



## **Swine Production in the Land of 10,000 Lakes**

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Those of us who live in Minnesota know how lucky we are to live in the “Land of 10,000 Lakes.” It seems that clean, fresh water surrounds us. A favorite fishing hole or good spot for water-skiing are just a few miles away. But, what would happen if you woke up one morning and found that you no longer had a safe water supply? What would you do if the water you rely on for drinking and recreation was contaminated and considered unfit for human and animal use? The mere mention of contamination in our water supply is enough to make most of us uncomfortable. Yet, we often take our water supply for granted.

Most Minnesota livestock producers are good environmental stewards and practice due diligence when it comes to protecting waters of the state. Large, confined swine operations are often scrutinized for their potential impact on water quality. In reality, both small and large swine operations have the potential to pollute Minnesota’s waters if they are not managed properly. That is why it is important for all swine producers in Minnesota to remember that they have a vital role in protecting our waters.

Livestock operations produce large amounts of manure. Manure contains nutrients essential to plant growth and increases the organic matter of the soil when applied to cropland. It aids in water retention, lessens the impact of wind and water erosion, and promotes growth of beneficial organisms in the soil. However, if not handled properly, manure can harm the quality of surrounding water. Over application of manure to cropland, leaching or spills from manure storage structures, and open lot runoff can all result in contamination of our water supply.

The primary pollutants from swine waste are nitrogen, phosphorus, and pathogens. Nitrate-nitrogen can leach into ground water from poorly constructed storage facilities or over-application of manure to cropland. Nitrate-nitrogen concentrations higher than 10 mg/L in

drinking water can cause methemoglobinemia or “blue baby syndrome” in infants. Livestock should not consume water with concentrations higher than 100 mg/L. Phosphorus from manure can attach to soil particles and runoff into surface water during rain events. Excess phosphorus in aquatic environments results in eutrophication or “algae blooms.” When the algae die and decompose, dissolved oxygen in the water is depleted, which can cause fish kills. Disease-causing bacteria such as *Salmonella*, *Campylobacter*, and *Yersinia* can threaten public health and reduce livestock performance if runoff containing these pollutants reaches human or livestock water supplies. What can you do on your swine operation to reduce potential contamination of surrounding surface and ground water?

***Properly manage, maintain, and monitor manure storage structure.*** One of the greatest fears people have of modern pork production systems is that a manure spill will occur. While some spills may be unavoidable, proper maintenance, management, and monitoring of your storage structure will greatly reduce your chances of having major and minor spills from your manure storage structure. Regular inspections of your storage structure will help detect small problems before they become major problems. Control rodent burrowing and tree growth around earthen storage basins. Ensure adequate freeboard and avoid over filling any manure storage structure. Monitoring wells around storage structures can help determine if there is a leaching problem.

***Control runoff and leaching from stockpiled manure and open lots.*** Most modern swine facilities are completely confined with below-ground storage pits or earthen storage basins. These conventional swine operations receive most of the attention with regards to potential water pollution. However, the small proportion of swine producers who use alternative housing systems such as open lots or pasture farrowing also have a responsibility to protect Minnesota’s waters. If manure must be stockpiled, producers should be sure to follow all regulations set by the Minnesota Pollution Control Agency (MPCA). The stockpiles must be located, constructed, and operated so that manure-contaminated runoff from the site does not discharge into waters of the state. To prevent groundwater contamination, have a concrete pad under the stockpile and make sure to locate the stockpile in an area where there is at least a two foot separation distance between the base of the stockpile and the seasonal high-water table. Catch basins can be used to prevent runoff from stockpiled manure from reaching surface

water. Filter strips are another treatment that can be used to prevent nutrient pollution in surface waters.

***Test soil and manure before land application of stored manure.*** When it comes time to land apply manure from the swine operation, test the soil on the cropland where manure will be applied to determine current nutrient levels in the field. Ideally, representative samples from the manure storage facility should also be tested before land application to more accurately determine the correct application rate of the manure. If it is not possible to obtain a manure sample before pumping or spreading, collect samples at the time of application. Build a database of information from year to year so you have a good idea about the nutrient content of manure from each manure storage facility on your farm. Remember that dietary changes such as the addition of phytase or distiller's by-products, and management changes such as use of wet/dry feeders or nipple waterers, will influence nutrient levels in the manure.

***Apply manure at correct rate to fields.*** Be sure to calibrate application equipment and apply at recommended rates based on crop nutrient needs. Determine crop nutrient needs based on realistic yield goals and credit all sources of nitrogen including commercial fertilizer. If applying manure on high phosphorus soils, follow MPCA recommendations for phosphorus management. Whenever possible, do not apply manure to frozen ground.

A plentiful, clean supply of water is essential to both humans and livestock. Minnesota swine producers need to do their part to ensure that future generations have a safe water supply to enjoy in the Land of 10,000 Lakes.

For more information about manure management in your swine operation, visit the University of Minnesota Extension Manure Management and Air Quality website at [www.manure.umn.edu](http://www.manure.umn.edu) or the Minnesota Pollution Control Agency website at [www.pca.state.mn.us](http://www.pca.state.mn.us).

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<http://www.extension.umn.edu/swine>