

Concentrated Animal Feeding Operations and Human Health in Wisconsin

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Topics

- Concentrated Animal Feeding Operations (CAFO)
 - Definitions
 - Roles of Government Agencies in managing CAFOs
 - Public health concerns
- Discuss activities of the University of Wisconsin-Extension *Understanding Manure Irrigation* workgroup.



What is a CAFO?

Animal Feeding Operations (AFOs): animals are kept and raised in confined situations.

- Feed, waste, animals and production operations on a small land area.
- Animals confined at least 45 days in a 12month period
- No grass or other vegetation in the confinement area
- Concentrated Animal Feeding Operations (CAFOs)
 - AFOs that meet EPA regulatory definitions: number of animals; waste handling

Ref: U.S. EPA http://www.epa.gov/region7/water/cafo/index.htm



Key message

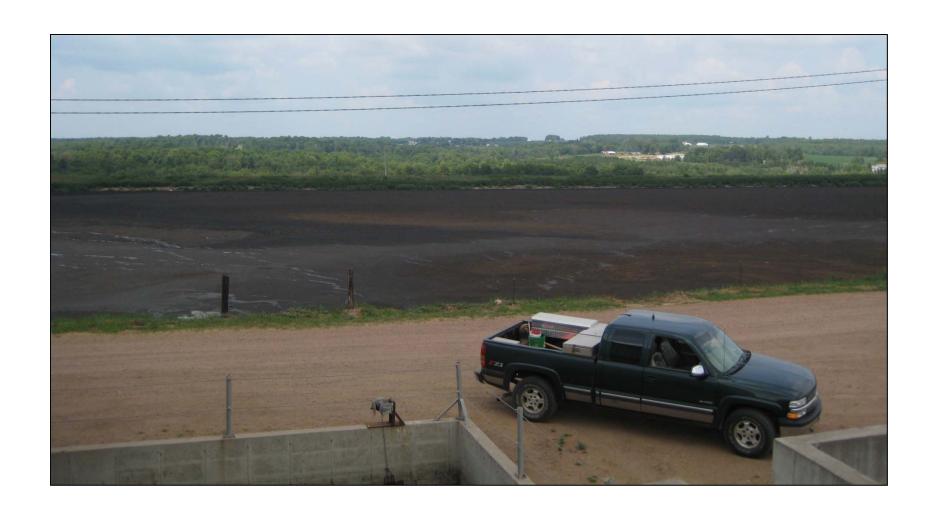
- CAFOs not inherently good or bad
- When livestock feeding and housing becomes concentrated, waste also becomes concentrated
 - The proper or improper management of livestock waste has environmental and public health consequences
 - Waste management at CAFOs is heavily regulated
 - Regulations are reviewed and revised to keep up with evolving agricultural techniques and operations of increasing size



Production, storage, treatment, and land spreading of livestock waste-important feature of CAFOs

- Livestock waste removed from confinement to storage tanks or ponds
 - 6 months storage capacity
- Dairy vs. human waste:
 - Total Solids Output: 1:37-44
 - Total Solids & Wastewater: ~3:1 (total volume cows:people)
 - Nutrient basis- relevant to calculating land spreading and nutrient management.













Other considerations with CAFO livestock waste

- Waste hauling and spreading
 - Increased heavy truck traffic and road maintenance
 - Proper calibration of nutrient application to crop, soil type, rainfall
 - Spills from stored or transported manure slurry
- The amount of land available for manure spreading limits operation size and siting



Role of DHS

- No formal regulatory role
- DHS environmental health scientists assist state and local agencies, at their request, with legislatively assigned roles
 - Invited participation in expert workgroups for review of Ag-related topics
 - Consult with agencies involved in site-specific incidents
 - Assist local health departments in ensuring that citizens have safe, clean drinking water



Roles of other agencies

- Understanding Local and State Regulations for New and Expanding Livestock Facilities
 - Many state laws administered by DATCP and DNR that regulate
 - Livestock siting
 - Manure management
 - Nutrient Management
 - High-capacity well rules
 - Storm water and erosion control
 - Local zoning laws, permits
 - Reference: Wisconsin Department of Agriculture and Consumer Protection (DATCP) factsheet: http://datcp.wi.gov/uploads/Environment/pdf/LawsForLivestockFacilities.pdf



What does DHS hear from the public about CAFOs?

- Odor complaints
- Complaints about runoff, spills
 - DHS responds in concert with other agencies where appropriate
- Reports of well water impacts
 - DHS supports Local Health and DNR in conducting well water investigations
- Concerns about emerging agricultural practices
 - New or expanding installations
 - Manure spray irrigation



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Manure Irrigation

- In this process, manure is liquefied by mixing the materials with water so that it can be applied to field through irrigation systems
 - Traveling gun
 - Drag line
 - Central pivot with drop nozzle
 - Central pivot with drop nozzle and end gun



Public health concerns over manure irrigation

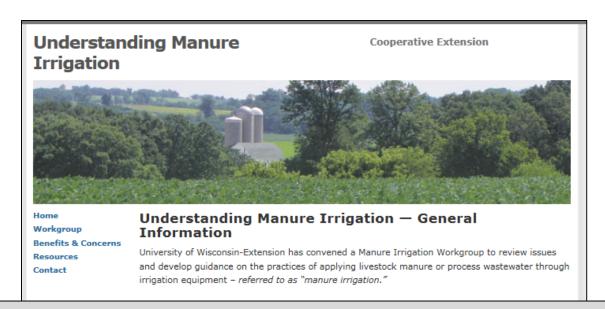
- Can manure spraying cause pathogens within the manure to become airborne and be transported to neighboring yards?
- Scientific Risk Assessment approach to answering health questions about manure irrigation



Understanding Manure Irrigation workgroup

- The University of Wisconsin-Extension
 Understanding Manure Irrigation workgroup
 has been established to address technical and
 health related questions and further develop best
 management practices for CAFOs
- Representatives from:
 - DNR
 - DHS
 - DATCP
 - Local health departments
 - UW Madison
 - Local farmers, and
 - Other stakeholders





http://fyi.uwex.edu/manureirrigation/

or search "UW extension understanding manure irrigation"

workgroup participants and other interested stakeholders, and 2) help identify the set of issues for the workgroup to address.

Meetings were held on May 9, 2013 at UW Stevens Point and May 17, 2013 at UW Fox Valley. Recordings of the presentations from the May 17th meeting are available through the links below, along with copies of presentation handouts for the meeting.

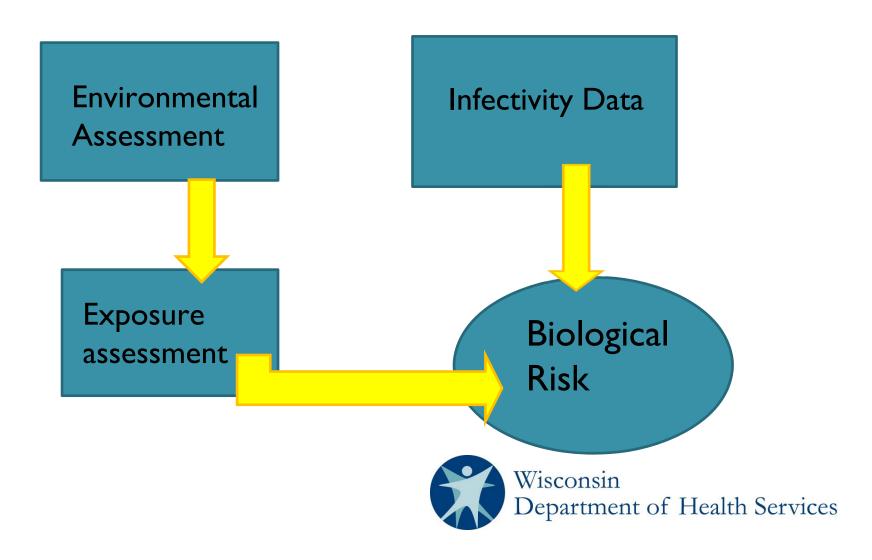
Agenda and presentations from the May 17, 2013 Public Research Symposium

9:00 Symposium begins: Welcome and introduction – Ken Genskow, UW-Madison [link to handouts]

Manure Irrigation Symposium Welcome & Overview ...

f Health Services

A Quantitative Microbial Risk Assessment (QRMA) is central to the *Understanding Manure Irrigation* workgroup recommendations



The QMRA requires understanding of the composition of livestock waste

- Chemical and microbial composition
 - Varies with livestock source
 - Key microbes in dairy operations: *Camplyobacter spp., E.coli, non-typhoid Salmonella, Crytosporidium spp.*
- Storage, handling, and processing affect waste characteristics
- Dominant air pollutants are hydrogen sulfide and ammonia
 - Many minor chemicals contribute to odor



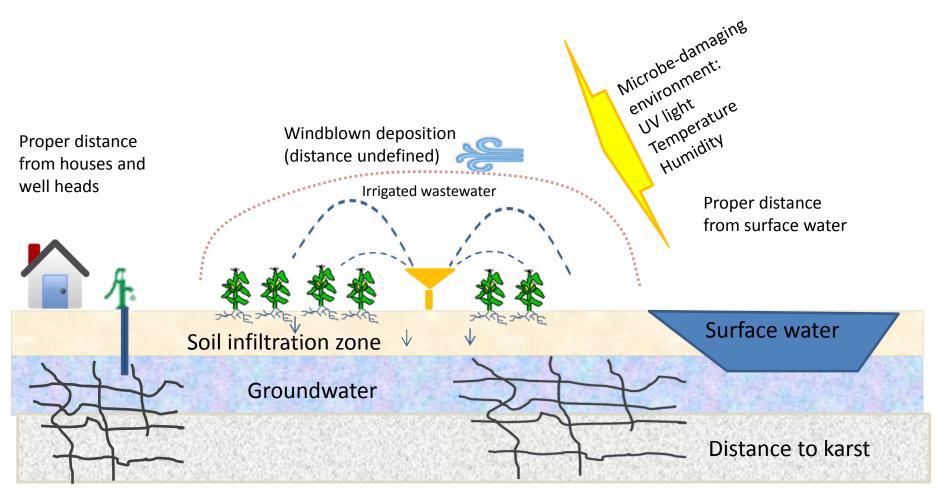
Odor-producing chemicals found in manure

- Hydrogen Sulfide
- Methane
- Nitrogen Heterocycles
- Mercaptans
 - Methyl-, Ethyl-, Propyl-
- Volatile Fatty Acids,Alcohols, & Aldehydes
- Organic acids
 - Proprionic, Butyric,Isovaleric, Isobutyric

- Ammonia
- Amines
 - Methyl-, Ethyl-, Dimethyl-
- Carbon dioxide
- Phenolics
- Sulfides
 - Dimethyl-, Diethyl-



Understanding fate and transport is key to QRMA



Contents of *draft* Manure Irrigation Workgroup Report

(anticipated release May 2015)

- Associated benefits and concerns
- Manure management and application overview
- Risk and public policy
- Considerations for practice: drift, odor, water quality, air quality, airborne pathogens, timing of application, road safety and damage, farm management
- Workgroup response and recommendations to Considerations, with tables and commentary



Key management variables identified by Workgroup

- Application time of day
- Setbacks
- Spray technology
- Pre-treatment of materials to reduce microbial load
- Spray droplet size
- Operational weather considerations
- Practices to reduce air impacts



Summary

- CAFOs are heavily regulated under various state and local agencies.
- Land spreading of livestock waste from CAFOs poses technical and environmental challenges; emerging technologies present opportunities for pollution control.
- Best Management Practices are engineered or agronomic systems to control, treat, or prevent pollution and nuisance problems associated with CAFOs.



Contact Information

- Wisconsin Department of Health Services
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- Local Health Department
 - See: http://www.co.wood.wi.us/Departments/Health/
- **■** Department of Natural Resources
 - See: http://dnr.wi.gov/topic/AgBusiness/CAFO/Contacts.html
- Department of Agriculture, Trade, and Consumer Protection
 - See: http://datcp.wi.gov/Farms/Nutrient_Management/index.as px

