

Things You Should Know about the Proposed Cumberland Farm

Cumberland LLC has twice proposed to build an industrial-scale hog farm in south-central Burnett County. Local residents have concerns: contamination of surface and groundwater, potent odors and noxious gases such as ammonia and sulfur dioxide, antibiotic-resistant pathogens, and disruption of quiet rural life from flies, heavy truck traffic, and farm equipment.

Economic issues are part of the worry too. The local economy is substantially driven by tourism, outdoor recreation, and residential development. Numerous studies have documented a detrimental link on recreational revenue and nearby property values from similar facilities.

KnowCAFOs has linked with *Thriving Earth Exchange* (TEEx), a project of the American Geophysical Union to promote community science - bringing together local leaders with volunteer. Three scientists engaged with KnowCAFOs on the impact of a hog CAFO issue.

Sudheer Bhimireddy, a post-doctoral researcher at the University of Illinois Urbana-Champaign, used a widely accepted atmospheric transport and dispersion model to generate data about the frequency and occurrence of odor from the proposed hog facility. Katie Kurowski, a Ph.D. student at Johns Hopkins University, developed an annotated bibliography of peer-reviewed literature concerning air quality impacts from hog CAFOs, including health, quality of life, recreation revenue, and property values. Steve Ventura, professor *emeritus* of Soil Science and Environmental Studies, University of Wisconsin-Madison explicated the nutrient management plan and potential for contamination of ground- and surface water.

This flyer provides a summary of the KnowCAFOs – TEEx community science project findings. Information about the current status of the proposed facility is on the KnowCAFOs.org website. More details and the community science reports are available through TEEx (https://thrivingearthexchange.org/project/know_cafos/).

Nutrient Management and Water Quality

Hogs generate lots of waste – feces and urine, wasted food, and culled animals. Six thousand farrowing hogs at the proposed facility will generate manure equivalent to about 950,000 people. Human sewage is treated while animal waste is simply spread on agricultural land.

The lakes, rivers, wetlands, and shallow groundwater of south-central Burnett County offer limited land area for spreading. The figure below shows a portion of northeast Trade Lake township. In the 9-section area, about 1,070 acres of the total area (5,760 acres) is open agricultural land. Only 165 acres is totally unrestricted. The rest has restrictions or prohibitions intended to protect surface and groundwater from contamination. A nearby 9-section area in Polk County (Laketown) has similar statistics: 1,188 acres of ag land, all except 179 with restrictions.

The CAFO’s manure management plan presented no evidence from the applicant verifying contracts to spread on properties specified in their nutrient management plan. Thus, the initial application for a *Wisconsin Pollution Discharge Elimination System* permit was rejected by the WI Dept. of Natural Resources due in part to the lack of explicit permission. Such rejection was unprecedented.

The area around Trade Lake WI has about 1,070 acres of agricultural land where hog waste could be spread (white outlines). Restricted or prohibited areas, to protect ground and surface water, cover all but about 165 acres.

Maps showing manure spreading restrictions statewide are available at http://www.manureadvisorysystem.wi.gov/pages/sn_apmaps.

The state-approved model for developing and evaluating nutrient management plans can be downloaded at <https://snapplus.wisc.edu>.



Air Quality Modeling

Sudheer Bhimireddy, a post-doctoral researcher at the University of Illinois Urbana-Champaign, used a widely accepted transport and dispersion model (HYSPLIT) to generate data about the frequency and occurrence of odor from the proposed hog CAFO in Trade Lake. Animal numbers (equated to waste generation volume) and facility design parameters were derived from applicant data submitted to WDNR. Terrain and wind data came from public domain federal data sources – five stations of the Automated Surface Observing System.

The model generated quantitative values of “odor units” (correlated with ammonia and hydrogen sulfide emissions) for a one-week test period during spring 2023 at seven public locations 2-½ to 15-½ miles from the proposed facility.

The models revealed an extensive area in all directions around the proposed facility that would be impacted by odor and associated gases. Odors would be detectable 50 – 80% percent of the time (frequency charts - top right). Very high levels would affect areas near the facility, depending on wind direction and speed (example emission plume diagrams at right).

The report also documents a general procedure for evaluating impacts under other facility emission factors and atmospheric or terrain. Conditions. HYSPLIT is scalable in space and time and can be expanded to multiple sources that represent manure, with or without injection, when the manure is spread or unloaded.

The summary report of this analysis is available at: <https://uwmadison.box.com/s/5ppy73q3j22b90c95b7lluk2qcl4e5ec>.

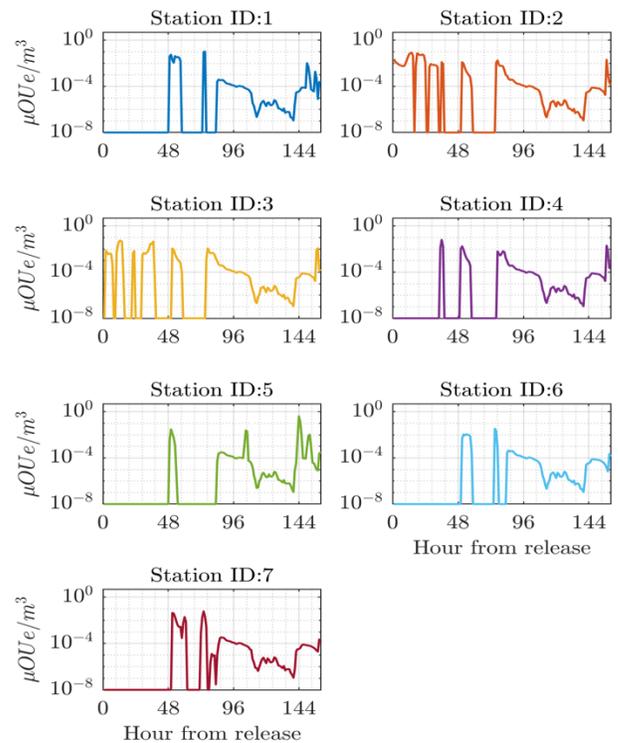
Air Quality Impacts

Katie Kurowski, a Ph.D. student at Johns Hopkins University, developed an annotated bibliography of peer-reviewed and other literature concerning air quality impacts from hog CAFOs, including health, quality of life, recreation revenue, and property values.

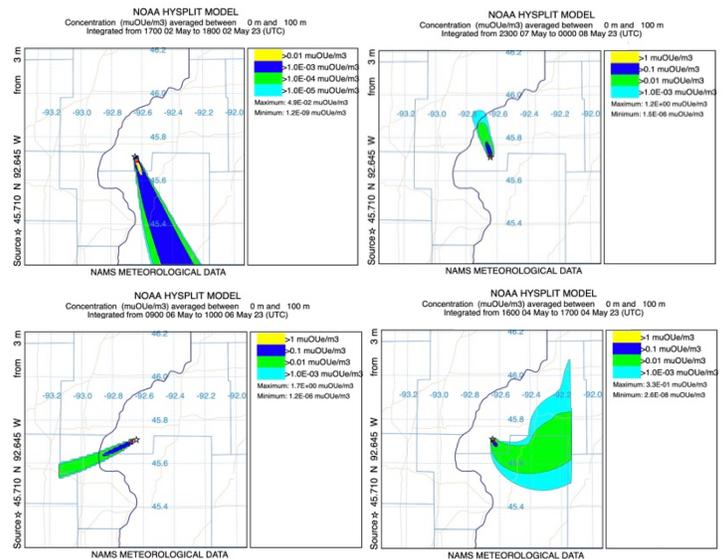
Experiences in other regions with hog CAFOs confirm what Burnett and Polk County residents fear: hog odor limits leisure time activities and beneficial uses of property. Hog odor limits daily activities – picnics, family reunions, socializing with neighbors, gardening, working outside, playing, drying laundry, opening doors/windows for fresh air, growing vegetables, and uses of well water. Prevailing wind direction was the largest influence on property values, and negative effects were largest for properties that were downwind and close to operations.

The articles in the public domain are at: https://drive.google.com/drive/folders/1RfWv65XFZxqidGrSuuUq6uUzIEVh_ds9?usp=sharing

Annotated summaries of all the articles are at: <https://docs.google.com/spreadsheets/d/10Ef8MYw4IIZkhPoel1zpOWKFOvGEjEzL7hRVV-srIWU/edit?usp=sharing>



Time series of odor concentration during a week (166 hours) in May 2023 at seven locations near the proposed hog CAFO. Based on the wind direction around the CAFO site, all the stations received concentrations, some as high as 0.7 $\mu\text{OUe}/\text{m}^3$. Also, every station recorded concentrations that are considerably high ($>10^{-5} \mu\text{OUe}/\text{m}^3$) and continuous for more than 24 hours.



Example malodor plumes during various one-hour intervals of the modeling test week (early May, 2023). The diagrams show how the odor plume emitting from the source location could be narrow, wide, short, or long, depending on the wind speed and direction. Areas in red, yellow, and blue would be receiving very high odor values and associated gases. Odor would still be noticeable in green and aqua areas.