

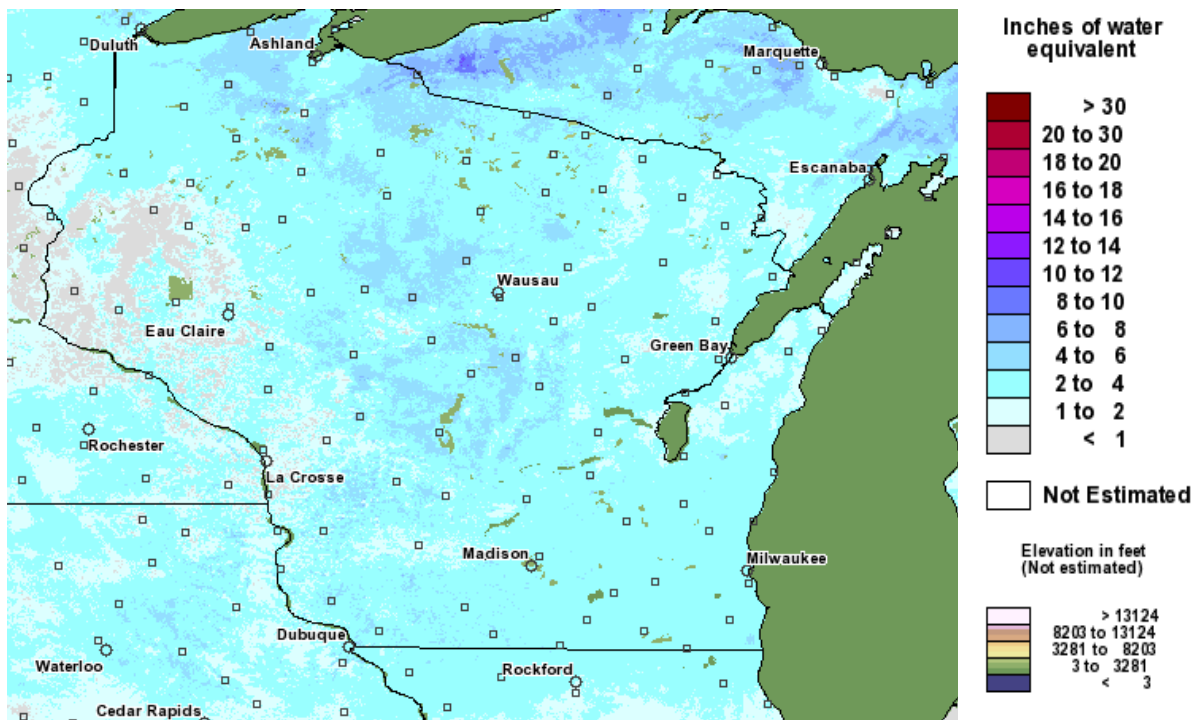
High Risk Period for Manure Runoff

February 15, 2008

University of Wisconsin – Discovery Farms Program

Livestock producers are probably getting tired of hearing about the risk of manure runoff and the need to be careful with late winter manure applications. A number of producers saw a warning issued around Christmas stating that there was a risk of runoff. While Discovery Farms did measure some surface-water runoff at most of our farms, much of that snowmelt infiltrated and/or evaporated. In general we had a moderate warm-up, high humidity conditions (which removed a fair amount of water), snow-water equivalents were only 1-2 inches, and the depth of frost was relatively shallow.

We have a different situation now; there is lot more snow on the ground. Throughout most of Wisconsin there is at least 2 inches of water equivalent contained in the snowpack, with many areas having 4" or more (see map below). This is the most water we have had since we started monitoring snowmelt runoff for the Discovery Farms program in 2001. Usually we see an inch or two of snow-water equivalent, so right now there is a lot of water sitting out on the landscape.



Snow water equivalent as of Feb 14, 2008 from NOAA's National Operational Hydrologic Remote Sensing Center. <http://www.nohrsc.noaa.gov/interactive/html/map.html>.

Another reason for the high risk of runoff is that as we get closer to spring, the days are getting longer and solar radiation is stronger every day. Snowmelts that begin later in February can happen very quickly as warm air temperatures and increased solar radiation work together. Our chance of having a quick snowmelt in the next couple of weeks is very real. A quicker melt means more surface-water runoff, even if the ground is thawed, because the rate of melt can

quickly exceed the rate at which water can infiltrate into the soil. Add rainfall into this equation and we could potentially be looking at big amounts of runoff.

A positive note is that frost depths are not particularly deep. Data on our farms show frost depths ranging from just over 1 foot in southwest Wisconsin to less than 6 inches in other areas. But, shallow frost depths don't necessarily mean that all of the melting snow will infiltrate! If we have several days of moderate temperatures (35 – 40 degrees) with cloudy conditions, we could see a lot of this water infiltrate into the soil. However, if we get sunny days with temperatures in the 40's – 50's we could lose a lot of snow quickly and have high rates of runoff.

Livestock producers who make manure applications to agricultural fields need to understand that spreading manure – regardless of the type – from now until the ground thaws is extremely risky. Studies from farms cooperating in the Discovery Farms Program indicate that different types of manure applied to snow covered and/or frozen soils both before and during conditions of snow melt or rain on snow can result in significantly higher nutrient losses than if manure was not applied. Data has also shown that when manure can contact soils and stay in place for a period of time (several weeks or even months), nutrient loss from the manure into surface-water runoff is much lower. With the significant snowpack we have across the state, livestock manure applied now will have limited opportunity to contact soil. If wind has blown much of the snow off of your fields and into ditches, you may be able to achieve some soil contact. But keep in mind, we see significant nutrient reductions only if manure was applied several weeks before runoff and, at this time of year, snowmelt is most likely right around the corner.

We understand that a number of operations apply manure every day or need to clean manure and snow from lots. Where possible, our recommendation is for producers to stack this manure in an area where the potential for runoff or groundwater infiltration is low. Producers who daily haul manure should work with their local conservation departments or consultants to identify safe stacking sites. Producers who have feedlots or facilities with bedded pack systems also need to be cautious about manure spreading during this high risk period. Cleaning lots and applying that manure on fields before the frost goes out can greatly increase the potential for nutrient losses. For those farms that must haul manure during this high risk period, we recommend identifying fields that are away from streams or lakes and have minimal risk of manure running to surface or groundwater. Data from our farms indicate that applying higher in the landscape (and further away from water sources and other areas of concentrated flow) allows more opportunities for infiltration/settling.

Other factors which can influence nutrient losses during this high risk period include application rate, the percentage of a field that is covered, and manure applied over tile drainage systems. Please keep in mind that our data shows that manure applied, even at very low application rates, can substantially increase nutrient concentrations in runoff water. Producers need to listen to the weather forecast and make good management decisions. If we work together we can reduce the risk of manure runoff events and continue to protect our farms as well as our water resources.