

DANE COUNTY MANURE SPREADING TASK FORCE FINAL REPORT

June 20, 2005

Task Force Background

On March 16, 2005, Dane County Executive Kathleen Falk and Chair of the Dane County Lakes and Watershed Commission Brett Hulsey announced the establishment of a task force to evaluate the risks associated with winter spreading of manure, especially liquid manure, and to recommend winter spreading restrictions in order to protect County rivers, streams, fisheries, and farm economy.

The Task Force was asked to make recommendations to the County Executive, Land Conservation Committee (LCC), Lakes and Watershed Commission (LWC) and County Board by May 1.

Members of the Task Force were:

Bob Uphoff, Pork Producer, Town of Dunn

Dennis Jelle, Dairy Farmer, Town of Blue Mounds

Jeff Endres, Dairy Farmer, Town of Springfield

Jeff Smith, Chair, Wisconsin Trout Unlimited Legislative Committee

Andrew Hanson, Staff Attorney for Midwest Environmental Advocates

Jerry Jensen, County Board Supervisor representing rural interests; LWC and Vice Chair of LCC

Don Eggert, County Board Supervisor representing urban interests; LWC and Environmental, Agriculture, and Natural Resources Committee (EANR) member

Chuck Erickson, County Board Supervisor, Chair of LCC, Vice-Chair of EANR

Brett Hulsey, County Board Supervisor and Chair of LWC

Brett Hulsey chaired the Task Force. Sue Jones, Kevin Connors, Steve Ottelien, and Michelle Richardson of the Dane County Land and Water Resources Department (LWRD), and Michelle Woldt of the County Executive's Office provided staff support.

The Task Force held six meetings, on April 13, April 20, April 27, May 4, May 18, and May 25. Meeting minutes and agendas are posted at www.co.dane.wi.us/committees/agendas.asp, under the Dane County Lakes and Watershed Commission. Immediately prior to the May 4 meeting, Jeff Endres led Task Force site visits within the Lake Mendota Watershed, where farms differ in size and scale and all have unique characteristics. Few areas of open water or streams were seen along the tour route. Task Force members observed fields varied in size and crop history, and also a wide variety of conservation practices: no-till, minimum tillage,

contour strips, and double cropping. Winter spreading plans consistent with Land Conservation Division (LCD) staff recommendations were reviewed field by field. At the last stop, the Task Force observed two examples of roughness factors that could be used in the winter spreading plan. Task Force members observed three examples of rates of spreading manure along with soil compaction caused by the manure spreader.

Situation Statement

In early February 2005, application of liquid manure on frozen ground washed into Dorn Creek flowing into Lake Mendota. The farmer had applied liquid manure before a major thaw. There was no fish kill as a result of this incident; however, DNR estimated that significant amounts of phosphorus were added to Lake Mendota at a time when efforts to limit phosphorus runoff from rural and urban areas were increasing.

In late February 2005, manure running off a frozen farm field killed approximately 200 brown trout in the West Branch of the Sugar River, a stream that had just been removed in October from the federal government's list of impaired waters.

This report addresses the landspreading of liquid manure during winter months. Liquid manure is of particular concern because of its mobility on frozen surfaces.

This report establishes the need for additional restrictions on landspreading of liquid manure during the winter months in order to ensure compliance with water quality standards in Dane County's lakes, rivers, and streams. This report also recognizes the economic importance and value of livestock agriculture in Dane County, and seeks to balance the needs of the livestock industry with Dane County's economic and recreational interest in clean water.

Value of Manure and Livestock Industry in Dane County. The application of manure to cropland provides valuable crop nutrients and improves soil structure. In 2003, 3.797 billion pounds (457,470,000 gallons) of manure were produced in Dane County, the majority of which was land applied (Dane County UW-Extension, 10/8/04 memo). The application of 7,000 gallons/acre of surface-applied dairy manure provides only 30% of the nutrient needs for an acre of corn (this assumes even application of manure) (Nutrient Management Fast Facts, Nutrient and Management Pest Management Program, University of Wisconsin-Extension, April, 2003).

Agriculture accounts for 6.8% of all jobs, 11% of the total economic activity, and 6.2% of total income in Dane County. Economic activity associated with Dane County farms and agriculture-related businesses generate \$102.8 million in local and state taxes (not including property taxes paid to local schools). Every dollar of sales from agricultural products generates an additional \$0.63 of economic activity in other parts of Dane County's economy (Dane County Agriculture: Value and Economic Impact, University of Wisconsin-Extension, Wisconsin Farm Bureau Federation, Wisconsin Milk Marketing Board, 2004).

Individuals, families, family partnerships and family-owned corporations make up the ownership structure of 98.7% of farms in Dane County (Dane County Agriculture: Value and Economic Impact, University of Wisconsin-Extension, Wisconsin Farm Bureau Federation, Wisconsin Milk Marketing Board, 2004). The number of dairy herds in Dane County has dropped from 1,111 in 1985 to 411 in 2004 (WI-DATCP-Ag Statistics). The number of milk cows in Dane County has dropped from 64,000 in 1984 to 48,000 in 2003. According to a report issued in 1997 by American Farmland Trust, Dane County is in the third most threatened farm area in the country. The disparity in the sale price of agricultural land in Dane County continuing in agricultural versus land diverted to other uses has increased from \$912 in 1990 to \$12,474 in 2003 (WI-DATCP-Ag Statistics, 1993 and 2004).

Dane County Water Resources. Dane County waters are very important for recreational enjoyment, for aesthetics and for defining residents' sense of place. They are a significant part of the high quality of life in Dane County, and the lakes and streams make a significant economic contribution to the community. Madison and Dane County consistently rank among the top communities in which to live, work, play and raise a family (Greater Madison Convention and Visitors Bureau, 2001). The many ways residents enjoy area lakes and streams are key to those high rankings and the new businesses and residents they help attract.

There are 54 lakes, 475 miles of streams and rivers, and 14 miles of the Wisconsin River located in Dane County. The 54 lakes, ranging in size from 2 acres to 9842 acres, comprise nearly 22,000 acres of our 766,912-acre county, or approximately 3% of the total Dane County area. The total surface water acreage in Dane County is 23,000 acres. The county also contains 52,000 acres of remaining wetlands.

There are many cold-water communities in the western, unglaciated part of the county, that are of special importance to trout fishers, and that receive special protection under the Dane County stormwater ordinance due to their vulnerability to thermal pollution. There are 18 identified trout streams in Dane County, and 19 streams designated as Exceptional Resource Waters or Outstanding Resources by the Wisconsin DNR for their high water quality and unique ecological values.

One measure of the increasing importance of water recreation is boat registrations. From 1975 to 2001, registrations for Dane County increased by 56%, from 16,557 to 25,852 boats (Boat registration data for Dane County. Wisconsin Department of Natural Resources, Bureau of Law Enforcement, 2002). The data does not include all Dane County watercraft, as not all boats are required to obtain state registrations, and does not include boats from outside Dane County and Wisconsin that use County waters.

Recreational fishing is very popular within Dane County. In fact in 1999, Black Earth Creek was named one of the top trout fisheries in the nation by Trout Unlimited. Location of waters within or near urban areas makes them readily accessible to anglers. The abundant fishery sustains a thriving local tourism industry, which coupled with fishing by local residents, supports many bait and tackle shops. Fishing provides hours

of enjoyment for people of all ages throughout the year, and the fish caught are important food supplement to many anglers (The Fishery of the Yahara Lakes, DNR 1992).

Water recreation and high water quality also have an economic value. For most lake recreational activities (e.g. swimming, fishing, sailing, motor boating), respondents to a 1995 survey indicated they spend an average of \$15 to \$22 per outing for supplies and fuel. Respondents stated that they average 15 to 23 outings per summer; thus their direct seasonal expenditure is about \$225 to \$500 for each activity (Dane County Regional Planning Commission 1995). Multiplied by even a portion of registered boats, expenditures for lake recreation easily run into the millions of dollars annually. UW-Madison and other studies show the high monetary value of high water quality. From 1993 through 2004, more than \$3.8 million has been spent on soil conservation, water quality, and watershed improvement projects. These figures do not include the landowner's share of the cost of installed practices, which averages 30-50% of total cost.

Regional Manure Runoff Incidents. The problems that arose in Dane County are not unique; as manure runoff incidents are happening regionally and statewide. There have been 17 incidents of manure affecting fisheries, groundwater and surface water resources in the last year in the 11 counties that comprise the DNR's South Central Region. Those incidents, involving either liquid or solid manure, affected more than 35 miles of public waters and thousands of fish. Two of the 17 events involved well contamination (6 wells from 4 spreading incidents - 2 solid and 2 liquid). Nine of the 17 events were winter spread liquid, and five events were winter spread solid manure. Four of the 17 events occurred in Dane County (2 were surface spread liquid in the winter; 1 was a barnyard runoff and the other spring spread liquid manure before a rain) (Kurt Welke and Mark Cain, 4/13/05 presentation, "The Impacts of Manure on Water Resources and Fisheries" and 5/18/05 clarification from Mark Cain). In addition to the acute affects of manure runoff described above, DNR and other stakeholders are also concerned about chronic, ongoing effects; summer runoff events, and runoff from additional events that are not documented.

Statewide manure spreading considerations. In a statewide study, UW researcher Mark Powell and colleagues found that decisions regarding manure spreading on dairy farms depend heavily on manure storage and labor availability. About 30% of Wisconsin's dairy farms have free-stalls (liquid manure) and 70% tie-stalls (semi-solid manure). Most farmers rely on family labor for manure spreading and manure is generally spread daily. The number of days a farmer can spread depends on soil moisture, or the ability to have tractors and spreaders in the field. Wisconsin dairy farms have 130-160 days to spread manure on an annual basis. The northeast region of the state has fewer spreading days (72) in the spring and fall than in the southwest (90 days).

Task Force Recommendations: Short-Term

The following are consensus short-term recommendations of the Task Force:

1) In order to apply stored, pumpable liquid manure on ground that is ice-covered, snow-covered, or frozen to the point that it does not allow incorporation, a producer shall include a site-specific multi-year winter spreading plan as a component of a conservation plan, and file it with the LWRD. The winter spreading plan shall be completed by November 1, and renewed with the producer’s conservation plan.

The required winter spreading plan shall have flexibility while maintaining accountability, by complying with the following provisions:

- Spreading of liquid manure is prohibited in certain areas identified in the USDA NRCS nutrient management standard (590):
 - on a waterway or other channelized flow;
 - on non-harvested vegetation;
 - within 30 feet on both sides of a waterway;
 - within 200 feet upslope of a well, tile inlet, sinkhole, gravel pit or fractured bedrock at the surface;
 - within 300 feet of a stream or drainage ditch;
 - within 1000 feet of a lake; and
 - on slopes greater than 12%.

- Liquid manure application rates shall be limited based on slope according to the guidelines below. The rates were determined by judgment of LCD staff and Task Force members based on experience, and should be subject to future review. As scientific data becomes available, these rates may need to be reviewed and adjusted in light of specific practices used.

Slope	0-2%	3-6%	7-12%	>12%
Maximum Application Rate	7,000 gallons/acre	6,000 gallons/acre	5,000 gallons/acre	prohibited

- Producers shall, as directed by Land Conservation staff, follow one or more of the following conservation practices:
 - grassed buffer along a stream, drainage ditch, or lake (minimum 30 feet)
 - grassed buffer in a field
 - contour strip
 - contour farming (with all residue on the surface)
 - no-till with all crop residue
 - terraces/diversion
 - chisel plow, and
 - other practices, such as intermittent strip spreading, approved by LCD.

- The plan shall incorporate an attachment outlining emergency response procedures that will be implemented if a manure runoff event occurs. This emergency response plan shall include, at a minimum, making emergency contacts (including farmers, haulers, DNR and LCD staff), advance identification of locally available equipment resources, options for emergency spreading, and other resources and contacts. Resource materials for developing a template emergency response plan are found in Appendix 1.
- This winter spreading plan requirement shall be phased in as follows:
 - Summer/Fall 2005 - notify everyone when the ordinance is complete and develop and implement education programs regarding winter spreading requirements
 - Ask for voluntary compliance from producers
 - Take applications for assistance in preparing plans in 2005
 - November 1, 2005 - priority for completion of plans by this date are manure storage facilities located in thermally sensitive watersheds OR Outstanding and Exceptional Resource Watersheds where 590 plans are not in place (LCD will complete as many as possible of the approximately 92 total plans). For these priority areas, winter spreading requirements shall be enforced.
 - November 1, 2006 – compliance deadline for all other Dane County manure storage structures. Priority for plan completion: storage structures where 590 plans are not in place.

2) Producers are strongly encouraged to avoid spreading liquid manure under the following conditions: a) melting snow on frozen ground, b) ice sheet over frozen ground, c) ice pack of snow on frozen ground, d) wet heavy snow on frozen ground, and e) dry snow on frozen ground. The LWRD shall develop and implement a warning/reminder notification system to alert producers when these conditions are present or anticipated. The ordinance shall indicate that failure to receive a reminder is not an acceptable defense for any violation of the ordinance.

3) Compliance shall be enforced to the extent provided by state statute, and monitored by LCD staff when complaints are received. Non-compliance means: no winter spreading plan is in place when one is required, or a winter spreading plan is in place but not followed. Compliance information shall be logged for use in ongoing evaluation. County staff shall proactively monitor for compliance when conditions described in #2 above are present. Penalties consistent with the recently-amended County manure storage ordinance (s. 14.23) shall be included in the ordinance implementing these recommendations: “Any person violating any provision of this subchapter shall, upon conviction, forfeit not less than \$10 nor more than \$200, together with the costs of such action. Each day of violation shall constitute a separate offense. Any violation of this ordinance may be enforced by court action seeking injunctive relief. The corporation counsel is authorized to commence all legal proceedings in aid of enforcement of this subchapter when requested by the department.” Forfeitures levied under the ordinance shall be directed to a fund for clean water projects.

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- 4) State law requires reporting of manure spills. However, farmers who self-report manure spills or runoff in time for actions to prevent or minimize damage to aquatic ecosystems shall receive county enforcement leniency.
- 5) All professional haulers are urged to join the Professional Nutrient Applicators Association of Wisconsin and receive training (the County is not able to require this). DNR should be asked to require a minimum level of training and/or certification for all professional haulers. The County shall make available a list of haulers who have attended training.
- 6) County funding and technical assistance to expand storage or promote other practices shall be available as appropriate to help farmers match state and federal funding. Technical and monetary assistance shall be expanded to provide manure storage and other practices where appropriate.
- 7) Based on workload analysis, two additional staff should be provided to the Land Conservation Division in order to develop, review and update winter spreading plans; conduct manure management education; manage the notification system; make site visits; follow up on complaints, etc.

Task Force Recommendations: Long-Term

The following are consensus long-term recommendations of the Task Force:

- 1) Regional Manure Facility. The County Executive, County staff, Dane County livestock producers, and others have been discussing the role that anaerobic digesters may play among long-term manure management solutions. These manure treatment and storage systems produce several components including bio-solids that can be land applied for fertilizer. The other co-generated product is methane gas, which can be flared off or burned as a green fuel for power generation or heat. These regional facilities might provide some emergency storage and reduce discharges to streams and rivers.

The County Agriculture Advisory Committee has offered to contribute funds toward a manure digester feasibility study, as have Madison Gas & Electric, Alliant Energy, and others. The feasibility study would also look at broader issues such as digester byproducts and how they could be used. The Task Force supports this feasibility study.

LWRD provided an initial survey of existing manure storage structures in Dane County and their relationship to impaired (303(d)), Outstanding, and Exceptional Resource Waters. This summary is included as Appendix 2. In order to be useful for the feasibility study, this survey should be updated to include estimated length of available storage for each structure.

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- 2) Municipal treatment. The possibility of using municipal treatment systems to handle liquid manure, particularly for short-term durations when conditions do not permit winter spreading, should be explored.
- 3) Matching manure supply and demand. The Task Force also supports exploring the feasibility of matching producers who have excess manure with those who could use it.
- 4) Funding. Put more money into Clean Water Fund to expand buffer strips, storage, and other manure management needs.

Other Options Considered by the Task Force

The Task Force reviewed the State of Maine's law prohibiting winter manure spreading. The Maine program prohibits livestock operations with more than 50 animal units from spreading manure from December 1 to March 15. Producers must have a nutrient management plan in place, and storage facilities must have 180-day capacity. Stackable manure may be placed in an approved stacking site. Maine farmers have used approximately \$30 million of state and federal cost share funds to build manure storage structures as a result of this program.

Dane County has more cattle and hogs than the entire State of Maine. Additional comparisons are found below:

	County of Dane	State of Maine
number of cattle	124,111	89,831
number of hogs	28,243	4,637
number of farms	2,887	7,196
acres in agriculture	515,475	1,369,768

Source: 2002 data from National Agricultural Statistics Service
(<http://151.121.3.33:8080/Census>)

The Task Force did not recommend a similar program for Dane County due the following factors: (1) lack of storage and cost related to building storage which would lead to a faster decline of animal agriculture in Dane County, (2) concerns regarding the amount of manure spread in the spring at a vulnerable time period that could lead to increased runoff events that would also include soil runoff, (3) yield loss and overall land productivity due to delayed planting and soil compaction from spring-time spreading, (4) faster decline of rural roads due to the weight of spreaders and trucks, and (5) lack of public commitment to devote the amount of funds needed to implement a program similar to Maine's.

Implementation of Task Force Recommendations

Short-term recommendations 1-4 (regarding requirements for application of liquid manure on snow-covered and frozen ground) will be incorporated into a Dane County ordinance amendment that will be introduced to the County Board for action.

The Land Conservation Division of the Dane County Department of Land and Water Resources will implement short-term recommendation 5, and all long-term recommendations.

Short-term recommendations 6 and 7, regarding funding and staffing, require County Executive and County Board leadership and action. In the 2006 budget deliberations, the County Executive and County Board will take up issues of funding, staffing, and fees or other revenues.

Currently, a number of committees such as LWC, LCC, EANR, and the Ag Advisory Committee share responsibility for dealing with issues related to winter manure spreading. Therefore, strong consideration should be given to continuing this Task Force, or reconstituting it as an ad hoc committee, to permit better coordination between these groups. The focus of the Task Force or replacement committee should be to continue the information gathering and feasibility analysis necessary to implement the long-term recommendations listed above, maximizing use of technical expertise from UW, Discovery Farms, and DNR. Additionally, any such recommendations considered feasible will likely require further action by the County Executive and the County Board, particularly with regard to funding, staffing, fees, and revenues.

Evaluation

The Task Force recommends an annual evaluation of these recommendations, with a followup report identifying any undue burdens on producers or additional actions, including rate adjustments and other requirements necessary to improve resource protection. Other resources that could be reviewed at that time include, but need not be limited to, descriptions of other Wisconsin county (e.g. Brown, Kewaunee, and Manitowoc) requirements, revised NR 243 manure spreading requirements, and recommendations of the statewide manure spreading task force appointed by the Secretaries of Natural Resources and Agriculture, Trade, and Consumer Protection.

If the proposed recommendations are not sufficient to protect water quality, additional restrictions shall be considered for waters that are already listed as Exceptional or Outstanding Resource Waters and waters that are impaired and listed on the 303(d) list. These are waters that are already clean and must remain so, or are already polluted and cannot sustain additional pollution through acute or chronic manure runoff. Additional wintertime restrictions could include:

1. Excluding fields that directly border ERW/ORWs/303(d) list waters from winter spreading plans; OR

2. Requiring 30-foot buffers on fields in the winter spreading plan that directly border ERW/ORWs/303(d) list waters; OR
3. Requiring more than one of the conservation practices listed in the table on fields in the winter spreading plan that directly border ERW/ORWs/303(d) list waters.

MINORITY REPORT

1. Andrew Hanson of Midwest Environmental Advocates and Supervisor Chuck Erickson believe that liquid manure spreading rates identified in Short-term recommendation #1 are too high, and, at a minimum, should be reduced to the following levels:

Slope	0-2%	3-6%	7-12%	>12%
Maximum Application Rate	7,000 gallons/acre	5,000 gallons/acre	2,500 gallons/acre	prohibited

2. Andrew Hanson of Midwest Environmental Advocates believes that the short term recommendations must include a requirement that livestock operations keep daily winter landspreading logs that, at a minimum, record the field used, acres applied, the date of application, the field conditions¹, air temperature, and the application rate of liquid manure that was applied. Without this information, there will be no way for Land Conservation staff to determine compliance with application rates in Short Term Recommendation No. 1 or whether the advisory recommendations were followed. As a result, non-compliance with the ordinance would include failure to keep daily manure spreading logs. Land Conservation staff should prepare standard daily log forms for livestock operations that apply for winter spreading plans.
3. Andrew Hanson of Midwest Environmental Advocates and Supervisor Chuck Erickson believe that there should be no liquid manure spreading during winter on fields that directly border ERW/ORW/303(d) list waters, or thermally sensitive waters, because of the mobility of liquid manure on frozen ground. Further, vegetative buffer strips on those fields would be likely be insufficient, standing alone, in the winter at attenuating manure pollutants and preventing manure runoff, particularly during a snow-melt.
4. Andrew Hanson of Midwest Environmental Advocates and Supervisor Chuck Erickson believe that the maximum penalty amount for violations of the ordinance should be raised to \$1,000 per day. All penalties collected should be dedicated to a fund that would provide cost-share assistance to livestock

¹ Field conditions to be recorded should include, if present, a) melting snow on frozen ground, b) ice sheet over frozen ground, c) ice pack of snow on frozen ground, d) wet heavy snow on frozen ground, and e) dry snow on frozen ground.

operations seeking to implement conservation measures. Raising the penalty amount increases specific and general deterrence, and provides rewards to livestock operations who want to comply with the ordinance and install additional conservation measures.

Appendix 1

Emergency Response

LWRD will develop a template for emergency response plans, drawing on the following resources recommended by DNR and LCD:

“How Can I Develop an Emergency Response Plan for My Livestock Facility?”
By Randy Fonner, Department of Agricultural Engineering, University of Illinois.
(available at www.age.uiuc.edu/bee/Outreach/lwmc/lwm46.htm)

Ohio Department of Agriculture Emergency Response Plan, pages 1-4 (Revised 9/2002). (Available at www.ohioagriculture.gov/pubs/divs/lepp/curr/fact/lepp-fm-emergencyresp-120103.pdf)

“Emergency Action Planning for Livestock Operations” by Don Jones and Alan Sutton, Purdue University, and Charles Gould, Michigan State University. Published by Michigan State University Extension (ID-301 E 2820). (available at www.ces.purdue.edu/extmedia/ID/ID-301.pdf)

Natural Resources Conservation Service Emergency Action Plan Example Templates
(Available at <http://www.wi.nrcs.usda.gov/technical/cnmp.html>)

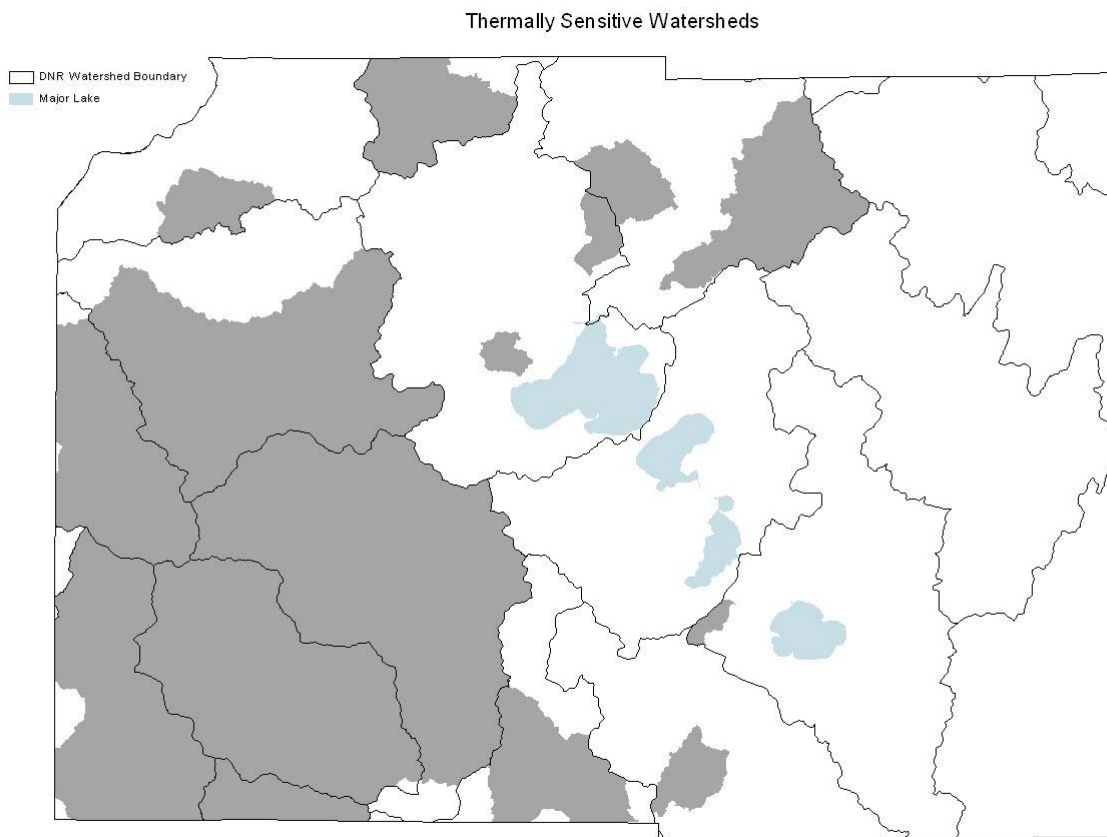
Appendix 2

Dane County Manure Storage Facilities: Their Nutrient Management Plan Status and Location in Watersheds of Concern

590 Status	County-wide	In Thermally Sensitive or O & E or 303d Watersheds	In Thermally Sensitive Watersheds	In Outstanding & Exceptional (O & E) Resource Waters Watersheds	In Thermally Sensitive AND O & E Watersheds	In Thermally Sensitive OR O & E Watersheds	In 303d (Impaired) Watersheds
None	135	118	55	80	43	92	71
N-based	26	24	8	16	6	18	19
P-based	28	26	4	10	3	11	23
TOTAL:	189	168	67	106	52	121	113

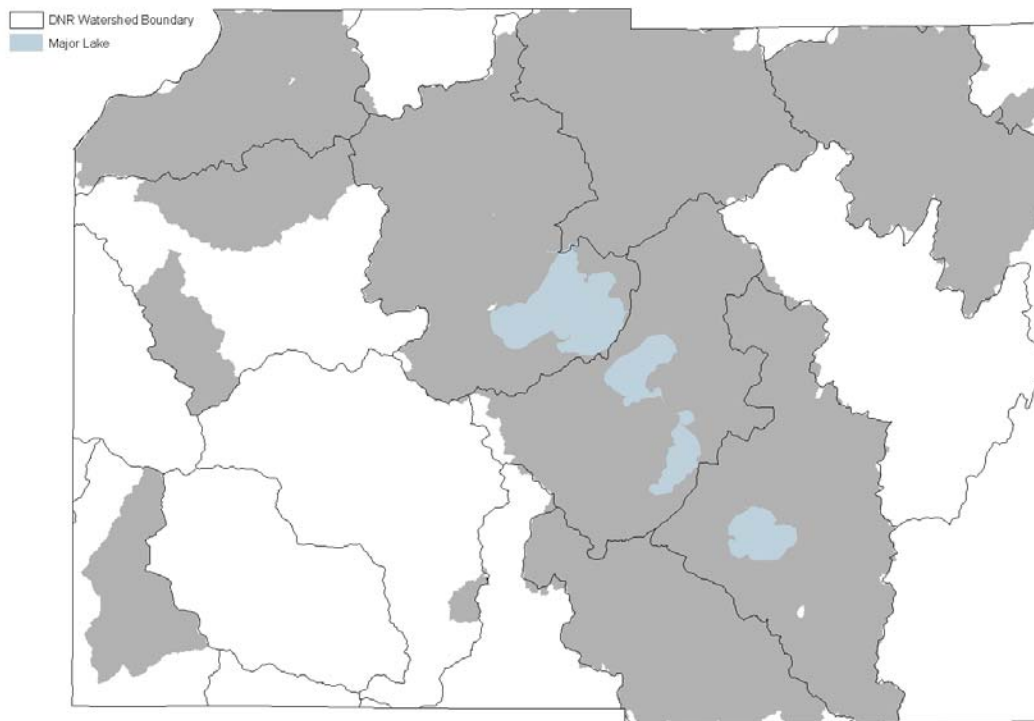
Source: Dane County Land & Water Resources Department, prepared 5/25/05

There are 189 manure storage facilities in Dane County. This table indicates their USDA NRCS nutrient management standard (590) status, and location in watersheds of concern. Maps of thermally sensitive, outstanding and exceptional resource water, and 303(d) impaired watersheds in Dane County are found on the following three pages.



Source: Layer was created by the Dane County LWRD with data from DNR and UW-Madison LICGF. Areas of land that drain to cold water communities (as defined by DNR). Drainage information derived from 1:24,000-scale DNR watersheds and 10m Digital Elevation Model.

303d Impaired Watersheds



Source: 303d information is from DNR (2004). Watershed information was derived from Dane County Subwatersheds (generated from a 10m Digital Elevation Model) by Dane County LWRD.