and general welfare of the residents of the Town, including impact on air quality, public infrastructure, property values, and the local economy. By Resolution No. 22-02 the Board extended the mission of the Committee through December 31, 2022.

The Committee presented its Report to the Board on February 10, 2022. The Board adopts the findings contained in the Committee's Report and Appendix in support of this Amended Concentrated Animal Feeding Operations Ordinance and incorporates those findings herein by reference.

The Town finds that there is ample scientific research and evidence establishing that CAFO's 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. The findings contained in the Committee's Report and the references contained in the Appendix to that Report support the Conditions set forth below.

Section 3. Definitions

a. "Applicant" or "Permit Holder" refer to the entity seeking a CAFO Operations Permit under the terms of this Ordinance.

b. "Large-Scale Concentrated Animal Feeding Operation" or "CAFO" means a lot or facility, other than a pasture or grazing area, where 500 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 500 or more animal units and at least one of the following is true: (1) The operations are adjacent; (2) The operations utilize common systems for the land spreading of manure or wastes; (3) Animals are transferred between the lots or facilities; (4) The lots or facilities share staff, vehicles, or equipment; or (5) Manure, barnyard runoff or other wastes are comingled in a common storage facility at any time.

c. "Operations" means a course of procedure or productive activity for purposes of conducting and carrying on the business of a CAFO including populating animal housing facilities, storing and managing animal and other waste materials, and conducting any other business activities.

d. "Pollution" means degradation that results in any violation of any environmental law as determined by an administrative proceeding, civil action, criminal action or other legal or administrative action investigation or proceeding.

e. "Private Nuisance" means a nontrespassory invasion of another's interest in the private use and enjoyment of land, and the invasion is either: (1) intentional and unreasonable, or (2) unintentional and otherwise actionable under the rules of controlling liability for negligent or reckless conduct, or for abnormally dangerous conditions or activities.

f. "Public Nuisance" means a thing, act, occupation, condition or use of property which shall continue for such length of time as to " (1) substantially annoy, injure or endanger the comfort, health, repose or safety of the public; (2) in any way render the public insecure in life, health or in the use of property; or (3) unreasonably and substantially interfere with, obstruct or tend to obstruct or render dangerous for passage or public use any street, alley, highway, navigable body of water or other public way or the use of public property or other public rights.

Section 4. Permit Required

Regardless of siting, a livestock facility with 500 or more animal units shall be allowed to conduct operations within the Town of Trade Lake only as provided under this Ordinance. Applicants shall apply for a CAFO Operations Permit to operate in the Town of Trade Lake under this Ordinance prior to conducting any operations. Existing operations that exceed the 500-animal unit threshold for application of the ordinance will have 5 years from the date the ordinance is enacted to come into compliance, unless the existing operation increases in size by 20%, based upon the size of the operation at the time the ordinance was enacted. An existing operation that exceeds 500 animal units and increases in size by more than 20% must comply with the ordinance.

a. General

A CAFO Operations Permit issued by the Town of Trade Lake is required for 1) new or 2) expanded livestock facilities that will operate with 500 or more animal units.

b. Permits for Existing Livestock Facilities

A CAFO Operations Permit is required for the expansion of a pre-existing or previously approved livestock facility if the number of animal units kept at the expanded livestock facility will exceed 500 animal units.

Section 5. Licensing Administration

The Town Board shall administer this Ordinance and related matters thereto and shall have the authority to issue permits under this Ordinance. The Board may also designate an individual or committee to issue permits under this ordinance.

Section 6. Permit Application and Standards

The Applicant shall apply for a CAFO Operations Permit prior to conducting any operations associated with a Large-Scale Concentrated Animal Feeding Operation in the Town of Trade Lake. The application shall be submitted on a form provided by the Town Clerk.

The Town Board shall decide whether to approve and issue a CAFO Operations Permit to an Applicant that has submitted a complete application and paid the required application fee, after holding a public hearing on the application and considering any evidence concerning the application and the proposed operation presented by the Applicant and any other interested persons or parties, including members of the public and other governmental agencies or entities. The Town may need to retain special legal counsel and expert consultants to assess an application. If that occurs, the Applicant agrees to reimburse the Town for the actual cost of such special legal counsel and expert consultants hired by the Town Board to review the application and advise the Town Board. Those costs may exceed the application fee set forth in Section 7.

The Town Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it is determined by a majority vote of all members, supported by clear and convincing evidence presented by the Applicant, that the operations as proposed, with or without conditions, will 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 of Trade Lake, and that the Applicant and the application meets all other requirements of this Ordinance.

Section 7. Permit Application Fee

A non-refundable application fee of One Dollar ($1.00) per proposed animal unit payable to the Town of Trade Lake shall accompany an application for the purpose of offsetting the Town costs to review and process the application.

Section 8. Application Procedure

a. An Applicant for a CAFO Operations Permit shall complete a Town of Trade Lake CAFO Operations Permit Application and pay the required application fee. At the time the application is submitted, the Applicant must be an owner or officer of the corporate entity proposing to operate the CAFO and sign the application. The application must also 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, approved by the Town, who attest that they have prepared or reviewed the plans and certify that they will meet the following performance requirements, as further clarified in the "conditions" section, below:

1. Prevent the spread of infectious diseases from the CAFO to other animals, livestock and humans;

2. The CAFO Waste Management Plan as implemented with engineered perimeter berms and liners, or equivalent or better containment measures, will prevent any obnoxious odors emanating from waste management activities, any discharge of contaminated runoff to surface water, and any seepage to ground water, including impacts to surface water and ground water from offsite management or disposal of animal wastes and that the CAFO has applied for and will not operate until it has received zero-discharge permit from the State, or in absence of action by the State, from the Town, a local zero discharge waste water and storm water permit(s);

3. The Animal Population Control and Depopulation Plans provide for the daily recording and reporting of animal counts and mortality and reporting to the Town of Trade Lake (the Town Board unless the Town Board has designated a person or committee to fulfill this function) within 24 hours of any unusual mortality, as defined in the plan, and that the provisions for managing the movement and transportation of livestock, containment and treatment of bodily fluids from carcasses, and safe disposal of carcasses, will prevent the spread of disease to other livestock, animals, workers and other residents and humans in the area;

4. The Biosecurity and Animal Health Plan provides for: 1) the health and humane treatment of all animals; routine observation and testing for diseases of concern--as defined in the plan; 2) the separation and quarantine of diseased animals; 3) the separation and quarantine of animals in contact with diseased animals; 4) euthanasia when required; 5) the handling and disposal of diseased animals, sufficient to prevent the spread of disease other animals and humans inside and outside of the facility; 6) for quarterly reporting of animal testing results; 7) plan-specified enforceable metrics; 8)

confirmation by a third-party inspector (selected or approved of by the Town) that, based on plan-specified enforceable metrics, the livestock and conditions at the facility are healthy and that any deviations from the metrics and/or any detection of diseases of concern will be immediately reported to the local health department and Town-designated local authority; 9) adequate financing for and immediate implementation of emergency containment measures by third-party contractors (selected or approved of by the Town) that includes testing of workers and contractors who may have come into contact with diseased animals and other emergency measures in the event of an outbreak of disease, based on the latest authoritative disease containment guidance;

5. The Animal Transportation Plan, in combination with the biosecurity and animal health plans, will provide for the safe transportation of all livestock to and from the CAFO, the disinfection of transport trailers and treatment of water used to disinfect trailers, the prevention of disease, and provide for coordination with local traffic and road authorities to assure their safe transport and prevent traffic accidents and to provide the necessary emergency response measures in the event of an accident;

6. The Water Use Plan is based on a thorough hydrogeologic characterization study, including identification of all onsite and nearby wells and springs, and artesian fed streams and water bodies (including ponds, wetlands, and lakes) within 5 miles, and that the planned use of water will have no impact, considering projected 50-year growth of population in the area, on the flow rate, extent, volume and storage capacity for any existing well or spring, or artesian fed water body within 2 miles of the CAFO and the quarterly reporting of water use to the local authority or their designated hydrogeologist. The Water Use Plan must include a procedure for metering of any wells utilized by the Applicant;

7. The Odor and Toxic Air Pollution Prevention Plan will prevent the presence of odiferous smells noticeable to human olfactory and the detection of toxic air pollutants along the property boundaries and provides for adequate offsets, waste containment, air and odor emission control devices including particulate filters to prevent air pollution and the transmission of disease particles from the CAFO or offsite waste management area;

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

9. The Construction, Fire and Road Plans, including signed engineered drawings for the measures required to meet the performance requirements of this ordinance and the measures specified in the plan have been submitted with the application, and include a fire-prevention/fire-fighting capacity/fire-water capacity needs analysis and the requisite fire water storage/fire prevention/fire-fighting equipment plans, as well as a traffic study and road improvement needs analysis and road traffic and roadway improvement plans, along with letters of conformance, on agency letterhead, stating that application-submitted plans are complementary with and are in conformance with

the associated traffic and road plans and requirements of and from the local, regional, state and federal road and transportation authorities;

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

11. The Compliance Assurance Plan shall be updated annually and document that the prepared plans and procedures are based on sound science and: include an updated review of best practices and technologies and test methods; provide for specific compliance metrics to assure the performance requirements of the plans are met and the permit approval conditions are satisfied; provide for annual audits, inspections, and certification by qualified, experienced, and licensed third party(ies) (selected or approved of by the Town); and compliance with the procedures and provisions of the various operational plans;

b. Upon signing and submitting a CAFO Operations Permit Application to the Town Clerk, the Applicant shall unconditionally agree 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 shall submit an administrative fee deposit as required by the Town Clerk.

c. After receiving the application and the application fee, the Town Clerk shall mail a notice that a CAFO Operations Permit Application has been received to all landowners within 3 miles of the proposed CAFO with the date and time of a Town Board meeting at which the application will be considered. The notice shall provide information on how interested persons and parties may inspect and obtain a copy of the application.

d. The Town Clerk shall place the application on the agenda for the next regular Town Board meeting for which required notice can be provided.

e. At a formal public hearing held by the Town Board on the application at least sixty (60) days after it has been determined to be complete, the Town Board shall consider any evidence concerning the application and the proposed CAFO presented by the Applicant and any other interested persons or parties, including members of the public and other governmental agencies or entities, and special legal counsel and expert consultants who may be hired by the Town to review the application and advise the Town Board. The Applicant agrees to reimburse the Town for the actual cost of special legal counsel and consultants hired by the Town Board to review the application and advise the Town Board.

f. In its review and consideration of a CAFO Operations Permit Application, the Town Board shall act in a quasi-judicial capacity, and its final decision on whether to approve and issue a CAFO Operations Permit, either with or without conditions, shall be based on written findings of fact and conclusions of law consistent with the provisions of this Ordinance, which shall be filed with the Town Clerk and served on the Applicant by regular U.S. Mail.

g. The Town Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it determines by a majority vote of all members of the Town Board, supported by clear and convincing evidence presented by the Applicant, that the operations of the proposed CAFO, with or without conditions, will protect health (including human and animal), 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 and that the application meets all other requirements of this Ordinance.

Section 9. Financial Surety

A CAFO Operations Permit shall require the Applicant and all contractors, subcontractors, agents and representatives, to ensure that 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 as planned and permitted, based on the following provisions:

a. A determination shall be made of the amount of financial assurance required by the scale of the operation. As a condition of the permit, the required financial assurance shall be filed with the Town of Trade Lake in an amount sufficient to clean up environmental contamination if the same were to occur, to abate public nuisances caused by the operation, including but not limited to the testing and replacement of any potentially contaminated private and public wells and water supplies within the areas subject to operations, and to ensure proper closure of the operations should the Applicant elect to close or should closure occur for some other reason. Upon notification of the required financial assurance, but prior to commencing operations, the Applicant shall file with the Town Clerk the financial assurance conditioned on faithful performance of all requirements for the permit. Upon notification of finance assurance or deposit approval and conformance with permit conditions, the Applicant may commence operations.

b. The Applicant may deposit cash or irrevocable letters of credit established with a bank acceptable to the Town as the required financial assurance.

c. The Town may reevaluate and adjust accordingly the amount of the financial assurance required on an annual basis.

Section 10. Conditions of Approval

A CAFO Operations Permit may be approved with conditions 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. To the extent not expressly or

otherwise preempted by Wis. Stat. 93.90, and Wis. Admin. Code Ch. ATCP 51 or any other provision of state or federal law, such conditions may include, but are not limited to:

1. Conditions relating to the operational characteristics of the proposed operation, to protect public health, prevent point and non-point sources of air and water pollution, and prevent private nuisances and public nuisances;

a) Information Provided Pursuant to These Conditions and Consent to Conditions

As a condition of operating within the Town of Trade Lake the Applicant agrees that the information required by the Town of Trade Lake to be produced and maintained, as set forth in these conditions, is not confidential, a trade secret or proprietary. Any claim as to the confidential or alleged protected nature of the information referenced in these conditions is waived by the Applicant as a condition of operating in the Town of Trade Lake. By submitting an application to operate in the Town of Trade Lake the Applicant acknowledges that the information provided pursuant to these conditions shall be accessible to representatives of the Town of Trade Lake, Representatives of Burnett County and representatives of the State of Wisconsin and that this information may be made public on Town, County or State websites or in response to requests made under the Freedom of Information Act. Furthermore, by accepting a Permit issued by the Town containing conditions imposed hereunder, the Applicant submits itself to the jurisdiction of the Town and agrees and consents to the terms of the conditions imposed hereunder.

b) Violations and Sanctions for Failure to Comply with Conditions

Violations of the Conditions contained in any Permit issued pursuant to the Town's ordinance may be enforced by the Town Board or any committee authorized by the Board to oversee CAFO operations.

Violation of Conditions imposed by the Town of Trade Lake shall result in assessment to the Applicant of all costs required to investigate and remediate any damages caused by the violation. Violations of Conditions imposed by the Town of Trade Lake may also result in lump-sum penalties if the violation has been cured or daily penalties that accrue until the violation has been cured. Such lump-sum or accruing penalties may include the cost of professional monitoring or assessment by engineers or other technical experts retained by the Town to address the violation.

Depending upon the nature and extent of the Violation of Conditions imposed by the Town of Trade Lake, the Town may withdraw the Applicant's Permit to operate until all violations have been cured. Serious or repeated Violations of Conditions imposed by the Town of Trade Lake may result in permanent withdrawal of an Applicant's Permit to operate.

c) False Statements or Misrepresentations

Any false statement or misrepresentation made by the Applicant in its application or in information provided to the Town, County or State in association with an application to operate a CAFO within the Town of Trade Lake shall be grounds for denial of a Permit.

d) Construction and Fire Plans

The Applicant must include signed engineered drawings for the measures required to meet the performance requirements of this ordinance and the measures specified in the plans submitted with the application. The Applicant shall include a fire-prevention/fire-fighting capacity/fire-water capacity needs analysis and the requisite fire water storage/fire prevention/fire-fighting equipment plans.

2. **Conditions relating to the management of animal and other waste that may be generated as part of an operations' ongoing operation, to protect public health, prevent point and non-point sources of air and water pollution, and prevent private nuisances and public nuisances**;

a) In addition to the requirements stated below, see requirements for disposal of manure under Condition 6.

b) Design: The production area shall be designed, operated and maintained to contain the entire design storage volume. To contain means to prevent any release of any pollutant from the area, including by leakage into groundwater.

c) Design storage volume means double the estimated volume of manure, litter and other processed waste waters accumulated during the storage period.

d) New facilities may not use outdoor lagoons.

e) The Waste Management Plan required by Section 8(a)(2) will include scientifically significant baseline data on the water quality of local human drinking and agricultural wells.

f) A site-specific assessment shall be done by a Professional Engineer.

g) Inspections: Each facility must conduct and record inspections of the production and storage areas (and as otherwise required of the fields where manure is deposited) according to the schedule and standards attached to this Permit.

- Inspection records are public property and must be provided to listed authorities upon request and at least every 6 months.
- Each facility must correct any identified deficiencies within 48 hours of discovery. Correcting an identified deficiency does not relieve the owner or operator of responsibility for reporting any Permit violation.
- Dead animals shall be disposed of in a manner that prevents creation of a public health hazard. All handling practices shall be in accordance with all applicable state and local regulatory requirements. (See Condition 3.)
- Daily visual inspections for mortalities shall be performed and mortalities shall be removed and disposed of upon discovery. (See Condition 3.)
- Clean water must be diverted, as appropriate, from the production area. Any clean water that is not diverted and comes into contact with raw materials, products or by-

products including manure, litter, feed, or bedding is subject to the effluent limitations specified above.

- Each facility must prevent direct contact of confined animals with the waters of the state or with land within 30 feet of the waters of the state.
- Permit Holders must ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, or processing area or in any stormwater storage or treatment system unless specifically designed to treat such chemicals and other contaminants. (Ex. Pesticides and petroleum products).

h) Nutrient Management Plan (NMP)

i. Site Specific Conservation Practices: Site specific practices to be implemented include buffers or equivalent practices, to control runoff of pollutants to waters of the state, and specifically to minimize the runoff of nitrogen and phosphorus. The NRCS Practice Standard, Code 590, including residue management, conservation crop rotation, grassed waterways, strip cropping, vegetated buffers, riparian buffers, setbacks, terracing and diversions may be utilized to prevent runoff of pollutants. At a minimum, such practices must be adequate to keep erosion levels in each field at or below the soil loss tolerance specified by the Town of Trade Lake Licensing Authority.

ii. Additional prevention of runoff attention must be given to areas at greater risk for erosion due to topography or increased potential to contribute to pollution of the waters of the state.

iii. Injection or "knifing in" of manure onto local fields is required. No form of surface spraying shall be allowed.

iv. Signed leases with disclosure of manure spreading to property owners receiving such are required for each property utilized for disposal/spreading of manure.

v. Disclosure of loss of any leases to Trade Lake Town Board.

vi. Adherence to all record keeping requirements per separate document.

3. Conditions relating to the population and depopulation of individual animal housing facilities, to protect public health and prevent the spread of animal-borne and vector-borne disease, to assure a safe level of sanitation, and to assure human health hazard control or health protection for the community;

a) The Animal Population Control and Depopulation Plans provide for the daily recording and reporting of animal counts and mortality and reporting to the Town-designated local authority within 24 hours of any unusual mortality, as defined in the plan, and that the provisions for managing the movement and transportation of livestock, containment and treatment of bodily fluids from carcasses, and safe disposal of carcasses, will prevent the spread of disease to other livestock, animals, workers and other residents and humans in the area.

b) Applicant's depopulation plan shall include a three-step, or 3D,

process - Depopulation, Disposal and Disinfectant. All or parts of this process shall apply to three circumstances:

i) **Standard mortality** - The tonnage of dead animals produced annually by normal operations is substantial. For example, mortality rates in a typical 5,000 sow farrow-to-finish farming system run up to 10% and will produce over 200,000 pounds of carcasses annually. In many systems losses may be higher. Horizontal integration of livestock agriculture systems can concentrate mortality losses into smaller and smaller geographic areas.

ii) N**on-diseased animal catastrophe** - The need for the 3D process can be triggered by catastrophic events such as the hurricanes, tornadoes or fire. In addition, CAFOs can be impacted by human pandemics. For example, chicken and hog CAFOs were forced to depopulate in 2020 when high worker Covid-19 infection rates shutdown processing plants.

iii) **Diseased animal catastrophe** - CAFO operators face disease outbreaks such as Foot-and-Mouth, Avian Influenza and Porcine Reproductive and Respiratory Syndrome (PRRS). Minnesota and Iowa have an especially virulent PRRS mutant affecting both sow and hog finishing barns. USDA earmarked $500 million in September 2021 in an effort to keep the global African Swine Fever outbreak from entering the country.

c) Each part of the plan shall include, at a minimum the following components:

i. Removal of livestock/Euthanasia protocols.

ii. Protocols for removal of any biohazardous materials, including but not limited to animals that have been euthanized from the facility, including the use of protective equipment, temporary storage of the carcasses outside the buildings during the removal.

iii. Protocols for disposal of the carcasses or animal tissue (e.g., Composting on-site; Composting off-site; Burial; Burial above ground; Rendering; Incineration; Burning (mobile gasifier or similar). The plan shall include an estimate of the volume of animal carcasses (in pounds) expected annually and, once operations begin, actual numbers of the volume of animal carcasses (in pounds) shall be provided to the Town. Animal carcasses and related material must be removed promptly and frequently from the site so that they do not generate odors or excess insect populations. When carcasses and related materials are removed from the site, the materials being removed must be in an enclosed truck or trailer to contain odors and ensure that debris does not fall out.

iv. If carcasses and related materials are to be composted, a composting plan must be approved by an environmental engineering firm (selected or approved of by the Town) to ensure the health and safety of the residents of the area. If the composting results in objectionable odor the CAFO will have to use other means to dispose

of the carcasses.

v. Protocols for remediation of any pollution, including contaminated soils or waters and chemical disinfection of all contaminated structures, equipment, vehicles, and surfaces on the premises follows animal euthanasia and disposal and application of insecticides and rodenticides.

vi. Protocols for repopulating the facility with stock free of major diseases. Producers shall thoroughly analyze risk factors for herd re-infection as well as the level of biosecurity that can be maintained. Hog CAFOs located in swine-dense areas are at great risk for re-infection.

vii. No animal carcasses or related material may be hauled into the site from other locations.

viii. The removal of equipment.

4. **Conditions relating to biosecurity and the maintenance of animal health and welfare, to prevent the spread of animal-borne and vector-borne disease, to protect public health, and provide for animal safety and welfare**;

a) In the context of animal agriculture, biosecurity is a series of management steps and practices implemented to prevent: 1) the introduction of infectious agents, especially Foreign Animal Diseases (FAD), into a herd or flock; 2) the spread of these agents through the herd; and 3) the spread of these agents out of the herd to other animals or humans. Each Applicant must produce an acceptable Biosecurity and Animal Health Plan. The Biosecurity and Animal Health Plan provides for the health and humane treatment of all animals, routine observation and routine testing for diseases of concern--as defined in the plan--and for the separation and quarantine of diseased animals and animals in contact with diseased animals, their euthanasia, and the handling and disposal of diseased animals, sufficient to prevent the spread of disease to workers, other livestock and animals and to humans. The Biosecurity and Animal Health Plan must also provide for quarterly reporting by a third-party inspector of animal testing results and plan-specified enforceable metrics, confirmation that the livestock and conditions at the facility (based on plan-identified metrics) are healthy, any deviations from the metrics, and that any detection of diseases of concern will be immediately reported to the local health department and local authority. The plan must provide for adequate financing and immediate implementation of emergency containment measures by third-party contractors, including testing of workers and contractors who may have come into contact with diseased animals, and other emergency measures in the event of an outbreak of disease, based on the latest authoritative disease containment guidance

The movement of people and equipment among livestock farms is a primary route of transmission for disease. Inspection of cleanliness and disinfection of

incoming transport vehicles may be necessary for the Biosecurity and Animal Health Plan to be effective. Mitigation strategies to tackle outbreaks go beyond ordinary preventative measures. Accordingly, strategies such as animal traceability, disease syndrome reporting, and analysis and risk-based herd health management should all be considered when preparing the Biosecurity and Animal Health Plan.

b) A strong biosecurity program is critical and must be properly implemented by the Applicant and not just developed as a plan on paper. The protocol shall include the following components:

i) Utilization of technology needed to characterize rapidly evolving, highly pathogenic and efficiently transmitted viruses.

ii) A plan to notify the Town, County and State within 24 hours of the Applicant becoming aware of the presence 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.

5. Conditions relating to transportation of animals as part of the ongoing operations, to protect public health, prevent pollution, and prevent private nuisances and public nuisances;

a) General Use of the Roadways

The Applicant will prepare a Transportation Plan which shall include a traffic study, road improvement needs analysis and road traffic and roadway improvement plans, along with letters of conformance, on agency letterhead, stating that application-submitted plans are complementary with and are in conformance with the associated traffic and road plans and requirements of and from the local, regional, state and federal road and transportation authorities.

The plan will also include the following elements:

i) Due to the recreational nature of the Trade Lake area, and the large number of people that use our roads to walk, bike, ride ATV's and ride snowmobiles, all trucking and moving of materials in and out of the CAFO facility will be done during standard business hours of 8:00 AM to 5:00 PM Monday through Friday. This includes the use of farm tractors and any other such vehicles.

ii) All trucks, tractors and farm equipment will follow all weight limits and laws. Any and all increased or enhanced maintenance or damage to roadways will be repaired by the Town or County having jurisdiction over the roadway. The CAFO will be responsible for reimbursing the appropriate governmental subunit for the total cost of the required increased or enhanced maintenance or repairs.

iii) The exterior of trucks, tractors and all other farm vehicles when leaving the property will be free from manure and other debris in order to keep the roadways roads clean and free from debris.

iv) Jake braking will not be allowed.

v) Livestock trucks will be designed and operated in such a way so that material will not fall from them.

vi) All vehicles going in and out of the facility will comply with the cleaning and sterilization requirements contained in the Applicant's Biosecurity and Animal Health Plan.

b) Mandatory Transportation Log

The Applicant shall keep a log of all trucks entering and leaving the Applicant's facility that are used for transportation of livestock, manure, feed, other waste (including biological and non-biological waste), construction material, or any other material identified by the Town of Trade Lake as falling under this condition.

The log shall include the following information:

i) the date and time the vehicle entered and left the facility;
ii) the identify the owner and company name of the trucking company;
iii) the type of truck, including the weight per axel;
iv) the license plate number of the truck;
v) the name of the insurance carrier insuring the vehicle and the insurance policy number;
vi) the name and driver's license number for the operator;
vii) the material being transported;
viii) where the truck came from and where it's next stop will be;
ix) if the truck is hauling drugs or disinfectants, a detailed explanation of their intended use;
x) if the truck is hauling live animals to the facility, where the animals came from, a copy of a certificate of health, the number of animals and their weight;
xi) if the truck is hauling live animals away from the facility, where the animals are going, a certificate of health, the number of animals and their weight.

All trucks hauling livestock have the risk of spreading diseases. To prevent the spread of disease, the Transportation Plan provide that all trucks shall be cleaned and washed with disinfectant before leaving the Applicant's facility. All wash water and cleaning materials will be considered to be infected and will have to be removed to an appropriate facility for treatment or storage of the contaminated water.

6. Conditions relating to protection of private and public drinking and agricultural wells, and other public water supplies, as part of an ongoing operation to protect public health, prevent pollution, and prevent private nuisances and public nuisances;

The Applicant will produce a Water Protection Plan that addresses protection of local wells, groundwater and surface water to protect the health, safety and welfare of Trade Lake residents and visitors. The water protection plan shall address the following:

a) The Applicant must disclose information regarding all wells that will be drilled or existing wells that will be utilized in its operation. The information shall include: 1) location; 2) depth; 3) pumping capacity; 4) rate of flow; and 5) ultimate use or purpose for the well. All wells utilized by the Applicant must be metered so as to effectively monitor the amount of water used by Applicant. The Town may place conditions on such wells to ensure that such wells do not cause significant environmental impact.

b) If the Applicant intends to dispose of manure by depositing the manure on local fields, whether those fields are within the Town of Trade Lake or outside of its boundaries, Applicant will provide executed field leases for each such property. Each lease must explicitly disclose that the field is going to be used for the disposal of manure or other animal byproducts and must contain a provision allowing representatives of the Town, at its discretion, to enter the property to perform testing or inspection. Any leases that lapse, are cancelled or otherwise become unenforceable shall be reported to the Town as soon as the change in status of the lease occurs. If the loss of a lease renders an Applicant unable to dispose of manure without complying with all of the conditions placed upon the Applicant, the Applicant shall find other acceptable methods of disposing of its manure or cease operations.

c) If the Applicant intends to dispose of manure by depositing the manure on local fields, whether those fields are within the Town of Trade Lake or outside of its boundaries, the amount of land used to spread waste as part of the Waste Management Plan in Section 8(a)(2) will be based on ***spreadable*** acres, not total acres.

d) If the Applicant intends to dispose of manure by depositing the manure on local fields, whether those fields are within the Town of Trade Lake or outside of its boundaries such manure must be injected or "knifed" into the ground or otherwise deposited below the surface of the field by other means. No surface spreading of any kind will be allowed.

e) Applicant may not deposit manure on any field where the water table is less than 24 inches from the surface.

f) Applicant may not deposit manure on fields that have slopes with a grade steep enough so that substantial manure runs off into adjacent ditches, streams, lakes, or adjacent fields for which the Applicant does not have an executed field lease. The term "substantial" when used in this section means sufficient to adversely affect any pond, lake, stream, creak, river or wetland into which the manure may run off.

g) Applicant may not deposit manure on fields when weather conditions exist that might cause the manure to run off the field into adjacent ditches, streams, lakes, or adjacent fields for which the Applicant does not have an executed field lease. For example, where precipitation is occurring or expected, or where the ground is frozen.

h) The Town is aware that there have been substantial failures, in Wisconsin and other states, of lines (pipes, hoses, etc.) transmitting manure to fields where the manure is applied. Such failures would be devastating in Trade Lake because of the number of waterways, wetlands, sensitive wildlife areas and the proximity to the St. Croix River. Accordingly, manure may not be transported in hoses, piping or other conduit running through or across drainage ditches, rivers, creeks, streams, ponds, lakes or wetlands.

i) Applicant must incorporate an emergency manure disposal procedure in its plan that provides for an alternative method of disposing of manure, other than knifing it into a farm field or depositing it below the surface of the field by other means, for occasions where weather conditions are not conducive to spreading manure or where the

Applicant no longer has sufficient acreage upon which to deposit manure. Such an alternative method may include, for example, approved waste treatment facilities. The Applicant should not expect to receive an exception to this condition.

j) In consultation with a qualified consultant, approved by or designated by the Town, the Applicant will provide the Town with a plan (and upon initiation of operations, effectuate that plan) for monitoring the groundwater on fields where manure is being spread. The consultant will determine the location, the frequency, and depth of groundwater test wells. Consultant will also determine how often test results need to be obtained. All test results for this and any other condition will be made available to the consulting expert, the Town of Trade Lake, representatives of Burnett County and representatives of the State of Wisconsin.

k) If the Applicant intends to deposit manure on fields that are adjacent to ditches, streams, creeks, rivers, ponds lakes, wetlands or other bodies of water, whether those bodies of water are permanent or seasonal, Applicant shall, in consultation with a qualified consultant, (selected or approved by the Town) provide the Town with a plan (and effectuate that plan) for monitoring any surface waters that could be affected by the Applicant's operation.

7. Conditions relating to air emissions and dust control as part of an ongoing operation, to protect public health, prevent pollution and prevent private nuisances and public nuisances;

The Applicant will submit an Air Emissions and Dust Control Plan that includes the following conditions:

a) In consultation with a qualified consultant, approved by or designated by the Town, the Applicant will provide the Town with a plan (and upon initiation of operations, effectuate that plan) for filtration of air exiting barns or other structures that are part of its operation.

b) The plan referenced in the preceding paragraph must include:

i) the incorporation of a filtration system for outgoing air exiting any building housing livestock or used for storage of manure, carcasses or other waste.
ii) engineering drawings of the outgoing air filtration system;
iii) identification of the make, model and specifications for the outgoing air filtration system;
iv) protocols for replacing and/or cleaning the filters or other components incorporated in the filtration system that require such maintenance;
v) protocols for the testing of air outside of the facility to monitor odor, chemicals including, but not limited to ammonia, hydrogen sulfide and methane, particulate matter and any other chemical or biological hazards that may be identified by the consultant. Such monitoring may also apply to field where manure is deposited.
vi) a description of setbacks and/or physical barriers incorporated into the design of the Applicant's facility

8. Conditions relating to protection of the private and public property rights and property values of affected property owners, as part of an ongoing operation, to protect the general welfare of the Town's residents and property owners, and to prevent private nuisances and public nuisances;

The Applicant will submit a Community Economic, Land-Use and Property Value Assessment and Impact Study performed by a licensed appraiser and qualified land use planner which demonstrates that there will be no negative impact to properties within 3 miles of Applicant proposed facility. Applicant will provide the Town with any studies appraisals or other information referenced in the Community Economic, Land-Use and Property Value Assessment and Impact Study.

9. Conditions relating to Permit compliance, enforcement and monitoring, including establishment of fees that may be assessed against the Permit Holder to cover the costs of hiring, training, and maintain Town personnel, or for contracting with private consultants, to conduct Permit compliance, enforcement and monitoring activities for the Town. Conditions relating to the monitoring of surface water, ground water, air quality and all other environmental factors and considerations.

The Applicant will provide financial surety to help enforce compliance with the conditions imposed by the Town, as set forth below**.**

a) Fees

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 evaluating Applicant's application, verifying and enforcing compliance with the terms of the Permit, with or without conditions, if approved by the Town Board. The Applicant shall submit an administrative fee deposit as required by the Town Clerk.

b) Financial Surety

i) Notification.
The Trade Lake Town Board shall determine the required financial assurance level of the CAFO and shall notify the Applicant. As a condition of a Permit, the Town Board shall require financial assurance to be filed with the Town Board in an amount sufficient to clean-up environmental contamination if the same were to occur, to abate public nuisances caused by CAFO operations, including but not limited to the testing and replacement of any potentially contaminated private and public wells and water supplies within the areas subject to CAFO operations, and to ensure proper closure of the CAFO, should the Applicant elect to close or should the closure occur for some other reason. Upon notification of the required financial assurance levels by the Town Board, but prior to commencing operations of the CAFO, the Applicant shall file with

the Town Board said financial assurance conditioned on faithful performance of all requirements of this chapter and the Permit. Upon notification by the Town Board of financial assurance or deposit approval and conformance with Permit conditions, the Applicant may commence CAFO operations.

c) Bond Requirements.

i) Bonds shall be issued by a surety company licensed to do business in this state. At the option of the Applicant or Permit Holder a performance bond or a forfeiture bond may be filed. Surety companies may have the opportunity to complete the clean-up of environmental contamination or complete proper closure of the CAFO in lieu of cash payment to the Town of Trade Lake.

ii) Each bond shall provide that the bond shall not be canceled by the surety, except after not less than 90 days' notice to the Town Board, in writing, by registered or certified mail. Not less than 30 days prior to the expiration of the 90-day notice of cancellation, the Applicant or Permit Holder under this chapter must deliver to the Town Board a replacement bond or approved alternate financial assurance in absence of which all CAFO operations shall cease.

iii) The bond shall be payable to "Town of Trade Lake, Wisconsin."

iv) The bond shall provide that the Town may obtain recovery from the bond through arbitration under the rules of the American Arbitration Association. The Town may recover against the bond for any damages to public or private property, degradation or impairment of surface water, groundwater or air quality. Trade Lake property owners may also bring action against the bond in the event that they are damaged by the Applicant's failure to comply with the terms of the conditions imposed hereunder.

d) Alternate Financial Assurance.

An Applicant or Permit Holder may deposit cash, irrevocable letters of credit, irrevocable trusts, established escrow accounts, negotiable certificates of deposit or negotiable government securities with the County in lieu of a bond. Certificates of Deposit shall be automatically renewed or replaced with an alternate security before the maturity date. Any interest earned by the financial assurance will be paid to the Applicant at the time such financial assurance is cancelled or withdrawn.

e) Financial Assurance Reevaluation.

i) The Trade Lake Town Board may reevaluate and adjust accordingly the amount of the financial assurance required for the CAFO, including reevaluating said financial assurance when requested to do so by the Applicant or Permit Holder, provided that the Applicant or Permit Holder may only request a reevaluation once per year.

ii) The Applicant or Permit Holder shall notify the Trade Lake Town Board in writing if there is a ten percent (10%) change in the average daily number of animal units housed at the CAFO in any 365 day period. This notification shall be provided at any time such a change occurs, and not just for financial assurance reevaluation.

iii) The Trade Lake Town Board shall notify the Applicant in writing within 60 days of a decision to adjust the amount of the financial assurance for the CAFO, whether the adjustment results in a greater or lesser financial assurance requirement.

f) Financial Assurance on Multiple Projects.

Any Applicant or Permit Holder that receives a Permit from the Trade Lake Town Board for two or more CAFOs may elect, at the time the second or subsequent CAFO is approved, to post a single financial assurance in lieu of separate financial assurance on each CAFO. Any financial assurance so posted shall be in an amount equal to the estimated cost to the Town to clean-up environmental contamination if the same were to occur at all such CAFOs, to abate public nuisances caused by CAFO operations, including but not limited to the testing and replacement of any potentially contaminated private and public wells and water supplies within the areas subject to CAFO operations, and to ensure proper closure of all such CAFOs, should the Applicant elect to close or should the closure occur for some other reason. When an Applicant elects to post a single financial assurance in lieu of separate financial assurance previously posted on an individual CAFO the separate financial assurance shall not be released until the new financial assurance has been accepted by the Town Board.

g) Financial Assurance Release.

The Trade Lake Town Board shall release the Applicant's or Permit Holder's financial assurance after providing notice to all property owners within 3 miles of the CAFO of the intent to release financial insurance and allowing such owners 90 days to object, if it finds, after inspection of the CAFO and documentation provided by the Permit Holder, that the Permit Holder has completed or ceased CAFO operations at the Permitd location and all associated parcels, and that there is no environmental contamination or public nuisance remaining at any locations used for any part of the CAFO operations, after operations have ceased. Title 5, Chapter 6, Public Safety Adopted in its Entirety 1-26-16 Published 1-30-16 8

h) Cancellation.

The financial assurance shall provide that it may not be canceled by the surety or other holder or issuer except after not less than a 90 days' notice to the Town Board in writing by registered or certified mail. Not less than 30 days prior to the expiration of the 90 days' notice of cancellation, the Applicant or Permit Holder shall deliver to the Town Board a replacement financial assurance. In the absence of this replacement financial assurance, all CAFO operations shall cease until the time the required financial assurance is delivered and in effect.

i) Changing Methods of Financial Assurance.

The operator of a CAFO may change from one method of financial assurance to another. This may not be done more than once a year unless required by an adjustment imposed pursuant to this chapter. The Permit Holder shall give the Trade Lake Town Board at least 60 days' notice prior to changing methods of financial assurance and may not actually change methods without the written approval of the Town Board.

j) Bankruptcy Notification.

The Applicant or Permit Holder under this chapter shall notify the Trade Lake Town Board by certified or registered mail of the commencement of voluntary or involuntary proceedings under the United States Bankruptcy Code, U.S. Code Title 11--Bankruptcy, naming the Applicant or Permit Holder as a debtor, within 10 days of commencement of the bankruptcy proceeding.

10. Conditions relating to the monitoring of surface water, ground water, air quality and all other environmental factors and considerations.

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

The Compliance Assurance Testing, Sampling and Monitoring Plan shall document that the prepared plans and procedures are based on sound science and include an updated review of best practices and technologies and test methods, and provide for specific compliance metrics to assure the performance requirements of the plan are met and the Permit approval conditions are satisfied, and for audits, inspections, and certification by qualified and experienced, and licensed third party(ies), of compliance with the procedures and provisions of the various operational plans, including with the identified metrics in the plans.

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.

The Town of Trade Lake recognizes that scientific and technical developments continue and the Town requires some flexibility to impose additional conditions not referenced above, or relax conditions as technology improves, in order to protect the health, safety and general welfare of Trade Lake's property owners and residents. Accordingly, the Town may impose additional conditions, at the discretion of the Board, where the Board determines that they are required by reasonable and scientifically defensible findings of fact.

The conditions stated above may apply not only to the CAFO facility itself, but also to any property upon which manure, carcasses, body tissue or other byproducts 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 review. Any modifications must be documented as required by Section 14.

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 Permit

A CAFO Operations Permit and the privileges granted by this Permit run with the land approved under the Permit and remain in effect, despite a change in ownership of the livestock facility, as long as the former operator was not in violation of the terms of its Permit and the new operator does not violate the terms of the local approval or any conditions contained within a duly approved CAFO Operations Permit.

Upon change of ownership of the livestock facility, the new owner of the facility shall provide the Town with information, including but not limited to the name and address of the new owner, contact information for the facility manager and responsible corporate representative of the new owner, and date of transfer of ownership. A new owner must provide all of the Plans required herein or endorse the existing Plans of the previous owner. A new owner is required to establish to the Town's satisfaction that it is able to comply with the Plans provided or endorsed by the new owner and is required to comply with all of the existing or future Permit conditions, including financial surety and reimbursement of costs incurred by the Town of Trade Lake in evaluating the new owner's ability to comply with the conditions imposed on the Applicant's operation.

Section 13. Expiration of Permit

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 livestock operator exercises the full authority granted by the approval. However, the Town may treat a CAFO Operations Permit as lapsed and withdraw the Permit if the Permit holder fails to do all of the following within 2 years after issuance of Permit:

a. Begin populating the CAFO.
b. Begin constructing all of the new or expanded livestock housing or waste storage structures proposed in the application for local approval.
c. Pay the renewal fee on or before January 1 of each calendar year as required by Section 14 of this Ordinance.

Section 14. Permit Terms and Modifications

A CAFO Operations Permit and the privileges granted by a CAFO Operations Permit issued under this Ordinance is conditioned on the livestock operator's compliance with the standards in this Ordinance, and with commitments made in the application for a CAFO Operations Permit. The operator may make reasonable changes that maintain compliance with the standards in this Ordinance, and the Town Board shall not withhold authorization for those changes. A violation of the Permit or a failure to comply with the commitments made in the application may result in suspension and/or termination of the Permit.

The Town Board, or its designee, shall work to ensure on an ongoing basis that all requirements and conditions of any Permit issued under this Ordinance are followed by the Permit Holder. To assist in accomplishing this task, any Permit issued pursuant to this Ordinance shall be subject to an annual renewal fee in the amount of One Dollar ($1.00) per animal unit.

Section 15. Penalties

Any person who violates any of the provisions of this Ordinance, or who fails, neglects or refuses to comply with the provisions of this Ordinance, or who knowingly makes any materially false statement or knowing omission in any document required to be submitted under the provisions hereof, shall be subject to the following penalties:

a. Upon conviction by a court of law, pay a forfeiture of not less than $100 nor more than $1,000, plus the applicable surcharges, assessments, and costs for each violation.

b. Each day a violation exists or continues shall be considered a separate offense under this Ordinance.

c. The Town Board may seek injunctive relief from a court of record to enjoin further violations.

d. In addition, the Town Board may suspend or revoke the local approval of a CAFO Operations Permit under this Ordinance after due notice to the livestock facility owner and a public hearing to determine whether the Permit should be suspended or revoked.

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

If a CAFO Operations Permit issued under this Ordinance is later suspended or revoked, all operations of the CAFO shall cease within thirty (30) days after such suspension or revocation. The sole remedy for reinstating a suspended or revoked CAFO Operations Permit shall be for the owner or operator of a facility under such Permit to re-apply for a CAFO Operations Permit pursuant to this Ordinance.

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

Section 16. Appeals

An Applicant or any other person or party who is aggrieved by a final decision of the Town Board on whether to issue a CAFO Operations Permit, either with or without conditions, or a taxpayer, may, within thirty (30) days after the filing of the decision with the Town Clerk, commence an action seeking the remedy available by certiorari in Burnett County Circuit Court. The court shall

not stay the decision appealed from, but may, with notice to the Town Board, grant a restraining order. The Town Board shall not be required to return the original papers acted upon by it, but it shall be sufficient to return certified or sworn copies thereof. If necessary for the proper disposition of the matter, the court may take evidence, or appoint a referee to take evidence and report findings of fact and conclusions of law as it directs, which shall constitute a part of the proceedings upon which the determination of the court shall be made. The court may reverse or affirm, wholly or partly, or may modify, the decision brought up for review.

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

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

Section 17. Severability

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

Section 18. Effective Date

This Ordinance is effective the day after publication or posting as required by law.
Adopted this 10th day of March, 2022 by the Town Board of Supervisors.

Roll Call Vote:

By: Ramona Moody — ☒ Aye ☐ Nay
Ramona Moody, Chairperson

By: _____ — ☒ Aye ☐ Nay
Scott Doornink, Supervisor

By: _____ — ☒ Aye ☐ Nay
Adam Lesak, Supervisor

Attested by Clerk: _____ Date: 3-10-2022

Posted: 3/10/2022

TOWN OF TRADE LAKE
BURNETT COUNTY, WISCONSIN

ORDINANCE NO. 2022-05

AN ORDINANCE AMENDING TOWN OF TRADE LAKE ORDINANCE NO. 2022-04 - AMENDED CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) ORDINANCE

The Town Board of the Town of Trade Lake, Burnett County, Wisconsin, does ordain as follows:

WHEREAS, on March 10, 2022, the Town of Trade Lake ("Town") in Burnett County, Wisconsin, adopted Ordinance No. 2022-04 Amended Concentrated Animal Feeding Operations (CAFO) Ordinance ("CAFO Permitting Ordinance"). A copy of the adopting ordinance is attached as **Exhibit A** and incorporated by reference;

WHEREAS, the Town Board has received comments from residents expressing a desire to specifically exclude planting, harvesting and haying from the Definition of Operations within the CAFO Permitting Ordinance;

WHEREAS, the Town Board believes the requested clarifications regarding planting, harvesting and haying are both appropriate and consistent with the spirit and intent of the CAFO Permitting Ordinance;

NOW, THEREFORE, in consideration of the above Recitals, which are incorporated herein by reference, the Town Board of the Town of Trade Lake ordains as follows:

Section 1 -- AMENDMENTS:

1.1 The definition of "Operations" as stated in Section 3. c. shall be stricken in its entirety and replaced with the following:

c. "Operations" means a course of procedure or productive activity for the purposes of conducting and carrying on the business of a CAFO including populating animal housing facilities, storing and managing animal and other waste materials, and conducting any other business activities related to the housing of animals or the storage and management and other waste materials. Operations shall specifically exclude non-animal related agricultural farming activities including planting, harvesting and haying. These non-animal related agricultural farming activities shall not be governed or otherwise regulated by this Ordinance.

1.2 Section 10, Condition 5(a)(i) shall be stricken in its entirety and replaced with the following:

i) Due to the recreational nature of the Trade Lake area, and the large number of people that use our roads to walk, bike, ride ATV's and ride snowmobiles, all trucking and moving of materials in and out of the CAFO facility will be done during standard business hours of 8:00 AM to 5:00 PM Monday through Friday. This includes the use of farm tractors and any other such vehicles. Exceptions for trucks or other agricultural vehicles entering or leaving the CAFO facility before or after the standard business hours of 8:00 AM to 5:00 PM, where the trucks or other agricultural vehicles are involved in typical non-animal related agricultural farming activities including planting, harvesting and haying, may be approved as part of the applicant's Transportation Plan.

Section 2 -- EFFECTIVE DATE AND PUBLICATION:

2.1 This Ordinance shall be effective upon adoption and publication as required by law.

2.2 The Town Clerk shall properly publish this Ordinance as a Class 1 Notice or post this Ordinance in three locations as required under Wis. Stat. §60.80(1).

PASSED AND ADOPTED by the Town Board of the Town of Trade Lake, Wisconsin, this 9th day of June, 2022.

Ramona Moody, Chairperson

Scott Doornink, Supervisor

Adam Lesak, Supervisor

ATTEST:

Town Clerk