Moving Forward - DRAFT

Bayfield County Large-Scale Livestock Study Committee
Report and Recommendations to the Bayfield County Board

Last Updated: December 3, 2015

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**Executive Summary**

The Bayfield County Large-Scale Livestock Study Committee was established by County Amendatory Ordinance No. 2015-06 and convened in April of 2015 with the task of researching, analyzing, and synthesizing scientific literature regarding the impact of large-scale livestock facilities on ground water, surface water, and air quality, specifically as those issues apply to Bayfield County, and reporting its recommendations on appropriate county-level regulatory approaches relative to the siting and/or operation of livestock facilities within Bayfield County to the County Board.

The Committee recognizes the economic and cultural importance of agriculture to Bayfield County and is guided by the dual goals of having a thriving agricultural community and maintaining the public's health and safety and a healthy environment.

The Committee has organized its work around four primary issues: groundwater, surface water, microbiology, and air quality. For each of these issues the Committee has: 1) Identified the primary risks and impacts associated with large-scale livestock operations, 2) Assessed whether the existing regulations and best management practices adequately mitigate those risks given the conditions in Bayfield County, and 3) For risks the Committee determined are not adequately addressed by existing regulations, proposed actions the Committee feels would mitigate those risks.

Since April, the Committee has received presentations and information from 17 professionals working in the field of livestock agriculture. These include professors and researchers from the University of Wisconsin, Wisconsin Geological Survey, and the USDA. The information presented to the Committee was used to make Findings-of-Fact (Facts) in each of the four topic areas, identify gaps in existing regulations or best management practices (Gaps), and identify actions to address those gaps (Solutions).

Given the unique climate, geography, and soils of Bayfield County and the unique circumstances of individual livestock operations, the Committee is recommending adoption of a Large-Scale Confined Animal Feeding Operations Ordinance. The ordinance will require new or expanding livestock operations of 1000 animal units or more to demonstrate the operations of the proposed livestock facility will not cause pollution or a private or public nuisance in order to obtain an Operations Permit from Bayfield County. In addition, the Committee is recommending the Bayfield County Land and Water Conservation and Health Departments consider new outreach education, cost-share and incentive programs, and regulatory actions to enable new and existing livestock operations to protect surface water, groundwater, and public health.
Committee Recommendations

1. The Committee recommends the Bayfield County Board adopt the Large-Scale Confined Animal Feeding Operations Ordinance and Application Form as presented in Appendix 1.

Key aspects of the recommended Operations Ordinance include:

- Bayfield County has the legal authority and responsibility to enact an ordinance to comprehensively regulate the operations of large-scale CAFOs of 1,000 animal units or greater.
- New or expanding livestock operations of 1,000 animal units or more are required to obtain an Operations Permit from Bayfield County prior to beginning operations.
- To the extent not preempted by state or federal law, the County Board may attach conditions to an operations permit to protect public health, safety, and general welfare, prevent pollution and the creation of private nuisances and public nuisances, and preserve the quality of life and environment of the County. Such conditions may include, but are not limited to matters of:
  - prevention of point and non-point pollution of air and water
  - management of animal or other waste
  - prevention of the spread of zoonotic disease
  - maintenance of animal health and welfare
  - transportation of animals, feed, or waste
  - maintenance of air quality related to dust or other hazardous air emissions
  - protection of private and public property rights and values.
- The applicant shall provide evidence that a CAFO having substantially similar operational characteristics, housing the same species of animals, and utilizing similar operations, has been continuously operated in the United States for at least ten (10) years without causing pollution of groundwater or surface water, and without causing either a private nuisance or a public nuisance. The County Board may waive this requirement at its discretion.
- The ordinance requires the applicant to ensure that sufficient funds will be available for pollution clean-up, nuisance abatement, and proper closure of the CAFO if it is abandoned or otherwise ceases to operate as planned and permitted.
- The applicant is required to compensate the County for all legal services, expert consulting services, and other expenses which may be reasonably incurred by the County 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 County Board.
Additional Recommendations

2. To further protect surface water, the Committee recommends the Bayfield County Land and Water Conservation Department and/or Bayfield County Health Department Committees consider the following actions:

a. Provide additional outreach education to farmers and landowners to understand and adopt best management practices and comply with existing regulations.
   i. Prioritize work duties of existing County staff to ensure continuation of the South Shore Nutrient Management Farmer Education Program.
   ii. Provide outreach education to assist agricultural producers with compliance with existing regulations and best management practices.
   iii. Provide up to $1000/farm of cost-sharing for five farms per year for development of a farm succession plan through the South Shore Farm Succession Program.

b. Provide additional outreach education and cost-share dollars to assist farmers and landowners in adopting best-management practices, installing conservation practices, and complying with existing regulations.
   i. Provide funding for cost-sharing barnyard runoff control projects.
   ii. Provide funding for cost-sharing well abandonment projects.
   iii. Provide staff for project implementation and implementation of livestock ordinances.

c. Adopt a Bayfield County Animal Waste Storage and Management Ordinance requiring:
   i. An Animal Manure Permit and adherence to the NRCS 313 Standard for all new or significantly modified manure storage structures with volume greater than 500 cu ft.
   ii. Closure of any permitted animal waste storage structure if unused for 24 consecutive months.
   iii. An Animal Manure Permit for all new or significantly modified livestock feeding operations with 50 animal units or more and adherence to barnyard NRCS Technical Standards.
   iv. Manure storage capacity of 180 days for new or expanding livestock operations with 200 to 499 animal units and 360 days of storage for livestock operations with 500 to 999 animal units.

d. Incorporate NR 151 standards into the Bayfield County Animal Waste Storage and Management Ordinance to allow for local enforcement.
e. Develop and implement a Bayfield County Water Quality Trading Program to allow new or expanding operations to purchase phosphorus credits to offset a planned increase in phosphorus loading to surface waters.

f. Each of the remaining risk management strategy options listed in the *Surface Water Findings-of-Fact Document (Appendix 2,)* given the unique geography, topography, soils, water resources, air quality and other natural features of Bayfield County, and potential legal considerations, may or may not be appropriate for consideration as a condition of a permit issued pursuant to any individual application under the Bayfield County Large-Scale Confined Animal Feeding Operations Ordinance.

3. **To further protect groundwater, the Committee recommends the Bayfield County Land and Water Conservation Department and/or Bayfield County Health Department Committees consider the following actions:**

   a. Implement a well-testing outreach and education program to encourage and facilitate annual testing of private well water and repair of substandard wells.
   
   b. Provide funding to test water from at least 10 private wells in each Township in Bayfield County to establish a baseline water quality understanding.
   
   c. Establish a County-maintained database with all well-drilling records and water test information.
   
   d. Develop a depth-to-bedrock map for Bayfield County to identify areas with less than 20 feet of soil to the bedrock.
   
   e. Analyze all known well-drilling records to identify wells with less than 20 feet of silty-clay till over water-bearing sand and gravel deposits.
   
   f. Develop a groundwater susceptibility map for Bayfield County to identify areas, such as those near Gilles Road, that have increased susceptibility to groundwater contamination compared to areas with deep silty-clay till.
   
   g. Identify abandoned wells and rate the risk of each well to groundwater quality for prioritizing abandonment efforts. Or conversely, identify fields with highest likelihood of groundwater contamination and look for abandoned and existing wells in and adjacent to these fields first.
   
   h. Utilize groundwater flow maps and groundwater susceptibility mapping to design groundwater monitoring programs for sited livestock facilities.
   
   i. Each of the remaining risk management strategy options listed in the *Groundwater Findings-of-Fact Document (Appendix 3,)* given the unique geography, topography, soils, water resources, air quality and other natural features of Bayfield County, and potential legal considerations, may or may not be appropriate for consideration as a condition of a permit issued pursuant to any individual application under the Bayfield County Large-Scale Confined Animal Feeding Operations Ordinance.
4. To further protect air quality, the Committee recommends the Bayfield County Land and Water Conservation Department and/or Bayfield County Health Department consider the following actions:

a. Expand outreach education and cost-sharing to assist existing producers in implementation of the Beneficial Management Practices recommended by the Wisconsin Air Emissions Advisory Group as listed in Appendix 3.

b. Require implementation of applicable Air Quality Beneficial Management Practices listed in Appendix 3 for new or expanding operations through local ordinance.

c. Each of the remaining risk management strategy options listed in the Air Quality Findings-of-Fact Document (Appendix 4,) given the unique geography, topography, soils, water resources, air quality and other natural features of Bayfield County, and potential legal considerations, may or may not be appropriate for consideration as a condition of a permit issued pursuant to any individual application under the Bayfield County Large-Scale Confined Animal Feeding Operations Ordinance.

5. To further protect human and animal health from microbiological pathogens, the Committee recommends the Bayfield County Land and Water Conservation Department and/or Bayfield County Health Department consider the following actions:

a. Implement manure-spill response training for emergency responders, health-care workers, and natural resource agencies.

b. Provide market incentives to enable installation of manure digesters, such as purchase of carbon credits for methane reductions, or tax incentives for co-location of energy-intensive businesses (greenhouses, kilns) with livestock operations.

c. Provide cost-sharing for feasibility studies for construction and operation of manure storage, handling, and treatment systems.

d. Provide incentives for adoption of managed intensive grazing systems for livestock production, such as per acre conservation payments or assistance with marketing or enterprise development.

e. To enable hoseline transport and injection of manure:

   i. Implement an incentive program for installation of culverts or hardlines for crossing roads at locations with minimal risk of manure reaching surface water in the event of a break in the hose.

   ii. Provide cost-sharing for secondary containment or hardline hoses for waterway crossings.

f. Each of the remaining risk management strategy options listed in the Microbiology Findings-of-Fact Document (Appendix 5,) given the unique geography, topography,
soils, water resources, air quality and other natural features of Bayfield County, and potential legal considerations, may or may not be appropriate for consideration as a condition of a permit issued pursuant to any individual application under the Bayfield County Large-Scale Confined Animal Feeding Operations Ordinance.
Agriculture in Bayfield County

Agriculture in Bayfield County is concentrated in two main areas (Figure 1). The northwest region between Port Wing and Iron River supports hay and forage production with some beef and dairy production. The east-central region is home to the majority of agricultural activity in Bayfield County with a mix of dairy, beef, forage, and grain operations. There is also a concentrated fruit growing region outside of Bayfield supports nearly 20 small diversified fruit operations.

In 2012, the agricultural economy in Bayfield County had total farm gates sales (revenues) of $13.9 million split across six main sectors: milk-$5.3 million, seed and hay-$2.1 million, cattle and calves-$2.0 million, aquaculture-$1.4 million, grain-$1.2 million, and apples and berries-$1.1 million. Bayfield County agriculture contributes $74.8 million of economic activity and provides more than 600 jobs. Despite the cultural and economic importance of agriculture to Bayfield County, the agricultural economy is relatively modest compared to other counties in NW Wisconsin. Burnett County farmers had $37 million in sales in 2012, for example.

Agriculture in Bayfield County is dominated by production of perennial forage crops, with 87% of the cropland acres in the two main agricultural regions being used to produce grass hay, alfalfa, clover, or pasture (Table 1). Corn silage is produced on a limited basis by dairy farms and there is some small grain and soybean production. The 2014 data is consistent with historical crop production trends for the region as annual row crop production is far riskier in the short season and wet clay soils of the region compared to perennial forages. This current land use information is important as significant changes within a given watershed, such as conversion from perennial forage crops to annual crops like or corn or soybeans, may result in changes to surface water quality.

Like many Counties in Northern Wisconsin, Bayfield County has seen a significant decline in agricultural activity in the last 40 years. In 1970, there were 850 total farms in Bayfield County. By 2012 the number had declined to 352. There were 112 dairy farms in 1992 and less than 30 still in operation in 2015. In 1992 there were 4300 dairy cows and by 2012 only 1750. Likewise, as cheap apples from Washington and Michigan flooded markets, the surrounding forest

![Figure 1. Primary Agricultural Areas of Bayfield County.](image)

<table>
<thead>
<tr>
<th>Crop</th>
<th>2014 Acreage</th>
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<tbody>
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<td>Grass/Pasture</td>
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<tr>
<td>Other Hay/Non Alfalfa</td>
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<td>Alfalfa</td>
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<td>Corn</td>
<td>3363</td>
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<td>Soybeans</td>
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<tr>
<td>Oats</td>
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<td>Winter Wheat</td>
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<tr>
<td>Rye</td>
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<tr>
<td>Clover</td>
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<tr>
<td>Spring Wheat</td>
<td>90</td>
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<tr>
<td>Dry Beans</td>
<td>50</td>
</tr>
<tr>
<td>Barley</td>
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</tr>
<tr>
<td>Other Annual Crops</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 1. Cropland Acres in the Agricultural Regions of Bayfield County

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quickly reclaimed the Bayfield apple orchards and, today, there are fewer than 300 acres of apple production in the Bayfield area spread across fewer than 20 small orchards.

The reasons for the decline are many, but farming has never been an easy lifestyle or occupation anywhere and is particularly challenging in Bayfield County due to the very short growing season and wet clay soils or dry sandy soils. Opportunities in town or in regional cities like Duluth, Minneapolis, or Wausau have offered an easier way of life and more pay. Today, the average revenue for farms in Bayfield County is $39,530\(^3\), and even with a best-case profit margin of 30%, the average farm in Bayfield County is not able to support a family. As such, the agricultural economy of Bayfield County is largely dependent on the rest of the economy providing off-farm income.

Of the 1.3 million acres in Bayfield County, 89,000 are in farms with 56,000 of those used for crops or pasture. With the low intensity of agriculture in the county, the demand for cropland is low, which is reflected in cropland values of less than $2000/acre and cropland lease values averaging $24/acre\(^4\). With land values in other parts of the Upper Midwest surpassing $10,000 per acre and annual cash rent exceeding $250/acre, the agricultural lands in the county will become increasingly attractive to outside producers, even with the short season and challenging soils.

Despite the overall decline in the agricultural economy, there are reasons to be optimistic about the future of agriculture in the region. As evidenced in Ashland County, with successful farm succession and modernization, dairy farming can be profitable in the region. Hay and forage producers are having success exporting hay to buyers outside the region. With support from the Northern Aquaculture Demonstration Center and area fish hatcheries there is a growing interest in aquaculture for bait, stocking, and food production. Pioneers in blueberry production have led the way in diversifying Bayfield’s fruit economy. Enterprising livestock producers are having success with managed intensive grazing and direct marketing of meats. Strong but volatile markets for small grains are providing new opportunities for cash-croppers. There is also a new wave of young, beginning, and aspiring farmers in the region capitalizing on the growing local food movement and are farming following a model of diversification, direct marketing, and product differentiation. Export of high-value agricultural products to larger urban markets is a positive development and is likely an area of significant growth potential.

The recent proposal for a large-scale hog operation in the Town of Eileen would bring a scale of agriculture that is increasingly common elsewhere in the Upper Midwest, but is new to the Lake Superior region. Such large-scale livestock operations have potential to bring new agricultural activity to the region, but also represent a significant change from the current system of distributed small-scale dairy operations managing predominantly perennial forage crops. A transition to large-scale concentrated animal feeding operations managing annual row crops (corn and soy) would significantly change land-use practices with concerns as to impacts to surface and groundwater quality.

\(^3\) 2012 Census of Agriculture, National Agricultural Statistics Service

\(^4\) Bussler, G. 2014. Wisconsin Ag News – County Cash Rent. USDA-NASS
The Soils and Water of Bayfield County

Soils
With the exception of the Bayfield fruit growing region, agriculture in Bayfield County takes place in the Superior Clay Plain on the Miller Creek Formation (Figure 2). The soils are predominantly clayey lacustrine till formed at the bottom of ice-margin lakes during periods of glacial retreat. Areas of well-drained sand and outwash gravel occur in correlation with beach ridges and lake and river terraces. The soils are predominantly poorly-drained, but areas can be well- to excessively-drained depending upon outwash deposition.

Groundwater
Based on analysis of 660 well-drilling records in the agricultural areas of Bayfield County, 67% are drilled into sand and gravel deposits within the silty-clay Miller Creek Formation and the rest are drilled into the sandstone bedrock beneath the formation. For the wells drilled into the embedded sand and gravel deposits, the average casing depth is 149 feet with a range from 36 to 488 feet. Figure 3 (in Appendix 6) shows a cross-sectional profile of the County running from the Binon Swamp northeast toward Ashland illustrating water-bearing sand and gravel deposits within the glacial till. The silty-clay soils of the Miller Creek formation provide significant protection of groundwater from percolation of contaminants from the surface. As such, the primary threat to groundwater in these areas is at points where the silty-clay cap is penetrated, such as with well casings from active or abandoned wells. Testing of 66 private wells in 2015 within the agricultural area of west-central Bayfield County found 10 with coliform bacteria, but 0 with E. coli, suggesting that some wells may need structural improvements such as new casing caps, but there is no evidence of biological contamination of groundwater from agricultural operations. Isolated areas within the agricultural areas of Bayfield County do have surficial deposits of sandier soils with higher porosity and greater rates of infiltration. Wells drilled in such areas are more susceptible to groundwater contamination compared to areas with the silty-clay. An example of such an area is the higher ground along and North of Hwy 118 and East of Gilles Road. Testing of groundwater from private wells in this area shows nitrate concentrations between 0.2 and 5 mg/L, which is safe to drink, but indicates nitrates from human activities are reaching the groundwater (Figure 4).

Figure 2. Surficial Geology of Bayfield County (Adapted from Gotkowitz and Li, 2015)

5 Gotkowitz, M.B., and Y. Li, 2015. Groundwater and Wells in Agricultural Regions of Bayfield County: Report to the Large-Scale Livestock Study Committee. Wisconsin Geological and Natural History Survey
6 Results of coliform and E. coli testing conducted by the Bayfield County Health Department in 2015
Surface Water

Farming on clay has significant advantages and disadvantages. The soils hold nutrients and water, but are often excessively wet inhibiting root growth and narrowing operational windows. To farm the soils, producers must enhance and maintain surface drainage networks to remove excess moisture (Figure 5). This results in faster rates and higher volumes of runoff and can result in soil and nutrient losses to surface waters and erosive peak flow events in streams and rivers. Efforts to protect streambank integrity and aquatic habitat in the region seek to “Slow the Flow” by reducing runoff and retaining more stormwater in upland areas. As such, there exists an underlying tension between efforts to farm the land and efforts to protect water quality.

Surface waters in Bayfield County in general meet WI DNR water quality standards with many achieving outstanding or exceptional designation (Figure 6). Recent water quality testing, however, indicates some streams in the region may not be meeting water quality standards. South Fish Creek in the Town of Eileen near Ashland, in particular, has excessive phosphorus (Figure 7). High levels of phosphorus in streams and lakes can cause excessive algae growth leading to a range of problems including beach closures and dead zones where fish can’t survive.

Phosphorus occurs naturally in the environment, but agricultural operations can be significant contributors of phosphorus to surface waters via non-point runoff from fields. The elevated phosphorus levels in South Fish Creek are particularly concerning as the majority of dairy cows in Bayfield County are currently in the South Fish Creek watershed and the proposed new hog facility would be located near a tributary draining to South Fish Creek. Any increase in annual row cropping or manure applications within the watershed could

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make it more difficult to reduce already elevated levels. Phosphorus loss modeling proposed for the watershed will provide a better understanding of the phosphorus sources and help guide efforts to reduce losses to South Fish Creek.

**Committee Members and Process**

As directed by the Bayfield County Board, the Large-Scale Livestock Study Committee consists of nine voting members. Six are County Board Supervisors and three are citizens chosen by the County Board specifically to provide relevant expertise to the Committee’s work. In addition, the Committee has six advisory members working to provide information at the Committee’s request.

The Committee recognizes that livestock operations provide a range of benefits to a community including economic activity and employment for Bayfield County citizens and, of course, the food we eat. However, the task delegated to the Committee by the Bayfield County Board was to analyze potential negative impacts and, therefore, that has been the focus of its work and is the focus of this report. The County Board will have to consider both the positive and negative impacts of large-scale livestock operations in determining how to act on the recommendations made by the Committee.

At the beginning of its work, the Committee decided to analyze the impacts of large-scale livestock operations in four broad topic areas: surface water, groundwater, microbiology, and air quality. For each of the topic areas, the Committee invited experts in the field to present relevant information to the Committee regarding the impacts and existing regulations meant to mitigate those impacts (Appendix 7). Committee members also toured a large-scale livestock operation to see animal housing and manure management systems and see first-hand how existing regulations are implemented by agricultural producers. Based on the information presented, the Committee developed Findings-of-Fact documents for each topic area as presented in Appendix 2-5. Based on those facts and gaps in existing regulations or outreach education, the Committee developed recommendations to the County Board on
actions the Board could take to mitigate the impacts posed by large-scale livestock operations on public health and environmental quality.

An important aspect of the Committee’s work has been inclusion of the public and stakeholders in the Committee’s work. All meetings have been open to the public with 15 minutes of public comment available at each meeting. The Committee has also partnered with UW-Extension to host the Large-Scale Livestock Study Committee Presentation Series with most of the presenters to the Committee also presenting to the public either before or after their presentation at a Committee meeting. This has allowed the public to ask questions and engage in discussion with the presenters. Copies of the presentations are available at the Bayfield County UW-Extension website at: http://bayfield.uwex.edu/2015/07/08/bayfield-county-large-scale-livestock-study-committee-presentation-series/. In addition, a formal public hearing was held to solicit feedback from the public and from stakeholders regarding the recommendations made by the Committee.

**Relevant Existing Regulations**

**ATCP 51 – Livestock Facility Siting Regulations**

A number of State regulations apply to livestock operations, most prominently and comprehensively are Wisconsin Administrative Code Chapter ATCP 51 and Chapter NR 243. ATCP 51 implements the Livestock Facility Siting Law (Section 93.90 of the Wisconsin Statutes) and sets statewide standards in five areas: setbacks from property lines, odor and air emissions, nutrient management, waste storage facilities, and runoff from livestock facilities. The standards set forth in the ATCP 51 only apply to livestock facilities if a County or Town in which the livestock facility is located has adopted the standards through local ordinance. In addition, the ATCP only applies to livestock facilities with new and expanding livestock operations with 500 or more animal units. Bayfield County adopted the standards with establishment of the Bayfield County Livestock Facilities Licensing Ordinance in January of 2015. To date, Bayfield County has not yet issued a livestock facilities license and there are currently no livestock operations with 500 or more animal units within Bayfield County.

The Livestock Facility Siting Law was passed in WI primarily to provide uniform regulation of livestock facilities. As stated specifically in ATCP 51, the law and standards are intended to be “protective of public health or safety, practical and workable, cost-effective, objective, based on available scientific evidence that has been subject to peer review, designed to promote growth and viability of animal agriculture, and designed to balance the economic viability of farm operations with protecting natural resources and other community interests”. Because the Siting Law was intended to provide uniform regulation of livestock facilities, local governments are not allowed to enact more stringent standards unless: 1) the standards are based on reasonable and scientifically defensible findings-of-fact, and 2) the findings-of-fact show the standards are needed to protect public health or safety.

The Siting Law is very specific in prohibiting a local government unit from restricting the size of a livestock facility. However, the Siting Law does allow a local government unit to utilize local zoning to create zoning districts or overlays as a means to regulate the size of operations within each of the zoning districts as long as at least one district within the local government unit allows livestock operations of unlimited size.
ATCP 51 does provide regulatory certainty to livestock operations and the public as to what is required to operate anywhere in Wisconsin. Providing this regulatory certainty does limit local regulatory discretion and can somewhat limit the controversy associated with local land-use decisions. However, it is important to note the standards set in ATCP 51 are a compromise between environmental and economic considerations and may not necessarily be adequate to protect surface and groundwater under the full range of soil and climate conditions in Wisconsin. Of particular concern is nutrient loading in surface and groundwater from non-point runoff from fields. With more than 35% of Wisconsin lakes and rivers impaired from excessive nutrients⁸ and 30% or more of wells in some regions unsafe due to nitrate contamination⁹, the Committee recognizes ATCP 51 may be limited in effectively managing non-point runoff. As such, with the responsibility to protect the public health and environment of the citizens of Bayfield County, the County Board should not necessarily rely on the statewide standards of the Siting Law to manage the impacts of large-scale livestock operations.

**NR 243 – Confined Animal Feeding Operations**

In addition to meeting the locally-adopted standards of ATCP 51, livestock operations with 1000 or more animal units (CAFOs) are required to have a Wisconsin Pollutant Discharge Elimination System (WPDES) permit from the WI DNR as outlined in NR 243. Under WPDES, a CAFO is required to have zero discharge¹⁰ of pollutants from livestock production facilities and is required to develop and implement a nutrient management plan as outlined in the [NRCS 590 Nutrient Management Planning Practice Standard](http://www2.epa.gov/nutrient-policy-data/waters-assessed-impaired-due-nutrient-related-causes). Livestock operations required to have a WPDES permit also have additional manure storage capacity requirements and manure spreading restrictions compared to operations only covered by the Siting Law.

It is important to note the zero discharge requirement in a WPDES permit applies only to the actual buildings and animal lots in the farmstead. It does not apply to non-point runoff from fields managed by the CAFO. The nutrient management rules are meant to address non-point runoff by limiting nutrient losses from fields, but the nutrient management rules do not prohibit nutrient losses. In fact, current rules allow for loss of 12 lbs of phosphorus in any single year with no more than an average of 6 lbs over an eight year rotation. This is significantly more than average phosphorus losses from forestland or hayland, which is less than 0.5 lbs/acre/yr.

**County Manure Storage and Nutrient Management Ordinance**

The ATCP 51 standards and the WPDES permit requirement apply to large-scale livestock operations. Most counties in Wisconsin have also adopted a county manure storage and nutrient management ordinance to regulate livestock operations under 500 animal units (Figure 8). In most cases, the ordinance requires anyone building a new or significantly altering an existing manure storage facility to obtain a manure storage permit from the county. To obtain the permit the operator typically has to follow the [NRCS 313](http://www2.epa.gov/nutrient-policy-data/waters-assessed-impaired-due-nutrient-related-causes).

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¹⁰ Per NR 243.13, a CAFO may not discharge pollutants from a production area directly to navigable waters except for manure storage overflows caused by storm events and the operation had at least enough excess manure storage capacity to accommodate a 25-year, 24-hour storm event at the time of the storm. Hog operations must maintain enough storage capacity at all times to accommodate a 100-year, 24-hour storm event.
Waste Storage Facility Practice Standard and develop a nutrient management plan. In addition, the ordinance typically requires operators with animal housing or feeding facilities, such as feedlots or barns, to install clean water diversions and runoff treatment infrastructure such as grass lined waterways to limit discharge of manure and nutrients to navigable waters. Bayfield County does not currently have a county manure storage and nutrient management ordinance.

Wisconsin Statute § 92.15(3)(a): Exceeding Agricultural Performance Standards
WI Statute § 281.16 and WI Administrative Code Chapter NR 151 outline agricultural performance standards and prohibitions meant to limit non-point runoff from agricultural field operations. Central to the Statute and Code is the NRCS 590 Nutrient Management Practice Standard that outlines specific restrictions, practices, or methods livestock operations must follow when applying fertilizer or manure. WI Statute § 92.15(3)(a) allows a local government unit to enact more stringent regulations than included in the 590 Practice Standard, but only if the local government unit gains approval from the WI DNR or WI DATCP that such regulations are necessary to achieve the water quality standards outlined in WI Statute § 281.15.

Facts, Gaps, and Solutions
For each of the four topic areas, the Committee summarized the information it received from presenters and Advisory Committee Members into: “Findings-Of-Fact” (Facts), “Gaps in Existing Regulations, Enforcement, and Outreach Education” (Gaps), and “Risk Management Strategy Options for Bayfield County” (Solutions). The full range of risk management strategy options for each topic area is shown to demonstrate the depth and breadth of options considered by the Committee. After deliberation by the Committee only some are included in the Committee recommendations to the County Board. The full text of each of these four documents is found in Appendix 2-5. Key aspects and considerations for each of the topic areas are summarized below:

Surface Water
The clay soils of the agricultural regions of Bayfield County result in slow infiltration rates and consequent runoff to adjacent waterways. Most nutrient and sediment loss from agricultural operations occurs during the spring melt season and immediately after storm events. As such, the primary threat from agriculture to surface water in Bayfield County is from surface runoff carrying sediment, nutrients, and manure. Protecting water quality, while also enabling agricultural production, is a matter of risk management. The following agricultural practices and situations on clay ground in northern Wisconsin pose the greatest risk to surface water quality:

- Spreading manure during periods of high runoff risk.
- Constructing manure pits without pre-construction soil borings or engineering plans.
- Applying manure to concentrated flow areas.

Figure 8. Wisconsin Counties with Manure Storage Ordinances Covering Operations with Less Than 500 Animal Units
- Lack of perennial vegetation in concentrated flow areas.
- Animal grazing within intermittent and perennial stream drainages in which animals have unrestricted access to the stream and/or vegetative cover within the drainage is lost.
- Barnyards, feedlots, and dry lots with unmitigated runoff to surface waters.
- Over-application of nutrients resulting in annual loss of excess nitrogen and/or increased risk of phosphorus loss due to higher soil phosphorus levels.
- Application of manure without incorporation

Regulations and best management practices are intended to mitigate these risks and minimize nutrient and sediment loss to surface waters. The Committee has determined that the existing regulations in NR 151, ATCP 51, and NR 243 are comprehensive at mitigating many of these risks. However, there are important gaps that existing regulations do not adequately address as outlined in Appendix 2. Of most concern is the regulation of non-point runoff associated with field operations. In particular:

1. In the event surface waters become impaired due to excessive nutrient loads, the WI DNR is required to develop a plan to lower the nutrient loads in that water body. Such a plan may involve a Total Maximum Daily Load (TMDL) and forced nutrient discharge reductions from WPDES permitted facilities. Such forced reductions do not apply to non-point nutrient sources such as runoff from agricultural fields. As such, under current regulations, new and expanding livestock operations of 1000 animal units or more may be sited upstream of impaired waters even if the operations will increase field-edge phosphorus losses compared to prior land-use. Such an increase is likely when perennial forages receiving no manure are converted to annual row crops receiving manure.

This issue is particularly relevant in the South Fish Creek watershed, which is likely impaired due to elevated phosphorus levels (Figure 7). If phosphorus levels in South Fish Creek, a major tributary to the Chequamegon Bay, continue to increase such that phosphorus levels increase in the Chequamegon Bay, it is possible the Washburn and Ashland wastewater treatment plants, as permitted WPDES discharge facilities, would be required to reduce their phosphorus discharge at taxpayer expense. Thus, finding ways to reduce phosphorus loading into South Fish Creek is imperative, especially if new or expanding livestock facilities are sited within the watershed.

2. Winter-spreading of manure, particularly in late-winter and early-spring, constitutes a significant risk to water quality. If climate change results in more freeze-thaw cycles during the winter months the risk becomes that much greater. One method of mitigating this risk is restricting applications to flat fields with significant no-spread buffers around waterways. If such fields are not available, there needs to be sufficient manure storage capacity to store manure until the spring when soils have thawed. Operations with a WPDES permit are required to demonstrate 180 days of storage capacity going into each winter season unless they are unable to spread manure in the fall due to adverse weather conditions. This may result in emergency land-spreading situations during the winter as the WI DNR mandates land-spreading manure if overflow from a storage facility is imminent. As has been experienced at times in WI, if one livestock operation is unable to spread manure in the fall most likely all of the producers in the region are unable to spread, resulting in...
region-wide emergency winter-spooling. If a winter-thaw or runoff event occurs shortly after the spreading, the nutrient loss can be severe.

As such, the 180-day storage capacity may not be sufficient for the long winters and wet clay soils of Bayfield County. Furthermore, reliance on a single manure spreading window, such as in the fall after the corn is harvested, increases the chance that adverse weather results in full manure storage facilities and emergency spreading. Having multiple spreading windows during the year is a possible risk management strategy that is particularly appropriate for Bayfield County given the short season and narrow operational windows created by the clay soils.

3. Livestock operations are required to maintain concentrated flow areas and direct conduits to navigable waters in perennial vegetation. The perennial vegetation protects the flow areas from erosion and can hold and filter nutrients from runoff. Such concentrated flow areas are extensive in Bayfield County agricultural fields (Figure 5) and are actively maintained by producers to remove excess moisture from the fields. During harvest operations with annual crops these flow areas can be rutted, requiring periodic scraping and re-shaping, particularly in wet years. In addition, with the complexity and scale of the surface drainage networks it can be difficult for tillage, manure application, and herbicide spraying application to avoid the drainages. Regardless of the methodology used, protecting these flow areas is key to protecting surface water in Bayfield County.

**Groundwater**

Groundwater in the agricultural areas of Bayfield County is largely protected from surface activities by the high bulk density and slow infiltration rates of the silt-clay glacial till of the Miller Creek Formation. Protecting groundwater in these areas is largely a matter of avoiding application of manure or nutrients near abandoned or active well casings. That said, there are areas of sandier soils within the agricultural regions of Bayfield County that may be more susceptible to surface activities. Nitrate levels slightly above background levels in a cluster of wells near Hwy 118 (Figure 4) highlights the need to evaluate the specific conditions of each well and evaluate any threats to the groundwater quality near that well.

Nitrate and microbial contamination are the most common groundwater problems associated with manure storage facilities and land-spooling activities. Because it is nearly impossible to source-identify nitrates, it is important to establish background water quality data prior to installation of a new or expanding livestock operation. The Committee provided funding to test 66 private wells in the east-central agricultural area of Bayfield County during the fall of 2015, but additional testing of private wells is needed. It is also prudent to monitor groundwater immediately downgradient of manure storage facilities in order to determine the degree of nitrate loss (if any) from the facility or possible microbial contamination. Such information can be useful in determining the cause of nitrate contamination of private wells downgradient of a livestock facility.

Although groundwater monitoring is important, existing regulations do not explicitly require monitoring of large-scale livestock operations. NR 243 authorizes the WI DNR to require groundwater monitoring for CAFOs, but because such required monitoring is at the discretion of the WI DNR, such decisions can and have been contested. With clean groundwater currently in Bayfield County, implementation of a
monitoring and contaminant source-verification system would help ensure livestock operations don’t contaminate groundwater.

**Air Quality**

Livestock facilities may generate hazardous air emissions such as particulate matter (dust), ammonia, or hydrogen sulfide. Such emissions are not as easily controlled as smokestack emissions, and are currently exempt from WI air emissions rules as the WI DNR awaits guidance from federal efforts to develop a regulatory framework and methodologies for hazardous air emissions from livestock operations. The primary means currently envisioned by the WI DNR to control air emissions from animal feeding operations is through implementation of a series of best management practices. To that end, in April of 2010, the WI DNR convened the WI Agricultural Waste Air Emissions Advisory Group to develop best management practices for the reduction of emissions of hazardous air pollutants (primarily ammonia and hydrogen sulfide) from livestock operations. Many of these best management practices are included in the odor standard of the Siting Law.

In addition to the odor standard, the Siting Law utilizes setbacks to help protect neighbors from hazardous air emissions. Simple dispersal and dilution of hazardous gases from stored manure, for example, is an effective strategy of quickly lowering concentrations to safe levels. The setbacks in the Siting Law require 350’ between a manure storage facility and a property line. However, for manure storage under housed animals (such as in swine operations), such facilities are classified as livestock facilities and only have a required setback of 100’ to 200’ depending on the size of the operation. Although aggressive odor control practices would be required for a barn that close to a property line to meet the odor standard, it is possible the standard could be met. In the event of equipment malfunction there is a greater chance that hydrogen sulfide concentrations could exceed ambient air quality standards on an adjacent property when the barn is only 100’ to 200’ from a neighboring residence compared to when the distance is 350’ or more.

Road dust and odor from transport and land-spreading of manure remain highly controversial issues in Wisconsin. Both the Siting Law and Right-to-Farm rules in Wisconsin address these issues by giving priority to agricultural land use in agricultural areas. In other words, residents in agricultural areas should expect odor and road dust as part of living in an agricultural area. Affected residents do have recourse via nuisance laws, but typically must show an adverse health impact from a specific chemical or compound exceeding air quality standards. Odor from land-spreading of manure typically does not expose neighbors to hazardous levels of ammonia or hydrogen sulfide, thus, bad odor has not typically been enough to constitute a nuisance, despite the negative impact it can have on quality of life.

There is no clear resolution to the odor issue related to land-spreading of manure. There is a growing effort to demonstrate odor itself can cause adverse psychosocial impacts leading to negative impacts on physical health, particularly if the odor is present for extended periods of time.\(^{11}\) It is possible such impacts may be sufficient to win nuisance lawsuits. If so, regulations to specifically minimize odor from land-spreading of manure may have stronger standing. Until then, odor management will likely rely on a combination of zoning, land-use planning, and voluntary best-management practices. An Operations Ordinance, as

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recommended by the Committee, may allow Bayfield County to address the nuisance and public health impacts associated with land-spreading of manure through conditions to an operations permit.

**Microbiology**

Zoonotic disease is a disease caused by microbiological pathogens that can spread from animals to humans. Livestock manure generally contains three classes of zoonotic disease organisms: bacteria (campylobacter, salmonella, E. coli), protozoa (cryptosporidium, giardia), and viruses (rotavirus, enterovirus, hepatitis E). If humans and livestock facilities are co-located, there will always be some risk of transmission of zoonotic disease, but there are many steps that can be taken to minimize the risk, as outlined in Appendix 5. Currently, there are no regulations to measure or minimize pathogen loads in stored or land-spread manure. Protecting public health is achieved primarily through practices meant to protect surface and groundwater quality.

Recently, livestock operations have used irrigation systems to apply manure, typically through spray guns or other high volume delivery mechanisms. This has raised concerns about not only odor but also spreading microbial pathogens through mist and aerosols produced by the irrigation equipment. Bayfield County passed an ordinance in 2015 prohibiting application of manure through aerial irrigation equipment.

Anaerobic manure digestion is an increasingly common system used to harvest methane from stored manure for energy production. Such systems also reduce pathogen loads, but have not yet been required as part of manure handling systems in livestock operations.

Antibiotic resistance in zoonotic pathogens is of growing concern in the United States with some evidence indicating routine use of antibiotics in livestock operations may be contributing to development of antibiotic resistance. Revisions to the Veterinary Feed Directive in 2015 have banned sub-therapeutic use of antibiotics in livestock operations and now require veterinary approval prior to treating a herd through feed or water.

An increase in antibiotic resistant microbes in a community, such as MRSA, could be caused by overuse of antibiotics or could be caused simply by an increase in animal populations, and thus, an increase in the probability of exposure. As such, in addition to minimizing over-use of antibiotics in livestock (and human) populations, strong biosecurity practices are key in reducing the chances of transport and exposure of zoonotic disease.

**Rationale and Justification for Committee Recommendations**

The Committee recommendations outlined in this report are intended to address the gaps identified for each of the topic areas as discussed above and in Appendix 2-5. The Committee recommends consideration and adoption of the Operations Ordinance by the Bayfield County Board. The remaining recommendations are a combination of outreach education, cost-share assistance, incentive programs, and some additional regulations, all of which require further consideration by the Land and Water Conservation and/or Health Department as it relates to priorities, budget, and staffing details.

The Committee reviewed a wide range of additional regulations for each topic area as means to address identified gaps in existing regulations. The Committee considered recommending codifying some or all of the possible additional regulations through amendment of the county siting ordinance, amendment of the
county zoning code, or enactment of a new ordinance such as a manure storage and nutrient management ordinance. Such an approach would require DATCP and/or DNR approval of any regulations determined to be more stringent than existing regulations. In addition, codifying regulations would require the County to anticipate the full range of possible situations or impacts presented by livestock operations now and into the future.

Taking all considerations into account, the Committee is recommending adoption of an Operations Ordinance that requires new or expanding livestock facilities with 1000 or more animal units to demonstrate that the operations of the facility, including field operations, will not cause pollution or a private or public nuisance. This allows the County to evaluate the specific circumstances, operations, and possible impacts of each proposed facility, and if necessary, apply specific conditions to an issued operations permit. It does allow a livestock facility of any size to operate in Bayfield County as long as it does not cause pollution or a private or public nuisance.

Through the course of its work, the Committee and its members have come to appreciate and recognize the complexity of the issues raised by large-scale livestock operations. Having food to eat and clean water is not an either/or decision and having both requires a comprehensive approach involving research, outreach education, cost-share and incentive programs, and regulations. As such, the Committee strongly recommends Bayfield County carefully consider the specific recommendations outlined in this report and take steps to implement them.
WHEREAS, the special Bayfield County Large-Scale Livestock Study Committee has determined, based on well-documented factual findings, that it is necessary and appropriate for Bayfield County to regulate both the operations and siting of large-scale Confined Animal Feeding Operations (“CAFOs”), in order to adequately protect public health (including human and animal health), safety, and general welfare, prevent public and private nuisances, and preserve the quality of life, environment, and existing livestock and other agricultural operations of Bayfield County; and

WHEREAS, on January 27, 2015, the Bayfield County Board of Supervisors enacted Chapter 2 “Livestock Facilities Licensing Ordinance” of Title 5 [Public Safety] of the Code of Ordinances, Bayfield County, Wisconsin (hereinafter “Livestock Facilities Licensing Ordinance”), pursuant to the powers granted under the Wisconsin Constitution and Wisconsin Statutes, including but not limited to Wis. Stat. § 93.90 (“Livestock Siting Law”), and Wis. Admin. Code Ch. ATCP 51; and

WHEREAS, the Livestock Facilities Licensing Ordinance was enacted pursuant to Wis. Stat. § 93.90, and Wis. Admin. Code Ch. ATCP 51, to establish standards and procedures for licensing the siting of new and expanded livestock facilities, to protect the public health and safety of the people of Bayfield County; and

WHEREAS, on February 18, 2015, the Bayfield County Board of Supervisors enacted Chapter 4 “Moratorium on Livestock Facilities Licensing” under Title 5 “Public Safety” for a duration of twelve (12) months (with a possible extension of up to 6 more months), pursuant to Wis. Stat. § 59.03(2), to provide adequate time to determine whether amendments to the Livestock Facilities Licensing Ordinance or creation of another ordinance is necessary to adequately protect public health and safety, and determine whether adequate resources exist to enforce any new or existing livestock facilities ordinances; and

WHEREAS, pursuant to Wis. Stat. § 59.03(2), the Bayfield County Board of Supervisors “is vested with all powers of a local, legislative and administrative character, including without limitation because of enumeration, the subject matter of water, sewers, streets and highways, fire, police, and health, and to carry out these powers in districts which it may create for different purposes, or throughout the county . . . .” Wis. Stat. § 59.03(2); and
WHEREAS, pursuant to Wis. Stat. § 59.70(1), Bayfield County has authority to “enact building and sanitary codes, make necessary rules and regulations in relation thereto and provide enforcement of the codes, rules and regulations by forfeiture or otherwise”; and

WHEREAS, pursuant to Wis. Stat. § 92.15, Wis. Admin. Code § ATCP 50.60(1), and Wis. Admin. Code § NR 151.096(3), Bayfield County has authority to issue individual permits that require livestock facilities to comply with uncodified conservation or water quality protection standards that may exceed state standards, without prior review and approval by Wisconsin Department of Agriculture, Trade, and Consumer Protection (“DATCP”) or the Wisconsin Department of Natural Resources (“DNR”), provided such permit requirements or standards are not routinely applied as de facto regulatory enactments; and

WHEREAS, although Wis. Stat. § 93.90, and Wis. Admin. Code Ch. ATCP 51, impose limitations on Bayfield County’s authority to restrict the siting of livestock facilities of over 500 animal units, these laws do not limit or withdraw Bayfield County’s authority to regulate the ongoing operations of such facilities to prevent pollution, protect public health, safety, and general welfare, and prevent or abate nuisances which may be caused by livestock facilities, and this was expressly recognized in Adams v. Wis. Livestock Facilities Siting Review Bd., 2012 WI 85, ¶ 65 n. 30 & ¶¶ 75, 83-84, 342 Wis. 2d 444, 820 N.W.2d 404; and

WHEREAS, in Adams v. Wis. Livestock Facilities Siting Review Bd., a majority of the Wisconsin Supreme Court stated that:

Our decision does not leave political subdivisions without recourse against polluters. Most importantly, political subdivisions retain the authority to bring nuisance abatement actions against polluting farms. See Wis. Stat. § 823.01. More generally, this decision does not speak to political subdivisions’ ability to regulate livestock facility operations. It simply says that the legislature has forbidden them from regulating livestock facility siting except as permitted by the Siting Law.

Id., 2012 WI 85, ¶ 65 n. 30; and

WHEREAS, pursuant to Wis. Stat. § 254.51(5), Bayfield County has authority to enact “ordinances that set forth requirements for animal-borne and vector-borne disease control to assure a safe level of sanitation, human health hazard control or health protection for the community”; and

WHEREAS, pursuant to Wis. Stat. § 254.59(7), Bayfield County has authority to “enact an ordinance concerning abatement or removal” of human health hazards that is “at least as restrictive as” Wis. Stat. § 254.59, which may be enforced in Bayfield County; and

WHEREAS, in addition to the Livestock Facilities Licensing Ordinance enacted on January 27, 2015, it is in the best interests of the County of Bayfield to enact a separate ordinance, to more effectively, efficiently, and comprehensively regulate the operations of large-scale CAFOs of 1,000 animal units or greater, regardless of where they may be sited, to adequately protect public health (including human and animal health), safety, and general welfare, and to prevent public and private nuisances, and preserve the quality of life, environment, and existing small-scale livestock and other agricultural operations of Bayfield County; and
WHEREAS, it is deemed to be in the best interest of the County of Bayfield that the Code of Ordinances, Bayfield County, Wisconsin, be further modified and amended in the manner set forth.

NOW, THEREFORE, the Bayfield County Board of Supervisors does hereby ordain as follows:

Section 1. Chapter 6 [Large-Scale Confined Animal Feeding Operations Ordinance] of Title 5 [Public Safety] of the Code of Ordinances, Bayfield County, Wisconsin is hereby created to read as follows:

Chapter 6  Large-Scale Confined Animal Feeding Operations Ordinance

Sec. 5-6-1  Authority

This ordinance is adopted pursuant to the powers granted under the Wisconsin Constitution and the Wisconsin Statutes, including but not limited to Wis. Stats. §§ 59.03(2), 59.70(1), 254.51(5) & 254.59(7).

Sec. 5-6-2  Title and Purpose

The title of this ordinance is the Large-Scale Confined Animal Feeding Operations Ordinance.

The purpose of this ordinance is to effectively, efficiently, and comprehensively regulate the operations of Large-Scale Confined Animal Feeding Operations of 1,000 animal units or greater (“CAFOs”), 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 Bayfield County (“the County”).

Sec. 5-6-3  Definitions

(a) All definitions located in Section 5-2-3 of the Bayfield County Code of Ordinances are hereby adopted and incorporated by reference as if set forth herein.

(b) “Large-Scale Confined 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 confined, 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 Confined Animal Feeding Operation or CAFO if the total number of animals stabled or confined 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 other wastes; (3) Animals are transferred between the lots or facilities; (4) The lots or facilities share staff, vehicles, or equipment; or (3) Manure, barnyard runoff or other wastes are commingled 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 “Large-Scale Confined Animal Feeding Operation” or “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, including but not limited to a determination of a violation of a livestock or cropland performance standard under Wis. Admin. Code. §§ NR 151 & 243.23, a determination that any type of unacceptable practice has occurred under Wis. Admin. Code § NR 243.24, a determination that malodorous emissions have been caused or allowed in violation Wis. Admin. Code § NR 429.03. For the purpose of this paragraph, issuance of an order or other communication addressing corrective action or a stipulated agreement, fine, forfeiture or other penalty, is considered a determination of a violation, regardless of whether there is a finding or admission of liability.

(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 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.

(g) “Siting” means determination of the place where the structures and other physical facilities associated with development of a “Large-Scale Confined Animal Feeding Operation” or “CAFO” may be located, pursuant to Chapter 2 “Livestock Facilities Licensing Ordinance” of Title 5 [Public Safety] of the Code of Ordinances, Bayfield County, Wisconsin, Wis. Stat. § 93.90, and Wis. Admin. Code Ch. ATCP 51.

Sec. 5-6-4 Large-Scale Confined Animal Feeding Operations or CAFOs

(a) Regardless of siting, a Large-Scale Confined Animal Feeding Operation or CAFO shall be allowed to conduct operations within the County only as provided for under this ordinance.

(b) The applicant shall apply for a “CAFO Operations Permit” prior to conducting any operations associated with a Large-Scale Confined Animal Feeding Operation or CAFO within the County. The application shall be submitted on a form provided to the applicant by the County Clerk, a copy of which is attached hereto as Appendix A.

(c) The Bayfield County Board of Supervisors (“County Board”) shall decide whether or not 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 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 County to review the application and advise the County Board.

(d) The County Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it determines by a majority vote, supported by clear and convincing evidence presented by the applicant, that the operations of the proposed CAFO, 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 County, and that the application meets all other requirement of this Ordinance.

(e) The County Board shall issue a CAFO Operations Permit, with or without conditions, to an applicant that has met all other requirements of this Ordinance provided it determines, based on information provided by the applicant and verified by the County, that a CAFO having substantially similar operational characteristics, housing the same species of animals, and utilizing similar operations, has been continuously operated in the United States for at least ten (10) years without causing pollution of groundwater or surface water, and without causing either a private nuisance or a public nuisance, as determined by an administrative proceeding, civil action, criminal action or other legal or administrative action, investigation or proceeding. However, this requirement may be waived by the County Board at the specific request of the applicant for a CAFO Operations Permit if the County Board determines, based on information provided by the applicant and verified by the County, that the proposed CAFO will otherwise meet the requirements set forth in Sec. 5-6-4 (d), above.

(f) A CAFO Operations Permit approved by the County Board can be voided at any time if the permittee violates any conditions of the permit or any conditions of any other required Federal, State or County permits or licenses, at any time.

Sec. 5-6-5 Procedures

(a) An applicant for a CAFO Operations Permit shall complete a Bayfield County CAFO Operations Permit Application (Appendix A) and pay the required application fee of one dollar ($1.00) per proposed animal unit to Bayfield County, at the time the application is submitted to the County Clerk.

(b) Upon signing and submitting a CAFO Operations Permit Application to the County Clerk, the applicant shall agree to fully compensate the County for all legal services, expert consulting services, and other expenses which may be reasonably incurred by the County 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 County Board. Within thirty (30) days of a request by the County Administrator, the applicant shall provide an administrative fee deposit with the County Clerk in an account such that funds are available to be withdrawn by the County and used to pay for or reimburse the County for the costs and expenses the County incurs in connection with processing the permit application. The County Administrator, in consultation with other County employees, independent consultants and/or legal counsel, shall determine the initial administrative fee deposit based upon the anticipated costs necessary to process the application. After the initial administrative fee deposit, should the County Board at any time determine that
additional fees related to the processing of the application will be necessary, the applicant will make an additional fee deposit into the related administrative fee account within fifteen (15) days of receipt of a request for additional funds by the County Board. Any funds remaining in the administrative fee account once the permit application process is complete shall be returned to the applicant. If the administrative fee account is insufficient to cover all remaining costs related to the CAFO Operations Permit Application, the County shall issue a bill for the remaining costs to the applicant, who shall pay said bill within thirty (30) days.

(c) After receiving the application and the application fee, the County Clerk shall mail a notice that a CAFO Operations Permit Application has been received to all adjoining landowners of the proposed CAFO with the date and time of the next County Board meeting. The notice shall provide information on how interested persons and parties may inspect and obtain a copy of the application.

(d) The County Clerk shall then place the application on the agenda for the next County Board meeting, at which time the County Board shall conduct an initial review of the application and schedule further proceedings for review and consideration of the application by the County Board. Such proceedings shall include: (a) Considering the need to hire special legal counsel and expert consultants to review the application and advise the County Board; (b) Developing a plan to make a determination of the completeness of the application within a reasonable amount of time; (c) Developing a plan to schedule further proceedings, including scheduling a formal public hearing before the County Board on the application at least sixty (60) days after the application has been determined to be complete by the County Board, and scheduling a subsequent special meeting of the County Board to decide whether or not to grant the requested permit and what, if any, conditions shall be required if the requested permit is granted, within a reasonable amount of time.

(e) At the formal public hearing held by the County Board on the application at least sixty (60) days after it has been determined to be complete, the County 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 County to review the application and advise the County Board.

(f) In its review and consideration of a CAFO Operations Permit Application, the County Board shall act in a quasi-judicial capacity, and its final decision on whether or not 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 County Clerk and served on the applicant by regular U.S. Mail.

(g) The County Board shall approve and issue a CAFO Operations Permit, either with or without conditions, if it determines by a majority vote, supported by clear and convincing evidence presented by the applicant, that the operations of the proposed CAFO, 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 County and that the application meets all other requirement of this Ordinance.

(h) The County Board shall issue a CAFO Operations Permit, with or without conditions, to an applicant that has met all other requirements of this Ordinance if it determines, based on information provided by the applicant and verified by the County, that a CAFO having substantially
similar operational characteristics, housing the same species of animals, and utilizing similar operations, has been continuously operated in the United States for at least ten (10) years without causing pollution of groundwater or surface water, and without causing either a private nuisance or a public nuisance. However, this requirement may be waived by the County Board at the specific request of the applicant for a CAFO Operations Permit if the County Board determines, based on information provided by the applicant and verified by the County, that the proposed CAFO will otherwise meet the requirements set forth in Secs. 5-6-4 (d) and 5-6-5 (g), above.

(i) The County Board shall, in granting any CAFO Operations Permit, require the applicant to ensure that sufficient funds will be available for pollution clean-up, nuisance abatement, and proper closure of the CAFO if it is abandoned or otherwise ceases to operate as planned and permitted, based on the following provisions:

1. Notification. The County Board shall determine the required financial assurance level of the CAFO and shall notify the applicant. As a condition of a permit, the County Board shall require financial assurance to be filed with the County 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 County Board, but prior to commencing operations of the CAFO, the applicant shall file with the County Board said financial assurance conditioned on faithful performance of all requirements of this chapter and the permit. Upon notification by the County Board of financial assurance or deposit approval and conformance with permit conditions, the applicant may commence CAFO operations.

2. Bond Requirements.

(a) 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 County.

(b) Each bond shall provide that the bond shall not be canceled by the surety, except after not less than 90 days notice to the County 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 County Board a replacement bond or approved alternate financial assurance in absence of which all CAFO operations shall cease.

(c) The bond shall be payable to “Bayfield County, Wisconsin”.

3. 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.

(a) The County 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.

(b) The applicant or permit holder shall notify the County 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.

(c) The County 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.

5. Financial Assurance on Multiple Projects. Any applicant or permit holder that receives a permit from the County 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 County 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 County Board.

6. Financial Assurance Release. The County Board shall release the applicant’s or permit holder’s financial assurance 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 permitted 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.

7. 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 County 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 County 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.

8. 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 County 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 County Board.
9. Bankruptcy Notification. The applicant or permit holder under this chapter shall notify the County 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.

(j) The County Board may conditionally approve a CAFO Operations Permit and attach 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 County. 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 CAFO, 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 a CAFO’s ongoing operations, 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 a CAFO’s 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 a CAFO’s ongoing operations 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 a CAFO’s ongoing operations, 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 a CAFO’s ongoing operations, to protect the general welfare of the County’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 maintaining County personnel, or for contracting with private consultants, to conduct permit compliance, enforcement and monitoring activities for the County; and

10. Any other conditions deemed reasonably necessary or appropriate by the County Board to effectively, efficiently, and comprehensively regulate the operations of a CAFO, 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 County.

(k) An applicant or any other person or party who is aggrieved by a final decision of the County Board on whether or not to approve and issue a CAFO Operations Permit, either with or without conditions, or a taxpayer, or any officer, department, board or bureau of the County, may, within thirty (30) days after the filing of the decision with the County Clerk, commence an action seeking the remedy available by certiorari in the Bayfield County Circuit Court. The court shall not stay the decision appealed from, but may, with notice to the County Board, grant a restraining order. The County 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.

(l) In any certiorari proceeding brought under the preceding paragraph, attorney fees and costs shall not be allowed against the County 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.

(m) A final decision of the County Board under this ordinance is not subject to appeal under Wis. Stat. 93.90(5) or the provisions of Chapter 2 “Livestock Facilities Licensing Ordinance” of Title 5 [Public Safety] of the Code of Ordinances, Bayfield County, Wisconsin, Wis. Stat. § 93.90, and Wis. Admin. Code Ch. ATCP 51, which apply only to siting decisions.

Sec. 5-6-6 Permit Term & Extensions

(a) A permit issued by the County Board under this ordinance shall be for an initial term of five (5) years. Thereafter, if no substantial changes or modifications are proposed to the CAFO operations and there have been no permit violations or compliance problems a permittee may apply for extension of the same permit for additional five (5) year periods.

Sec. 5-6-7 Penalties

(a) Any violation of this ordinance shall be punishable by a forfeiture of not less than $100.00 or more than $5,000.00 per day for every day of violation of this ordinance, plus the costs of prosecution, including the County’s reasonable attorney fees and costs, for each and every violation.

(b) Each day of violation shall constitute a separate offense. In addition, the County Board may: (1) issue a notice of violation and order that specifies required remedial action, which may include a
Section 2. Except as specifically modified and amended by this ordinance, the Bayfield County Code of Ordinances shall remain in force and effect exactly as originally adopted and previously amended. All ordinances or parts of ordinances inconsistent with or in contravention of the provisions of this ordinance are hereby repealed.

Section 3. SEVERABILITY. If a court of competent jurisdiction adjudges any section, clause, provision, or portion of this ordinance, unconstitutional or invalid, the remainder of this ordinance shall remain in full force and effect and shall not be affected thereby. In addition, if a court of competent jurisdiction adjudges any section, clause, provision, condition, or portion of any CAFO Operations Permit approved and issued by the County Board, pursuant to this ordinance, unconstitutional or invalid, the remainder of the CAFO Operations Permit shall remain in full force and effect and shall not be affected thereby.

Section 4. EFFECTIVE DATE. This ordinance shall take effect and be in full force from the date of its passage by the County Board.

APPENDIX A  CAFO OPERATIONS PERMIT APPLICATION

BAYFIELD COUNTY CAFO OPERATIONS PERMIT APPLICATION

Application Filing Fee: $ __________ (# of Animal Units) x $1.00 per AU = $ __________

Date of Application: ______________________________________________________

Name of Individual or Organization Operating CAFO): ______________________________
________________________________________________________________________

Name of Individual Completing Application: ______________________________________

Federal Employer ID# __________________ State Employer ID# __________________

Contact Person:______________________________________________________________

Address: ___________________________________________________________________

City __________________________ State ________________ Zip _____________

Phone: ( )___________ Fax: ( )___________ Cell Phone: ( )_____________

Email: _____________________________________________________________________

Legal Description of Land Proposed for Site of CAFO (attach as Addendum A if necessary):
Name and Address of Land Owner:

Name: _______________________________________________________________________

Address: _____________________________________________________________________

City ____________________________ State _______________________ Zip _____________

Legal Description of any Owned or Rented land proposed to be used in conjunction with CAFO Operations (e.g. manure spreading) (attach as Addendum B if necessary):

____ 1/4 of ____ 1/4, Section____Township ___N. Range____W. Town of ________________

Tax Parcel ID Number: ________________________________ Acreage ____________

____ 1/4 of ____ 1/4, Section____Township ___N. Range____W. Town of ________________

Tax Parcel ID Number: ________________________________ Acreage ____________

____ 1/4 of ____ 1/4, Section____Township ___N. Range____W. Town of ________________

Tax Parcel ID Number: ________________________________ Acreage ____________

____ 1/4 of ____ 1/4, Section____Township ___N. Range____W. Town of ________________

Tax Parcel ID Number: ________________________________ Acreage ____________
Name and Address of Land Owner:

Name:  _______________________________________________________________________
Address:  _____________________________________________________________________
City ____________________________State _______________________Zip _______________

(1) Describe current land uses within and adjacent to the proposed CAFO site, including aerial photographs. For cropland, include a description of crops currently being grown with an estimate of acreage of each crop:

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

(2) Permits:
   a. Does this CAFO have a Bayfield County Siting Permit?  Yes    No
   b. Does this CAFO have a Wisconsin Pollutant Discharge Elimination Systems Permit?  Yes    No
   c. Does this CAFO have Bayfield County Land Use Permit(s)?  Yes    No
   d. If so, identify the permits held ______________________________________
   e. If this CAFO lacks any of the above permits, please set forth all plans to obtain any of the above permits, including when applications have been or will be filed, and the expected date for approval or denial of the permit:

_______________________________________________________________________

(3) Location/Size:
   a. Identify each structure of facility intended to be used in conjunction with the proposed CAFO, setting forth the location, physical dimensions, and intended use for each structure, as well as how many animal units, if any, will be housed in each structure (attach as Addendum C if necessary):

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
b. List each crop that will be grown on land managed by the CAFO. Provide an annual yield estimate for each crop and how that estimate was made.

c. Identify all perennial streams, intermittent streams, navigable waters, and direct conduits to navigable waters on any parcel of land intended to be used in conjunction with the proposed CAFO and all waterways located within 1,000 feet of any such parcel of land (attach as Addendum D if necessary with aerial photographs, if available):

d. Provide a soil map using SSURGO data for all parcels of land intended to be used in conjunction with the proposed CAFO. Include a soil map unit description for each predominant and critical soil type shown on the maps and include an estimate of soil depth to bedrock or gravel or sand deposits. Include soil test data for phosphorus with one sample per five acres. The soil test data must have been collected no more than 12 months prior to submission of this application (attach as Addendum E evidence of soil testing verifying the information provided on this form):

e. Using the P-Trade report in SNAP-PLUS or other viable means, provide an estimate of total annual field edge phosphorus losses for all fields to be used in conjunction with the
proposed CAFO for each of the two full calendar years prior to the date submitting this application.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

f. Provide an estimate of total annual phosphorus losses for each of the two full calendar years prior to the date submitting this application for all existing agricultural facilities (buildings, animal lots, animal feeding areas, etc.) on all lands to be used in conjunction with the CAFO.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

(4) CAFO operations:

a. Describe the method or methods the CAFO will employ to store any and all animal waste products, including describing the exact location where such products will be stored at any time during operation of the CAFO: (attach as Addendum F, if necessary):

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

b. Describe the method or methods the CAFO will employ to handle and process any and all animal waste products, including the specific machinery and methods that will be employed, the location where the processing of waste will take place, and any materials or chemicals that will be used: (attach as Addendum G, if necessary):

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
c. Describe the method or methods the CAFO will employ to dispose of or spread any and all animal waste products and process wastewater, including the specific machinery and methods that will be employed, the location where the disposal or spreading of waste will take place, and any materials or chemicals that will be used: (attach as Addendum H, if necessary):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


d. Provide an estimate of the quantity of ammonia, hydrogen sulfide and particulate matter that will be emitted to the atmosphere by the CAFO for both the livestock facilities and cropland areas. Describe the method or methods the CAFO will employ to reduce, eliminate, or treat ammonia, hydrogen sulfide, and particulate emissions from the proposed CAFO, including the specific machinery and methods that will be employed, and any materials or chemicals that will be used: (attach as Addendum I, if necessary):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


e. Describe how animals will be transported to, from, and within the CAFO, including a description of the type, size and weight of the transportation vehicles, all highways or roads within the County that will be used, the proposed hours of operation for said transportation, and the specific path of travel for all such transportation (attach as Addendum J, if necessary):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


f. Describe how all animal waste will be transported to, from and within the CAFO, including a description of the type, size and weight of the transportation vehicles, all highways or roads within the County that will be used, the proposed hours of operation for said transportation, and the specific path of travel for all such transportation (attach as Addendum K, if necessary):

_________________________________________________________________
_________________________________________________________________
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g. Describe how all other products or materials (apart from animal units or animal waste) will be transported to, from and within the CAFO, including a description of the type, size and weight of the transportation vehicles, all highways or roads within the County that will be used, the proposed hours of operation for said transportation, and the specific path of travel for all such transportation (attach as Addendum L, if necessary):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


h. If manure is transported by pipeline (permanent or temporary) to fields for land-spreading provide a map showing the intended route and the location and photo of every culvert used along the route. If required, provide a copy of the permit allowing use of the right-of-way or culvert. If crossing driveways or land not under the control of the CAFO, provide a letter from the landowner clearly granting permission to cross the driveway or land with the permanent or temporary pipeline.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


i. Identify all residential and business structures within 500 feet of a gravel road used at any time of the year and by any sort of vehicle by the CAFO. Describe how road dust generated by use of the gravel roads by the CAFO will be controlled.
j. Identify the source of all water to be used at the proposed CAFO facility and the anticipated quantity of water that will be necessary for all CAFO related operations, and also set forth the location of any private or public well located within 1000 feet of any parcel of real estate to be used in conjunction with the proposed CAFO facility. Provide well-drilling records, if available, for all private or public wells within 1000 feet of any parcel of real estate to be used in conjunction with the proposed CAFO facility:

k. Identify a CAFO having substantially similar operational characteristics, housing the same species of animals, and utilizing similar operations, that has been continuously operated in the United States for at least ten (10) years without causing pollution of groundwater or surface water, and without causing either a private nuisance or a public nuisance. Set forth in what ways said existing CAFO has similar operational characteristics of the CAFO proposed in this application. In the alternative, state whether the applicant is requesting a waiver of this requirement and, if so, provide information that may be verified by the County, to show that the proposed CAFO will otherwise meet the requirements set forth in Secs. 5-6-4 (d) and 5-6-5 (g), of the Ordinance:

(5) Animal Welfare:

a. Describe how all animal will be housed in the proposed CAFO, including a description of the type and size of all buildings within which animals will be housed, a description of the size of each pen any animal will be kept in, the number of animals that will be kept within each pen, and the location and type of any outdoor area allotted for animals (attach as Addendum M, if necessary):
b. In the event of power outages or equipment failure, describe how the welfare of animals housed by the CAFO will be maintained including, but not limited to: providing water, venting hazardous air emissions, cooling, and feeding.

c. Describe how all animal units will be fed, including the type of feed, the amount of feed per animal, the method of feeding each animal, etc.:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


d. Apart from the food identified above, identify all products (including chemicals or medicines) that will be injected in, fed to, or otherwise administered to animals in the CAFO on an ongoing basis (i.e. at least once per month):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


e. Identify any and all measures that will be taken to prevent the spread of disease between animals and between animals and humans at the proposed CAFO:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


f. Identify all veterinary care that will be routinely administered to or available to the animals of the proposed CAFO, and identify all medicines or treatments that are anticipated to be administered to animals of the proposed CAFO. Identify steps that will be taken by the CAFO to limit development of resistance to antibiotics:

_________________________________________________________________
(6) Employee Welfare:
   a. Identify the number of anticipated employees at the proposed CAFO and, if any employees have already been hired, set forth their name, address and contact information.

   b. What type of education will employees receive regarding operating safe CAFOs and maintaining safe and healthful conditions for animals and employees at said facility? (attach educational materials and brochures as Addendum N, if available):

   c. What type of healthcare will be made available to employees of the proposed CAFO, or what type of routine medical examinations will be performed?

   d. What are the hours and days of anticipated operation of the proposed CAFO (including maintenance)?

(7) Emergency management:
   a. Set forth in detail an emergency plan of action in the event of soil, water or air contamination emanating from the proposed CAFO, or in the event of a spill of animal
waste products, whether on or off the proposed CAFO site, including the name and contact information for emergency management response team members, the equipment and location of equipment available to respond to such an emergency situation, the anticipated timeline for response to an emergency event, and the anticipated testing measures to be used to ensure the emergency response was effective (attach as Addendum O).

b. Set forth in detail all regular testing of equipment, water, soil, air, animals and employees that will take place to ensure that no contamination or environmental degradation is occurring as a result of CAFO related activities (attach as Addendum P).

(8) Environmental impact:

a. List resources that may be impacted by the proposed CAFO such as timber, agriculture, surface water, ground water, air quality, noise pollution and plant, wildlife or fish habitat. Describe measures that will be taken to mitigate those impacts.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

b. Are there any known endangered species on or near the proposed CAFO site? **Yes** / **No.** If yes – describe the species and whether an environmental impact statement will need to be prepared?

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________


c. Are there any known acid producing minerals or soils present? **Yes** / **No.**

If Yes – how will acid water pollution from the areas used in connection with the proposed CAFO be controlled?

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

d. Will groundwater monitoring wells be installed? If not, describe why not. If so, provide information on each monitoring well including anticipated well depth, well location, chemicals and/or substances that will be monitored, and the schedule and protocol for
testing the water from each well. How will this information be shared with Bayfield County and the public?

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

e. Describe erosion control practices that will be used during the CAFO operations. If no measures will be used, explain why none are needed.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

f. Describe how concentrated flow areas will be maintained in perennial vegetation. If concentrated flow areas are rutted during field operations, describe how the concentrated flow areas will be repaired. Provide an estimate of how often the concentrated flow areas will need to be repaired.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

(9) Public and private nuisances:

a. Describe measures that will be taken to screen the CAFO operation from view of surrounding land uses or explain why such measures are not needed (include photos of the area to show affected areas or why no areas will be affected):

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

b. Describe how odor from the livestock facilities and land-spreading activities will be controlled. If no such measures are necessary, explain why. Also explain the schedule and method for air quality testing within a quarter mile of the proposed CAFO’s boundaries before, during and after the CAFO is opened, worked and closed. (Monitoring distance may need to be increased depending upon the CAFO’s location).

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
(10) Financial Security:
   a. Set forth all bonds already in place in relation to CAFO operations and in support of this
      permit or, if no such bonds exist, set forth the amount the operation anticipates obtaining
      in a bond amount. Explain why this amount is sufficient pursuant to the terms of the
      Bayfield County Livestock Operations Ordinance.

   ____________________________________________
   ____________________________________________
   ____________________________________________

(11) Example CAFO Operations:
   a. Set forth all bonds already in place in relation to CAFO operations and in support of this
      permit or, if no such bonds exist, set forth the amount the operation anticipates obtaining
      in a bond amount. Explain why this amount is sufficient pursuant to the terms of the
      Bayfield County Livestock Operations Ordinance.

   ____________________________________________
   ____________________________________________
   ____________________________________________

Print or Type the Livestock Operator’s Name: ______________________________________
Legal Name of Livestock Company: ________________________________________________
Legal address of Livestock Company: ______________________________________________
City ____________________________State _______________________Zip _____________

Signature:
________________________________________________   _______________________
Authorized Operating Company Representative’s Signature Date

Note: Signature of this application by the applicant or applicant’s representative authorizes the County and its
      designees to enter upon the property to perform needed inspections without prior notice to applicant(s).

Note: Applicant(s) are required to provide twenty-five (25) copies of their completed application to the County Clerk
      upon submission, along with the application filing fee. The additional copies are for the County Board,
      adjoining landowners, and the general public at the public hearing.
Appendix 2 – Surface Water Findings-of-Fact Document

Bayfield County Large-Scale Livestock Study Committee
Adopted December 3, 2015

Surface Water

Findings-of-Fact (Facts)

1. The predominant farmed soils in Bayfield County are clay-loams originating from glacial till. With high bulk density and slow infiltration, runoff during the spring snowmelt and after heavy rains is common.

2. To farm the clay soils of Bayfield County, agricultural producers maintain extensive surface drainage networks to rapidly remove excess water.

3. Drainage practices that increase runoff rates from agricultural lands lead to higher peak flows in streams, resulting in increased streambank erosion and consequent loading of particulate phosphorus and sediment into downstream surface waters.

4. As such, the primary threat from agriculture to surface water in Bayfield County is from surface run-off carrying sediment, nutrients, and manure.

5. Phosphorus loading in surface waters and consequent algal blooms constitute a threat to human health due to toxins produced by the algae.

6. Microbiological pathogens from manure in runoff and surface waters constitute a threat to human health, particularly to swimmers and others in direct contact with the water.

7. Most erosion, sedimentation, and nutrient loss from agricultural lands occur during spring snowmelt and during large storm events.

8. Natural (background) and anthropocentric sources contribute phosphorus to surface waters. Anthropocentric phosphorus comes from both point-source (outflow pipes) and non-point sources (surface runoff).

9. Historical precipitation data and future climate modeling indicate the Chequamegon Bay region is and will continue to receive more precipitation in larger storm events.

10. Engineered edge-of-field mitigation and conservation practices such as settling ponds can be effective in retaining stormwater and reducing peak flows and nutrient loading in adjacent waterways.
11. Phosphorus loss from agricultural lands varies considerably with management practices and precipitation, but averages 2.0 lbs/ac. Total maximum daily load (TMDL) levels are typically set at between 0.16-0.33 lbs/ac. Agriculture will increase phosphorus loading to surface waters compared to background levels.

12. Increasing manure and fertilizer applications within a watershed is likely to increase nutrient loading into surface waters within that watershed.

13. In Bayfield County it is currently unknown how much phosphorus can enter surface waters from agricultural lands before surface waters become impaired. Likewise, the predominant sources of phosphorus within each major watershed in Bayfield County have not been quantified. Therefore, it is unknown how much phosphorus loss from agricultural lands can occur before surface waters become impaired.

14. Protecting water quality and human health while also enabling agricultural production is a matter of risk management. The following agricultural practices and situations on clay ground in northern Wisconsin pose the greatest risk to surface water quality and downstream human health:

   a. Spreading manure during periods of high runoff risk.
   b. Constructing manure pits without pre-construction soil borings or engineering plans.
   c. Applying manure to concentrated flow areas.
   d. Lack of perennial vegetation in concentrated flow areas.
   e. Animal grazing within intermittent and perennial stream drainages in which animals have unrestricted access to the stream and/or vegetative cover within the drainage is lost.
   f. Barnyards, feedlots, and dry lots with unmitigated runoff to surface waters.
   g. Over-application of nutrients resulting in annual loss of excess nitrogen and/or increased risk of phosphorus loss due to higher soil phosphorus levels.

Gaps in Existing Regulations, Enforcement, and Outreach Education (Gaps)

1. The required manure storage capacity in the 590 Standard, NR 243, and ATCP 51, given the climate and soils of Bayfield County, is likely inadequate to ensure no winter manure applications.

2. The short growing season for corn and the likelihood of saturated or frozen ground conditions after harvest increases the likelihood that manure cannot be applied after harvest and livestock operations covered by NR 243 will utilize emergency spreading allowances for winter applications of manure.

3. Manure storage facilities on farms with fewer than 500 animal units are not currently required to follow the NRCS 313 Technical Standard for manure storage structures.

4. Existing barnyards and winter lots in Bayfield County contribute nutrient runoff to surface waters and there is insufficient cost-share resources and staffing to help producers mitigate the runoff problems.
5. Local enforcement of NR 151 currently relies on DNR staffing, which may not be adequate to respond to compliance problems.

6. The 590 Nutrient Management Standard adopted by NR 243, ATCP 51, and NR 151 allows single year Phosphorus Index values of 12 and 8-year average values of 6, likely resulting in increased loading of phosphorus into adjacent waterways compared to existing conditions.

7. Current regulations do not require a lower phosphorus index for fields draining to impaired, exceptional, or outstanding bodies of water unless the soil test P exceeds 100 ppm.

8. An impairment of the Chequamegon Bay due to elevated phosphorus caused by a mass balance increase in phosphorus or an increase in the average phosphorus index in surrounding watersheds will require the taxpayers of the City of Ashland and City of Washburn to pay for reductions in phosphorus discharges from their respective waste treatment facilities.

9. The prohibition of application of manure on frozen ground between February 1 and March 31 currently only applies to operations with 1000 or more animal units.

10. The current prohibition of application of manure on frozen ground between February 1 and March 31 may not accurately encompass the high-risk runoff period for Bayfield County.

11. It may not be possible for row crop producers in Bayfield County to maintain perennial vegetation in concentrated flow areas due to rutting that occurs during harvest operations and the subsequent grading and shaping that is necessary to ensure adequate drainage.

**Risk Management Strategy Options for Bayfield County (Solutions)**

1. Take no additional action and rely on farmers, existing regulations, and existing outreach education and cost-share capacity to limit nutrient and bacterial loading in surface waters. Rely on the Clean Water Act (as implemented by the DNR) and the TMDL process to fix a problem if it occurs.

2. Provide additional outreach education to farmers and landowners to understand and adopt best management practices and comply with existing regulations.
   a. Prioritize work duties of existing County staff to ensure continuation of the South Shore Nutrient Management Farmer Education Program.
   b. Provide outreach education to assist agricultural producers with compliance with existing regulations and best management practices.
   c. Provide up to $1000/farm of cost-sharing for five farms per year for development of a farm succession plan through the South Shore Farm Succession Program.

3. Provide additional outreach education and cost-share dollars to assist farmers and landowners in adopting best-management practices, installing conservation practices, and complying with existing regulations.
a. Provide $270,000 per year for five years for cost-sharing barnyard runoff control projects.
b. Provide $9000 per year for five years for cost-sharing well abandonment projects.
c. Provide $70,000 per year for five years for 1.0 FTE position for project implementation and implementation of livestock ordinances.

4. Adopt additional regulations to mandate more aggressive risk management practices by farmers. Such regulations could include:
   a. Adopt a Bayfield County Animal Waste Storage and Management Ordinance requiring:
      i. An Animal Manure Permit and adherence to the NRCS 313 Standard for all manure storage structures with volume greater than 500 cu ft.
      ii. Closure of any permitted animal waste storage structure if unused for 24 consecutive months.
      iii. An Animal Manure Permit for all livestock feeding operations with 50 animal units or more and adherence to barnyard NRCS Technical Standards.
      iv. Required manure storage capacity of 180 days for new or expanding livestock operations with 200 to 499 animal units, 360 days of storage for livestock operations with 500 to 999 animal units, and 540 days of storage for livestock operations with 1000 or more animal units.
      v. For livestock operations storing liquid manure and with 1000 or more animal units, a requirement to show a 270-day indicator in the summer and a 180-day indicator in the fall.
      vi. A minimum of 3 spreading windows with the capability to spread at least 1/3 of the annual manure production during each of those windows.
      vii. No mechanical application of manure when precipitation capable of producing runoff is forecast within 48 hours.
      viii. Additional manure spreading restrictions between December 1 and April 15 including:
            1. No manure on slopes >12%.
            2. Liquid manure on slopes 6-12% only if incorporated within 48 hours.
            3. Solid manure on slopes 6-12% only if incorporated within 48 hours, farmed with contours, with perennial forages, or with 40% crop residue.
   b. Incorporate all NR 151 standards into the Bayfield County Animal Waste Storage and Management Ordinance to allow for local enforcement.

5. Limit livestock density in a watershed with zoning districts to limit impacts of changes in nutrient mass balance (ie elevated soil phosphorus levels) and to mitigate against low compliance and/or enforcement capacity. Such zoning options could include:
a. Create agricultural overlay districts to limit size of livestock operations in certain districts while allowing livestock operations of unlimited size in at least one district.

b. Change the Bayfield County A2 zoning district to an “intensive farming district”. Operations with fewer than 500 animal units would be allowed on parcels zoned A1. Operations with 500 or more animal units would only be allowed on parcels zoned A2. With no parcels currently zoned A2 in Bayfield County, any livestock operation with 500 or more animal units would require a rezone to A2.

6. Minimize a phosphorus loading into surface waters in Bayfield County watersheds by:
   a. Requiring all livestock operations with an Animal Manure Permit to follow all NR 243 phosphorus regulations. In addition, require a Phosphorus Index of 2 or less for all fields adjacent to impaired, exceptional, or outstanding waters.
   b. Requiring new or expanding livestock operations to have no net increase in phosphorus loading to surface waters.
   c. Developing and implementing a Bayfield County Water Quality Trading Program to allow new or expanding operations to purchase phosphorus credits to offset a planned increase in phosphorus loading to surface waters.
Appendix 3 – Groundwater Findings-of-Fact Document

Bayfield County Large-Scale Livestock Study Committee
Adopted November 19, 2015

Groundwater

Findings-of-Fact (Facts)

1. Groundwater consists of the molecule H₂O and a broad array of physical and dissolved compounds. Anything other than H₂O is called an “impurity” and any time an impurity exceeds a given standard it is considered a “contaminant”.

2. Groundwater contaminants from agricultural operations may be chemical or biological.

3. Biological contaminants of most concern are zoonotic pathogens including, but not limited to: E. coli, Salmonella, Campylobacter, Leptospiridium, Cryptosporidium, Giardia, and Norovirus. See the Bayfield County Large Scale Livestock Study Committee Microbiology Findings-of-Fact document for more information about zoonotic pathogens and surface and groundwater quality.

4. Chemical contaminants from agricultural operations include nutrients from fertilizer including nitrate, chloride, and potassium and soil-mobile pesticides such as triazine (Atrazine).

5. The porosity and depth to the water table are the primary determinants of how quickly water from the surface reaches groundwater. Water moving through sandy soils to a shallow water table will reach groundwater faster than moving through clay soils to a deep water table. Water and contaminants will move even more quickly via direct conduits to groundwater such as sinkholes, cracks in bedrock, or along unsealed well casings.

6. The longer it takes for water to move through the soil into the groundwater the more likely biological contaminants will be inactivated.

7. The soils in the agricultural regions of Bayfield County consist primarily of the Miller Creek formation, which consists of silty-clay glacial till with embedded sand and gravel deposits with a depth ranging from 0 to more than 400 feet.

8. Based on analysis of 660 well-drilling records in the agricultural areas of Bayfield County, roughly 67% are drilled into sand and gravel deposits within the silty-clay glacial till and the rest are drilled into bedrock beneath the glacial till.

9. For the wells drilled into the embedded sand and gravel deposits, the average casing depth is 149 feet with a range from 36 to 488 feet.

10. The Miller Creek formation in the agricultural areas of Bayfield County provides significant protection of groundwater from percolation of contaminants from the surface. As such, the primary threat to groundwater in these areas is at points where the silty-clay cap is penetrated, such as with well casings.

11. Testing of 66 private wells in 2015 within the agricultural area of west-central Bayfield County found 10 with coliform bacteria, but 0 with E. coli, suggesting that some wells may need structural improvements such as new casing caps, but there is no evidence of biological contamination of groundwater from agricultural operations.

12. Isolated areas within the agricultural areas of Bayfield County do have surficial deposits of sandier soils with higher porosity and greater rates of infiltration. Wells drilled in such areas are more susceptible to groundwater contamination compared to areas with the silty-clay. An example of
such an area is the higher ground along and North of Hwy 118 and East of Gilles Road. Testing of groundwater from private wells in this area shows nitrate concentrations between 0.2 and 5 mg/L, which is safe to drink, but indicates nitrates from human activities are reaching the groundwater.

13. Nitrate is the most common contaminant of groundwater and can come from a range of sources including agricultural fertilizer, manure, legumes, septic tanks, septage, and lawn fertilizer.

14. Nitrogen is a plant limiting nutrient that is key to crop production. Without nitrogen from biological nitrogen fixation (legumes) or conversion of atmospheric nitrogen to ammonia (Haber-Bosch), agricultural productivity would greatly decline.

15. Nitrogen comes in different forms in the environment and changes forms depending on temperature, moisture, and presence of other compounds. Nitrate, ammonia, and ammonium are the most common forms with nitrate and ammonium being available to plants.

16. Nitrogen in soil organic material is released as ammonium and when soil temperatures are at or above 50F the ammonium is converted to nitrate in a process called nitrification. Ammonium is a positively charged ion and is held tightly by soil. Nitrate is a negatively charged ion and moves readily in soil. For this reason, the nitrate form of nitrogen is of greater concern for groundwater contamination than ammonium. Nitrates can be absorbed by plants or soil biota and converted back into organic matter.

17. Biologically active soils with continuous living cover can greatly reduce nitrate losses through immobilization (incorporation of nitrate into organic matter).

18. In anaerobic conditions, such as in compacted or saturated soils, nitrates can be converted to nitrogen gas and lost to the atmosphere in a process called denitrification. In areas where contamination of surface water with nitrates is a problem, such as in the Raccoon River in Iowa, settling ponds within watersheds can denitrify the nitrogen out of the water and back into the atmosphere.

19. Urea is the most commonly used nitrogen fertilizer in Bayfield County and when applied will quickly convert to ammonium. When soil temperatures are above 50F, ammonium will either convert to nitrates in the soil or, if exposed to the atmosphere, convert to ammonia and be lost to the atmosphere. As such, incorporation and timing of urea applications is important toward limiting nitrogen losses.

20. The 590 Nutrient Management Standard includes stipulations to limit movement of nitrates to groundwater including: 1) Limiting nitrogen applications to the nitrogen need of the crop, 2) Prohibiting application of nitrogen to areas within 50 ft of a well, 3) Requiring incorporation of manure applied 200 feet upslope of a direct conduit to groundwater, 4) Prohibiting fall application of nitrogen fertilizer to soils with a high potential of nitrogen leaching to groundwater except for fall-seeded crops, 5) Requiring use of a nitrification inhibitor or split application for irrigated fields, 6) Encouraging application of manure in the fall after September 15 or when soil temperatures drop below 50F.

21. Manure is an excellent source of nitrogen for three reasons. There is ammonium available to plants immediately. There is nitrogen bound in microbes that is released slowly and available as the plants grow. The organic matter in the manure stimulates further biological activity in the soil resulting in tighter cycling and availability of nitrogen in the soil ecosystem.

22. The nitrogen content of manure can vary considerably. If manure is used as the primary source of nitrogen for a crop it is important to test the manure for nitrogen content to avoid over application.
The 590 Standard encourages manure testing, but does not require it. NR 243 requires CAFOs to test manure prior to spreading.

23. The pre-sidedress nitrate test can be an effective tool for determining spring carry-over nitrogen from manure from previous year applications. The test can be used to guide supplemental nitrogen applications in the spring.

24. Because nitrate from different sources is identical it can be difficult to identify the source when elevated nitrates are measured.

25. Elevated nitrogen measured at a single isolated well suggests the nitrate source may be from a single point such as a leaking septic tank. A cluster of wells with elevated nitrates suggests the nitrate source could be from surface applications of nitrogen from manure or fertilizer.

26. Groundwater flow models can be used to predict the movement of contaminants in groundwater and be a tool in identifying sources of contaminants. For example, if a cluster of wells down-gradient of a manure storage facility had elevated nitrate levels and wells up-gradient of the facility did not, that is strong evidence that the manure storage facility is leaking nitrates to the groundwater.

27. Livestock operations designated as Confined Animal Feeding Operations (CAFOs) by the WI DNR may be required to install monitoring wells depending on the design of the facility and whether groundwater in the area is susceptible to contamination (NR 243.15(3)(c)(2)).

28. Monitoring wells for manure storage facilities or land-spreading activities should be immediately down-gradient from the site (as determined by a groundwater flow model) and include sampling of water from multiple depths in the aquifer.

**Gaps in Existing Regulations, Enforcement, and Outreach Education**

1. There is insufficient groundwater testing information in the agricultural regions of Bayfield County to establish a background understanding of water quality as of 2015, particularly for the agricultural area in the northwest corner of the County.

2. The number and location of existing and abandoned wells in Bayfield County is not known. The risk of those wells contributing to the contamination of groundwater is also not known.

3. Monitoring of groundwater is not routinely required by existing rules covering livestock operations. NR 243 allows for monitoring wells for manure storage facilities, but at the discretion of the WI DNR.

4. Livestock operations covered by NR 243 are prohibited from spreading manure within 100 feet of a well, but other livestock operations may apply within 50 feet of a well.

5. Livestock operations covered by the 590 Nutrient Management Standard are prohibited from spreading nutrients within 200 feet upslope of a direct conduit to groundwater unless the nutrients are incorporated within 72 hours. Operations covered by NR 243 must incorporate nutrients in such areas within 48 hours. Rainfall events capable of causing runoff are not always accurately predicted 72 or even 48 hours in advance.

6. For operations covered by NR 243, manure or process wastewater may not be applied at any time on areas of a field with a depth to groundwater or bedrock of less than 24 inches. Likewise, manure may not be applied to fields with soils less than 5 feet thick over fractured bedrock when the ground is frozen or snow is present. Such regulations do not apply to fields with soils over sand and gravel deposits, even though groundwater in sand and gravel deposits is also very susceptible to
contamination. Furthermore, Kewaunee County applies the same restrictions to fields with 20 feet or less of soil.

**Risk Management Strategy Options for Bayfield County**

1. Implement a well-testing outreach and education program to encourage and facilitate annual testing of private well water and repair of substandard wells.
2. Provide funding to test water from at least 10 private wells in each Township in Bayfield County to establish a baseline water quality understanding.
3. Establish a County-maintained database with all well-drilling records and water test information.
4. Develop a depth-to-bedrock map for Bayfield County to identify areas with less than 20 feet of soil to the bedrock.
5. Analyze all known well-drilling records to identify wells with less than 20 feet of silty-clay till over water-bearing sand and gravel deposits. For such private wells within 1000 ft and downgradient of a sited livestock facility require the facility to dig a new and deeper well for the owner of the well.
6. Develop a groundwater susceptibility map for Bayfield County to identify areas, such as those near Gilles Road, that have increased susceptibility to groundwater contamination compared to areas with deep silty-clay till.
7. Identify abandoned wells and rate the risk of each well to groundwater quality for prioritizing abandonment efforts. Or conversely, identify fields with highest likelihood of groundwater contamination and look for abandoned and existing wells in and adjacent to these fields first.
8. Utilize groundwater flow models and groundwater susceptibility mapping to design groundwater monitoring programs for sited livestock facilities.
9. Require sited livestock operations to install a minimum of two monitoring wells immediately downgradient of the livestock facility at locations and depths recommended by a qualified hydrogeologist.
10. Provide semi-annual testing of water for all private wells within 1000 ft downgradient of a sited livestock facility or fields with permeable soils that receive manure or fertilizers from the livestock operation.
11. Prohibit all livestock operations, regardless of size, of applying nutrients within 100 feet of a private well.
12. Apply additional restrictions on application of nutrients within areas 200 feet upslope of a direct conduit to groundwater. Such restrictions could include:
   a. Prohibit application of nutrients of any kind or at any time within the area.
   b. Require injection or immediate incorporation if applying within the area.
13. Apply additional restrictions on application of nutrients on areas of fields with less than 20 feet of soil depth to bedrock or water-bearing sand and gravel deposits. Such restrictions could include:
   a. Prohibit application of all manure and nutrients on such areas when the soil is snow-covered or saturated or when precipitation capable of producing runoff is forecast within 48 hours of application.
   b. Require a nitrification inhibitor for all applications of urea or liquid manure on such areas.
   c. Prohibit fall application of manure to such areas unless the soil temperature is less than 50F.
Air Quality

Findings-of-Fact (Facts)

Hazardous Air Emissions

1. Livestock operations have the potential to adversely affect local air quality through emissions of:
   a. Chemicals from excreted, stored, and land-spread manure.
   b. Dust and organic particulates from animal housing and field operations.
   c. Dust from vehicle and equipment operation on gravel or dirt roads.
   d. Pesticides from drift, overspray, or volatilization.
2. Animal waste is known to contain at least 25 toxic air contaminants, but ammonia and hydrogen sulfide are the two chemicals most likely to occur above levels of concern.
3. Ammonia results from the mixing of urease in feces with urea in urine. Ammonia is caustic and is an irritant to the lungs, airways, and eyes. It can be smelled starting between 0.04 and 53 ppm, becomes an irritant at 50 ppm, and is immediately lethal at 5000 ppm.
4. Ammonia can also react with other airborne chemicals to create fine particulate matter resulting in haze and respiratory problems. The volatilization of ammonia can also result in acid rain with deleterious effects to water quality and plant communities.
5. Wisconsin has an ambient air quality standard for ammonia of 0.55 ppm averaged over a 24-hour period.
6. Hydrogen sulfide is primarily released from livestock operations via anaerobic decomposition of sulfur-containing organic matter such as manure. Hydrogen sulfide is detectable as odor at very low concentrations and can cause headaches at 0.3 ppm, olfactory paralysis at 150 ppm, and loss of consciousness and death at 500 ppm.
7. Wisconsin has an ambient air quality standard of 0.22 ppm averaged over a 24-hour period. For perspective, Minnesota’s ambient air quality standard is 0.03 ppm no more than twice in 5 days, averaged over 30-minutes.
8. The federal Clean Air Act sets standards for six “criteria pollutants” (ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead) as well as for a list of “hazardous air pollutants”. Ammonia and hydrogen sulfide from livestock operations are not currently considered hazardous air pollutants. The EPA conducted a study in 2006-2008 to monitor air emissions from large-scale livestock operations (National Air Emissions Monitoring Study) with the purpose of developing monitoring protocols and eventual rule-making regarding air emissions from large-scale livestock operations. The work has not yet been completed.
9. Hazardous air emissions from livestock operations are not as readily controlled as through smokestack emissions, as such the primary means envisioned by the WI DNR to control air emissions from animal feeding operations is through implementation of a series of best management practices. To that end, in April of 2010, the WI DNR convened the WI Agricultural Waste Air Emissions Advisory Group to develop best management practices for the reduction of...
emissions of hazardous air pollutants (primarily ammonia and hydrogen sulfide) from livestock operations.

10. The DNR Advisory Group released a final report in December of 2010 outlining “beneficial management practices for mitigating hazardous air emissions from animal waste in Wisconsin”. In June of 2011, the WI DNR proposed extending the exemption of animal agricultural waste from the control requirements of NR 445 and eliminating consideration of such emissions when determining applicability of permitting requirements in NR 406 and NR 407. The exemption remains in place as of October 2015, ostensibly to wait for the EPA to finalize federal regulations of hazardous air emissions from animal feeding operations. As such, the recommendations of the Advisory Group remain voluntary beneficial management practices.

11. Large-scale livestock operations emitting more than 100 lbs of ammonia per day are required by the federal Emergency Planning and Community Right to Know Act (EPCRA) to report their emissions to state or county emergency planning coordinators. Dairy operations with more than 700 cows or swine operations with more than 2500 sows are likely to emit more than 100 lbs of ammonia per day.

Odor

12. The combination of the chemical emissions, primarily from manure and stored feed, creates odors that may be offensive to neighbors. Odor is the most common complaint about livestock operations.

13. At high enough concentrations, the individual or combination of chemicals contributing to odor may cause negative impacts to physical health. Below such concentrations, odor may still be present and may cause psychosocial impacts (impacts to mental health or quality of life).

14. Wisconsin’s Livestock Facility Siting Law creates an odor standard and requires new operations with 500 or more animal units and expanding operations with 1,000 or more animal units to meet the odor standard. Compliance with the odor standard is based on modeling and not a measurement of odor or specific chemicals.

15. Wisconsin’s Livestock Facility Siting Law only applies an odor standard to the livestock facilities themselves and does not create an odor standard for land-spreading of manure. The rationale being that odor from a livestock facility is a daily ongoing event, whereas, odor from land-spreading is an occasional and episodic event.

16. Wisconsin’s Livestock Facility Siting Law establishes a 350’ property line setback for a manure storage facility. However, when manure is stored under a livestock housing facility it is considered a livestock housing facility with a property line setback of 100’ for an operation of more than 500 but less than 1000 animal units and a setback of 200’ for an operation with 1000 or more animal units.

17. The right-to-farm law in Wisconsin (WI Stat. 823.08) generally protects livestock operations from nuisance claims related to odor. A plaintiff has to prove an agricultural activity poses a “substantial threat to public health or safety”. As such, with respect to odor, a plaintiff generally has to demonstrate a negative impact on physical health caused by a measurable chemical such as hydrogen sulfide or ammonia.
18. There is a growing body of literature suggesting the psychosocial impacts of odor may cause stress leading to negative impacts on physical health, particularly if the odor is present for extended periods of time. It is unknown whether such psychosocial impacts have successfully won a nuisance complaint under any State’s right-to-farm law.

**Road dust**

19. Use of gravel roads by livestock operations can be extensive, particularly during travel-intensive operations like harvest or manure hauling.

20. The dust from gravel roads may fall into three separate categories: total suspended particulate (TSP), particulate matter up to 10 micrometers (PM10), and particulate matter up to 2.5 micrometers (PM2.5).

21. Road dust can make things dirty and reduce quality of life for properties adjacent to gravel roads, but of greater concern, PM10 and PM2.5 are associated with respiratory problems such as bronchitis and asthma.

22. Road dust can be controlled through road wetting prior to use, through application of calcium chloride binders, or by converting from gravel to asphalt.

**Gaps in Existing Regulations, Enforcement, and Outreach Education**

1. Current regulations do not specifically regulate dust created by the hauling of manure or use of gravel roads by livestock operations.

2. Existing regulations do not currently address odor associated with land-spreading of manure.

3. Existing regulations do not require new or expanding livestock operations to compensate existing neighbors for declines in property values due to the perceived or actual negative aspects of living near a livestock operation.

4. Only new operations with 500 or more animal units or existing operations that expand to 1,000 or more animal units are required to meet an odor standard or implement best management practices to limit hazardous air emissions or odor.

5. Livestock operations are currently exempt from the control requirements of NR 445 and permitting requirements in NR 406 and NR 407.

6. Manure storage facilities under livestock are considered barns and only have a required property line setback of 100’ to 200’ depending on the size of the operations. Other manure storage facilities have a property line setback requirement of 350’. Although aggressive odor control practices would be required for a barn with below-animal manure storage to meet the Odor Standard of ATCP 51, it is possible the standard could be met. In the event of equipment malfunction there is a greater chance that hydrogen sulfide concentrations could exceed ambient air quality standards on an adjacent property when the barn is only 100’ to 150’ from a neighboring residence compared to when the distance is 350’ or more.

**Risk Management Strategy Options for Bayfield County**

1. Take no additional action and rely on existing regulations and voluntary implementation of best management practices to minimize hazardous air emissions.
2. Expand outreach education and cost-sharing to assist existing producers in implementation of the Beneficial Management Practices recommended by the Air Emissions Advisory Group as shown in Appendix A.

3. Require implementation of applicable Air Quality Beneficial Management Practices listed in Appendix A for new or expanding operations through local ordinance. Some practices may already be part of an operation’s plan to comply with the Siting Law odor standard.

4. Increase the property line setback for livestock facilities with below-animal manure storage to 350 feet to match the setback required for manure storage structures.

5. Utilize zoning ordinances to locate livestock facilities in areas with low population density.

6. Require new or expanding livestock facilities to guarantee the property values of all residential properties within a certain distance of the operation.

7. Implement additional requirements to mitigate air quality impacts, including:
   a. Require no-spread or incorporation-only buffers for land-spreading within a certain distance of all residential properties.
   b. Require prior notification of adjacent landowners when land-spreading manure.
   c. Require the application of water or binding agent to gravel roads used by new or expanding livestock operations to reduce dust, particularly when roads are used intensively, such as during manure hauling or harvest times.
Appendix A

Beneficial Management Practices Recommended by the 2010 WI Agricultural Waste Air Emissions Advisory Group

d. Reduce Milk Urea Nitrogen (MUN) levels in dairy operations through improved animal nutrition and diet formulation in order to reduce nitrogen excretions in urea and consequent ammonia emissions.

e. Formulate swine and poultry diets based on amino acids rather than crude protein as a means to reduce nitrogen excretion in urine and consequent ammonia emissions. In addition, reduce sulfur in water and feed to reduce hydrogen sulfide emissions.

f. Improve silage storage and handling practices to reduce spoilage and consequent ammonia and hydrogen sulfide emissions.

g. Utilize a biofilter for scrubbing exhaust air from animal housing and enclosed manure storage facilities. Exhaust air should be in contact with wetted media for 3-5 seconds prior to exiting the filter.

h. Use aerobic composting for manure to reduce hydrogen sulfide emissions. The carbon to nitrogen ratio of the manure mixture should be 25:1 to 40:1 with a moisture content of 40-65%.

i. Establish a 3-row vegetative environmental buffer around the perimeter of the livestock facility to deflect and filter exhaust air. One row should be shrubs, one confers, and one fast-growing deciduous trees.

j. Utilize mechanical scraping to clean dairy freestall housing rather than flushing with recycled water from manure storage.

k. Sprinkle vegetable oil on surface and manure in swine barns to suppress dust and gas emissions.

l. Replace pit fans in swine barns with wall or ceiling fans to reduce hazardous air emissions.

m. Apply alum to poultry litter to reduce litter pH to inhibit conversion of ammonium into ammonia.

n. Utilize a wet scrubber to use water to absorb gasses and particulate matter from exhaust air. Utilize both acid soluble and base soluble chemicals in the water to remove ammonia and hydrogen sulfide, respectively.

o. Utilize a floor design in animal barns to separate urine from feces to reduce conversion of urea to ammonia.

p. Utilize a vertical chimney for exhaust air to remove particulates.

q. For egg laying operations, capture manure on belts or scraper boards and treat with forced air to dry the litter prior to storage or land spreading in order to reduce ammonia emissions.

r. Cover manure storage with an impermeable barrier and draw off gases from under the barrier for flaring or treatment through a biofilter.

s. For bovine operations with organic bedding allow the natural crust to form. The biologically active crust acts as a biofilter with microbial degradation of ammonia. For operations without organic bedding, install a bio-cover (straw, air-filled clay balls, etc.) or geotextile permeable cover to reduce mass transfer of gas emissions.
t. Fill manure storage facilities from the bottom to reduce surface agitation and release of gasses.
u. Cover stockpiled solid manure on a concrete pad to reduce wetting and the consequent release of ammonia.
v. Utilize an anaerobic digester to capture methane, ammonia, and hydrogen sulfide. Hydrogen sulfide must be removed from the gas if used for electricity or heat generation.
w. Implement a wastewater treatment system involving an aeration/aerobic lagoon or phototrophic facultative circulating aerobic system to remove nutrients.
x. Scrape and remove manure from open animal lot surface at least once every three days when manure is not frozen and land-spread or treat. Reducing exposure of stored manure from precipitation and anaerobic conditions reduces hydrogen sulfide and ammonia emissions.
y. Incorporate chemically or biologically-active products known to reduce ammonia or hydrogen sulfide emissions into stored manure. Such products should not cause more harm when land-applied then the untreated manure.
z. Encourage rotational grazing systems to reduce concentration of manure and urine and feces separation. Urine soaks into pasture rather than mixing with feces, thereby reducing ammonia emissions. Feces remain aerobic thereby reducing hydrogen sulfide emissions.
aa. When land-applying manure inject to a depth of at least 4 inches to reduce ammonia losses.
bb. Incorporate manure into the soil immediately after spreading.
c. Band apply manure to growing annual row crops using drop tubes from a boom applicator. Band application to actively growing crops reduces ammonia losses through decreased agitation compared to broadcast spreaders and immediate plant uptake.
Appendix 5 – Microbiology Findings-of-Fact Document

Bayfield County Large-Scale Livestock Study Committee
Adopted November 19, 2015

Microbiology

Findings-of-Fact (Facts)

Zoonotic Disease

1. A zoonotic disease is a disease that can be spread from animals to humans. Some zoonotic diseases require the animal biting the human, such as with deer ticks and lyme disease. Other zoonotic diseases can be spread through water droplets through the air, such as with swine flu (influenza). Enteric zoonotic diseases requires ingestion of a microorganism typically causing gastrointestinal problems.

2. Livestock manure generally contains three classes of zoonotic disease organisms (pathogens): bacteria (campylobacter, salmonella, E. coli), protozoa (cryptosporidium, giardia), and viruses (rotavirus, enterovirus, hepatitis E).

3. The presence and concentration of specific pathogens in excreted and stored manure varies considerably from farm-to-farm and throughout the year.

4. The Centers for Disease Control estimate that fourteen percent (14%) of all reported annual enteric illnesses are attributed to contact with animals or their environments.

5. Workers within livestock facilities are typically most at risk of zoonotic disease due to close proximity and long-term exposure to the animals and animal manure.

6. Neighbors and community members living near a livestock facility can also be at risk from zoonotic disease organisms if exposed to the manure through surface water, ground water or airborne particles.

7. Land spreading activities that put aerosols or fine water droplets into the air can result in downwind spread of manure and pathogens through the air.

8. Movement of pathogens in manure from farm fields is most likely to occur during run-off events.

9. Zoonotic and animal-to-animal disease can be spread rapidly and across long distances from livestock facilities via the movement of workers and vehicles servicing the facilities.

10. Manure spills from failure of storage facilities, accidents with hauling equipment, or breaks in draglines can have immediate and long-term negative impacts on water quality and health of humans and wildlife.
11. For an individual to become sick from a zoonotic disease three things must happen: 1) There must be a disease-causing organism, 2) There must be a susceptible host for the disease-causing organism, and 3) The susceptible host must be exposed to the viable disease causing organism and the environment must be conducive for the organism to colonize and infect the host. This “disease triangle” is used to quantify and characterize the risks posed by zoonotic diseases via a risk assessment process.

12. If humans and livestock facilities are co-located, there will always be some risk of transmission of zoonotic disease. When co-locating humans and livestock facilities, the following practices can help lower the risk of transmission:

   **Limiting transport**
   a. Applying manure at times when it is least likely to run off.
   b. Applying manure to fields with a low likelihood of run-off following a rain event or during the spring melt.
   c. Not applying manure to areas of concentrated water flows.
   d. Excluding livestock from surface waters and concentrated flows to surface waters.
   e. Diverting clean water (rainfall or runoff) away from livestock housing and manure storage structures.
   f. Not applying manure to direct conduits to groundwater or areas draining to direct conduits to groundwater.
   g. Injecting or immediately incorporating the manure into the soil.
   h. Maintaining biosecurity practices to minimize entry or exit of pathogens into or out of a livestock facility.
   i. Maintaining adequate separation distances between humans and manure spreading activities to account for downwind distribution of manure through the air.
   j. Implementing risk reduction strategies to minimize the risk of manure spills.

   **Inactivation of pathogens**
   k. Storing the manure for extended periods of time (3 months or more) prior to spreading to allow for reductions in pathogen populations.
   l. Maintaining healthy animals to prevent excretion of pathogens.
   m. Treating the manure with anaerobic digestion or thermophilic processing (composting) to reduce pathogen loads.
   n. Adjusting the pH of the manure to create a hostile environment for the pathogens.
   o. Applying manure in full sunlight and warm air temperatures to deactivate zoonotic disease organisms.

**Antibiotic Resistance**

1. Antibiotics are used in livestock operations to treat disease, prevent disease, or promote growth.

2. There are many different antibiotics used in livestock operations, but most are variations within different classes of antibiotics (aminoglycosides, carbadox, Beta-lactams, fluoroquinolones,
macrolides, sulfonamides, tetracyclines). The method in which a particular antibiotic kills or stops growth of an organism is called the “mode-of-action”.

3. Antibiotics in dairy operations are primarily for treatment of disease (such as mastitis) and are typically given to individual cows. Treating the entire herd through feed or water would result in loss of the milk during the withholding period and is not typically done.

4. Antibiotics in swine or poultry operations are given to individual animals, but can also be delivered through feed and water in order to protect a herd from a fast-moving disease.

5. Starting in 2016, antibiotics used to treat disease in humans can no longer be used for sub-therapeutic uses in livestock, such as growth promotion.

6. Efforts to protect humans from antibiotics are focused in three areas: 1) Maintaining antibiotic residues in food products (meat, milk, eggs) below allowable limits, 2) Limiting development of antibiotic resistant microorganisms, and 3) Protecting the public from antibiotics in the environment.

7. Systems to protect the public from antibiotic residues in food products include mandatory withholding periods before products from an animal treated with antibiotics can enter the food supply and monitoring food products before and after they enter the supply chain to ensure residues are below allowable limits.

8. Growing concern about pathogen resistance to medically important antibiotics has prompted the FDA to take action with 2015 revisions of the Veterinary Feed Directive. Under the revised rules, medically important antibiotics can no longer be used in livestock operations for growth promotion purposes. In addition, when used for prevention or treatment of disease through feed or water, such antibiotics must be used under the direction of a veterinarian.

9. There is growing concern about antibiotics and intermediaries in wastewater and land-applied manure, but with limited research and understanding of the risks posed by antibiotics in the environment there has been little to no policy or regulations put in place.

10. The resistance of an individual disease organism (such as an individual bacterium) to an antibiotic depends on the heritable genetics of that individual organism. This genetically-controlled resistance, or lack thereof, is called intrinsic resistance.

11. Within a population of a disease organism, it is possible that all individuals are intrinsically resistant to an antibiotic, none are intrinsically resistant to the antibiotic, or only some are intrinsically resistant to the antibiotic.
12. It is possible for all individuals in a population to be intrinsically resistant to one antibiotic, but intrinsically susceptible to another antibiotic. This intrinsic resistance is a major factor in which antibiotic a doctor or veterinarian will recommend for treating a given disease.

13. Use of an antibiotic in a population of disease-causing organisms acts as a selection pressure where all susceptible individuals die and resistant individuals (if present) survive. As a result, a population can shift from mostly susceptible to mostly resistant. However, if all individuals within a population are susceptible to an antibiotic, the development of resistance within the population will take much longer and may not occur at all.

14. The presence of antibiotic resistant organisms in a livestock facility is not necessarily a result of use of antibiotics, as pre-existing intrinsic resistance is possible within any given population. Likewise, an increase in the number of resistant individuals in a population could be a result of an increase in the population in general due to improved environmental conditions for the population.

15. Antibiotics are essentially a pesticide. Managing resistance to pesticides is an important aspect of integrated pest management in agriculture, whether the goal is to treat a bacterial disease in livestock operations, kill weeds in row crop systems, or control fungal disease in fruit crops. The following practices can help reduce the chances of a population developing resistance to a pesticide, whether it be an antibiotic, herbicide, or fungicide:
   a. Maintain animal (or crop) health to prevent the need for treatment with an antibiotic.
   b. Use the full recommended dosage and duration of a pesticide to ensure the target organism is killed or controlled.
   c. Use pesticides with different modes-of-action to reduce the intensity of the selection pressure of any single mode-of-action.
   d. Utilize integrated pest management to ensure the pesticide is only used if absolutely necessary. If a pesticide is necessary, use it at the right time, the right place, and the right way.

Gaps in Existing Regulations, Enforcement, and Outreach Education (Gaps)

1. Emergency responders, natural resource professionals, and area livestock producers in Bayfield County may not have adequate training to appropriately handle a large-scale manure spill.

2. There are currently no regulations specifying allowable levels of zoonotic pathogens or antibiotics in land-applied manure.

3. There are currently no regulations requiring inactivation of zoonotic pathogens or degradation of antibiotics prior to land-spreading manure.

4. Current regulations do not specifically address the transport of zoonotic pathogens or exposure to the public related to land-spreading of manure.
5. There are currently no regulations requiring monitoring of pathogens or antibiotics in surface or groundwater near livestock facilities.

6. Current regulations do not allow limitations on the number of animals in a single enclosed space as a means to limit the magnitude and severity of contagious disease and, thus, the magnitude of antibiotic use.

7. Bayfield County currently is not able to regulate the density of livestock operations as a means to maintain biosecurity and reduce the spread of contagious disease.

**Risk Management Strategy Options for Bayfield County (Solutions)**

8. Take no additional action and rely on existing regulations and best management practices to minimize the risk of transmission of zoonotic disease and development of antibiotic resistant pathogens.


10. Develop and implement incentive programs for livestock facility operators to achieve pathogen reduction targets in manure prior to land-spreading.
    a. Provide market incentives to enable installation of manure digesters, such as purchase of carbon credits for methane reductions, or tax incentives for co-location of energy-intensive businesses (greenhouses, kilns) with livestock operations.
    b. Provide cost-sharing for feasibility studies for construction and operation of manure storage, handling, and treatment systems.
    c. Provide incentives for adoption of managed intensive grazing systems for livestock production, such as per acre conservation payments or assistance with marketing or enterprise development.

11. Develop and implement incentive programs to enable hose-line transport and injection of manure.
    a. Install culverts or hardlines for crossing roads at locations with minimal risk of manure reaching surface water in the event of a break in the hose.
    b. Require and/or provide cost-sharing for secondary containment or hardline hoses for waterway crossings.

12. Require a monitoring program to track potential movement of manure-based pathogens.
    a. Monitor neighboring wells for zoonotic pathogens.
    b. Monitor for zoonotic pathogens in surface waters downstream from large-scale livestock operations.
    c. Secure the right to access a livestock facility at any time to pull manure samples for genetic fingerprinting of pathogens.
d. Require testing of manure for pathogen concentrations and antibiotic residues immediately prior to spreading and require stepped risk-reduction strategies concordant with the measured pathogen and antibiotic loads.

13. Require treatment of manure sufficient to achieve 90% (log 1) reductions in pathogen loads and antibiotic residues prior to land-spreading, such as with manure digesters.

14. Require additional risk-reduction actions to minimize chances of spread of zoonotic disease organisms associated with land-spreading. Such actions could include:
   a. Require injection of all manure.
   b. Require no-application or injection-only buffers around neighboring residences to account for downwind movement of manure.

15. Require additional risk-reduction actions to minimize likelihood of development of antibiotic resistant pathogens. Such actions could include:
   a. Limit the number of animals per building to limit the number of animals being treated in the event of a barn-wide disease outbreak.
   b. Require immediate and full implementation of the newly revised Veterinary Feed Directive.
   c. Require integrated disease management plans specifically to minimize the development of antibiotic resistance.
Appendix 6 – Hydrogeologic Cross-Section of Bayfield County
Appendix 7 – Presentations to the Large-Scale Livestock Study Committee

April 23, 2015

Groundwater and Drinking Water Education Program Overview, Kevin Masarik, Groundwater Education Specialist, UW-Steven’s Point Center for Watershed Science and Education

Groundwater in Bayfield County, Madeline Gotkowitz, Hydrogeologist, Wisconsin Geological and Natural History Survey

May 7, 2015

Waste Storage Facility Practice Standard 313, Pete Wurzer, Conservation Engineer, Department of Agriculture Trade and Consumer Protection

State and Local Regulations of Livestock Operations, Jason Fischbach, Agriculture Agent, Bayfield County UW-Extension

May 28, 2015

Overview of Nutrient Management, Jason Fischbach, Agriculture Agent, Bayfield County UW-Extension

UW Discovery Farm: Understanding Nutrient and Sediment Loss from Agricultural Landscapes, Eric Cooley, Co-Director, University of Wisconsin Discovery Farms

June 4, 2015

Surface Water Quality in Bayfield County, Michelle Wheeler, Water Resources Management Specialist, Wisconsin Department of Natural Resources

Surface Water Quality in the Chequamegon Bay Region, Dr. Randy Lehr, Professor of Environmental Science and Management, Northland College

June 18, 2015

Clean Water Act, Impaired Waters, Total Maximum Daily Loads (TMDLS), and CAFO Permitting, Aaron Larson, Water Resources Management Specialist, Thomas Bauman, Wastewater Engineer, WI Department of Natural Resources

July 2, 2015

When It Hits The Fan...Pathogens from Human and Swine Sources in the Environment, Dr. Mark Borchardt, Research Microbiologist, USDA-Agricultural Research Service

August 13, 2015

Regulating the Operations of Large-Scale Livestock Operations, Glenn Stoddard, Attorney, Farms Not Factories

August 27, 2015
Concentrated Animal Feeding Operations and Human Health in Wisconsin, Dr. Robert Thiboldeaux, Senior Toxicologist, WI Bureau of Environmental and Occupational Health

September 10, 2015

Antibiotic Usage and Resistance on Dairy Farms, Dr. Pamela Ruegg, Milk Quality Specialist, University of Wisconsin – Madison

Antimicrobial and Drug Use in Swine, Locke Karriker, Associate Professor and Director, Swine Medicine Education Center, Iowa State University

September 24, 2015

From Waste to Worth: Anaerobic Digestion, Dr. Rebecca Larson, Biowaste Specialist, University of Wisconsin - Madison

Unintended Health and Environmental Consequences of CAFO Agriculture, Bob Watson

November 12, 2015

Groundwater Quality Overview, Kevin Masarik, Groundwater Education Specialist, UW-Steven’s Point Center for Watershed Science and Education, Michelle Dale, Environmental Health Specialist, Bayfield County Health Department

November 19, 2015

2015 Results of Chequamegon Bay and Tributary Water Quality Monitoring, Dr. Randy Lehr, Professor of Environmental Science and Management, Northland College

Groundwater and Wells in Agricultural Regions of Bayfield County: Report to the Large-Scale Livestock Study Committee, Madeline Gotkowitz, Hydrogeologist, Wisconsin Geological and Natural History Survey