NEWS SOURCE

Focus on Nutrient Management

38 Nutrient Management Initiative Sites Established in 2009

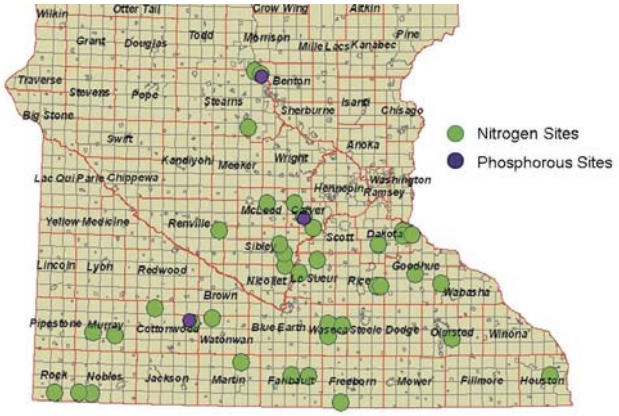
by Brian Williams, Agricultural Consultant, Minnesota Department of Agriculture

The Nutrient Management Initiative (NMI) program provides a framework for farmers and crop consultants to evaluate nutrient management decisions. This is done by comparing two application rates in side-by-side replicated strips and evaluating yield and economic results. Farmers who have participated in the program have gained a better understanding of their nutrient management decisions.

In 2009, the program expanded to include 45 southern Minnesota counties. Thirty-eight evaluation sites in 22 counties are currently enrolled. Farmers are required to work with a Certified Crop Adviser (CCA). Once program requirements are completed, participating farmers receive a payment of $1200. Funding is through the USDA-Natural Resources Conservation Services Environmental Quality Incentives Program (EQIP). The Minnesota Department of Agriculture (MDA) assists the NRCS through promotion, education outreach activities, data collection and compilation.

The field design is simple. Compare two rates and replicate each rate 3 times in alternating strips. Nitrogen rate sites must maintain a minimum 30-pound rate difference and require a short, zero-rate check within the field. Highly productive fields are preferred with no manure or alfalfa history within the last five years. A certified crop adviser assists the farmer with planning and validates crop management information and yield results. This information is reported on July 1st and December 1st. Once the results are tabulated, participating farmers and crop consultants receive a summary of their site and results from other evaluation sites. Farmer's name and field location is kept strictly confidential. Information collected also assists Minnesota USDA-NRCS with nutrient program guidance.

2009 Nutrient Mangement Initiative Evaluation



We saw huge fluctuations in nutrient prices in 2008 and 2009. For crop year 2008, early summer/fall 2007 purchased N was most cost effective with prices spiking during the spring planting season. Price fluctuations reversed in 2009. Prices remained high during the fall, stabilized, and retreated during spring 2009 planting season. In most cases, the nitrogen price divided by the price of corn remains fairly constant at a .10 ratio. (factor used when determining N rates) unless using higher priced forms of N such as urea and UAN solutions. Average prices paid by participants were comparable for both years.

In 2008, 29 locations in 16 counties were enrolled in the program. The average N rate difference on all nitrogen plots was approximately 35 pounds. Two thirds of the sites did result in a yield increase with an average increase of 3-bushels per acre or $13.50 per acre additional gross income. Cost for this additional N averaged $17.00 per acre resulting in a net loss of $3.50 per acre. Over half of the sites (52%) did not show an economical benefit from additional N. However, three sites did have a substantial yield increases from a supplemental 30# N side-dress application. These sites averaged an additional return of $34 per acre above the cost for the added N.

NMI Participants – Average N Prices Paid

Nitrogen Source	2008	2009
Anhydrous Ammonia	$686 (.42)	$701 (.43)
Urea	$441 (.48)	$441 (.48)
UAN 28%	—	$401 (.72)
UAN 32%	$364 (.57)	—

Farmers can sign up for the 2010 NMI program at their county USDA Farm Service Center. For additional details or go to: www.mda.state.mn.us/nmi This web site has program protocol, informational documents, and past NMI results.

Brian Williams, Minnesota Department of Agriculture, 651-201-6637.

SOIL FERTILITY RESEARCH PROGRAM APPROVED BY LEGISLATURE

By Bruce Montgomery, Supervisor Fertilizer Management

Starting July 1, 2009, Minnesota joined the ranks with eleven other states that have fertilizer check-off fees dedicated for soil fertility research and education programs.

With fertilizer costs steadily increasing over the past decade, it is important that producers have the most current research and technology readily available. Producer groups in states with existing check-off programs view them as an excellent return on investment. Minnesota's new program will be funded by raising the fertilizer inspection fees forty cents per ton. When the additional fees are averaged across all of Minnesota's cropland acres, the annual cost is four cents per acre.

The 2007 Legislature established the Agricultural Fertilizer Research and Education Council (AFREC). The Council was formed as a result of a previous task force which determined that fertilizer research in Minnesota was lagging behind many Midwestern states. The Council is made up of twelve members who are farmers, crop production retailers, and consultants with the charge of directing future soil fertility research and educational programs in Minnesota. The MDA serves as the fiscal agent to insure that the collected funds are tracked and audited. MDA also assists the Council in administrative functions. Once fully operational, the Council will delegate a maximum of $800,000 each year. During the transition period, the Council will have approximately $600,000 to distribute for the 2010-11 cropping seasons.

In the near future, expect to see numerous studies and reports to help you with your soil fertility decision making.

In the near future, expect to see numerous studies and reports to help you with your soil fertility decision making. The following is a listing of current research projects funded through the Soil Fertility Research Program.

A. Nitrogen, Phosphorus, and Potassium Production Research

1. Impact of Phosphorus Fertilization Strategies on Efficiency of Nitrogen Use by Corn Rotated with Soybean
2. Fertilizer Requirements for Native Perennial Plants Harvested for Biomass
3. Efficient Management of Nitrogen Fertilizer for Wheat Grown in Minnesota
4. Validating Top Dressed K Fertilizer Recommendations in an Alfalfa-Corn Rotation

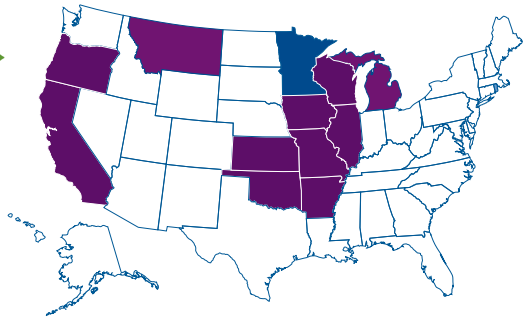
B. Sulfur and Micronutrient Production Research

1. Zinc and Sulfur Fertilization for High Yield Corn Production
2. Tillage and Sulfur Management for Corn in Fine Textured Soils

C. Agricultural Water Quality Impacts

1. Minimizing Nitrate Loss to Drainage by Optimizing N Rate and Timing for a C-C-S Rotation
2. Drainage Control to Promote High Crop Yields and Diminish Nutrient Losses from Agricultural Fields in Minnesota

States with fertilizer research check-off programs →



For more information go to:

http://www.mda.state.mn.us/afrec

Mining Soil Fertility Can Be Costly!

by Gyles Randall, Soil Scientist, U of M Southern Research and Outreach Center

With elevated input costs to corn production, namely land rent and fertilizer, farmers are often tempted to mine soil P and K by either not applying P and K fertilizers or by applying reduced rates. These reduced rates are often applied in a band to potentially achieve reduced fixation and greater efficiency. Mining of P and K has some downsides and can be costly, depending on the soil test level. At very high soil test levels, mining the soil for a couple of years is often a good decision without negative consequences. However, as soil tests move from high to medium to low levels, the risk of yield loss and reduced profit escalates quickly. Thus, with a large amount of land being rented, it is important for producers to accurately know the soil test level when developing a fertilizer game plan to maximize profitability of their fertilizer dollar. Results from a 3-year study at Waseca confirm that very high P-testing soils produce greater and more profitable corn and soybean yields without additional fertilizer P than mined, low P-testing soils where recommended rates of P are applied.

A study was conducted on both low (L) P and very high (VH) P-testing Webster clay loam soils to evaluate optimum P placement methods [pop-up (in seed furrow), deep-band (6-7" below soil surface under the seed), and broadcast]. Phosphorus was applied for corn at rates of 0, 25 and 50 lb P2O5/A on the low P-testing sites and at rates of 0, 20 and 40 lb P2O5/A on the VH P-testing sites. Potassium was deep-banded in the fall to all low P-testing plots at 120 lb K2O/A in 2004 and 200 lb K2O/A in 2005 and 2006. Corn was grown on both L and VH P-testing soils in 2005, 2006, and 2007. Soybeans were planted the following year at each site to determine residual effects of P applied for corn; no additional P was applied for soybean. Soil test P averaged 7 ppm (L) at the three low P-testing sites that had been mined for six years and 25 ppm (VH) for the three higher-testing sites. Soil pH averaged 5.9. Corn was planted following fall strip tillage, and soybeans were no-till planted.

Three-year corn yields shown in Table 1 averaged 193 bu/A on the VH P-testing soils with no yield response to added fertilizer P. On the L P-testing sites, broadcast application yielded 8 bu/A more (166 bu/A) than deep-band or pop-up placement (158 bu/A) when the 25-lb P2O5 rate was used. At the 50-lb P2O5/A rate (the UM recommendation for 195 bu/A corn is 40 lb/A when band-applied), corn yields averaged 166, 166, and 167 bu/A for the deep-band, pop-up, and broadcast treatments, respectively. Thus, there was no advantage for band placement over broadcast application.

Soybean yields in the following year averaged 49 bu/A on the VH P-testing soils without added fertilizer P and 38 bu/A on the low P-testing soils that received 50 lb P2O5/A for corn the previous year. Similar to the corn results, there was no yield advantage for deep-band placement compared to broadcast.

The corn and soybean yield advantage of 26 and 11 bu/A, respectively, for the VH P-testing sites points out the economic penalty associated with low P-testing soils even when P fertilizer is applied. At corn and soybean prices of $3.50 and $11.00/bu, respectively, economic return was reduced by $91/A for corn and $121/A for soybean on these low P-testing soils.

The results from this study clearly show: (1) the importance of knowing the soil test P status of fields planted to corn and soybeans, especially those recently rented or acquired, (2) mining of soil P may pay in the short term, but over time yields and profits will be reduced substantially, and (3) deep-banding P at a half-rate led to decreased yields and economic return compared to a full-rate of fertilizer P on soils that have been mined to low soil tests.

Table 1. Three-year average corn and soybean yields as affected by soil test phosphorus level and rate and method of P application at Waseca.

P Treatment		3-Yr. Avg. Yield	
Rate	Method	Corn	Soybean
lb P_2O_5/A		- - - - bu/A - - - -	
	Low P-Test (7 ppm Bray P)		
0	--	148	34.5
25	Deep-band1/	158	34.7
25	Pop-up	158	36.4
25	Broadcast	166	36.7
50	Deep-band	166	38.5
50	Pop-up	166	38.2
50	Broadcast	167	37.1
	V. High P-Test (25 ppm Bray P)		
0	--	193	49.1
40	Deep-band	186	49.1
40	Pop-up	194	48.9
40	Broadcast	190	48.4

1/ 6-7" below soil surface in strip-till band.

How Do I Determine My Nitrogen Rate?

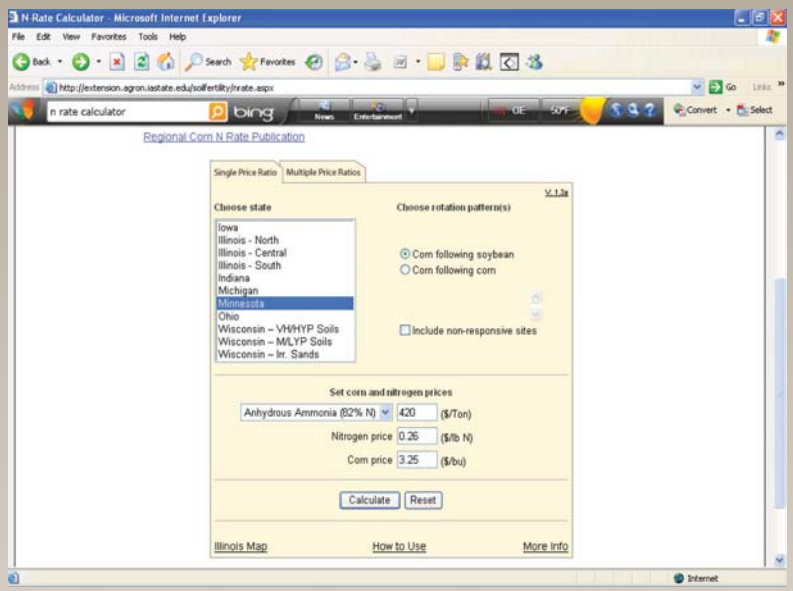
by Brian Williams, Agricultural Consultant, Minnesota Department of Agriculture

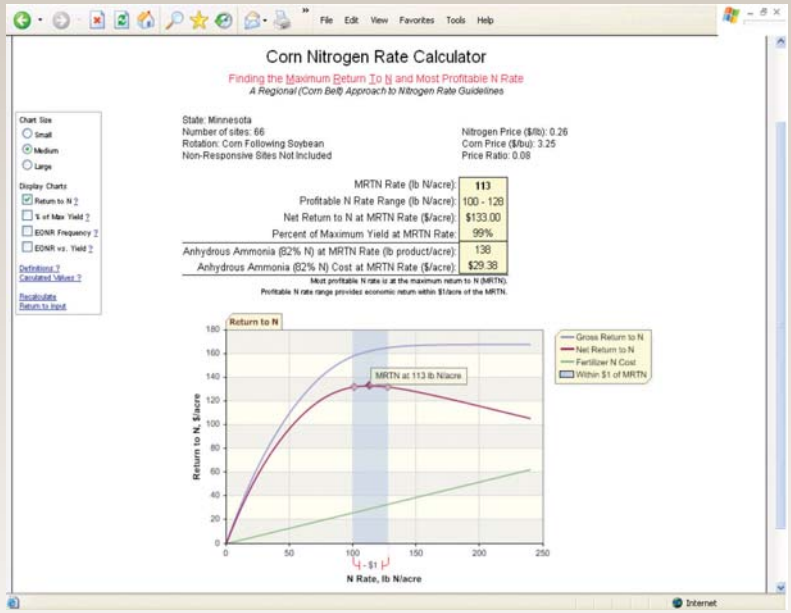
A handy, simple and convenient tool to help Minnesota corn growers arrive at the optimum nitrogen rate is the "Corn N Rate Calculator." The CNRC contains yield data from replicated studies at 128 sites in 25 Minnesota counties from 1990 through 2007. Corn Nitrogen Rate Calculator is an on line resource that aids N rate decisions for corn production and is helpful in determining the effect of fertilizer and corn price on application rates. This web site provides a method to calculate the return to N application and to find the maximum return to N (MRTN) at selected prices of N.

How to Use the Calculator

- Choose if you want to calculate for one set of prices or multiple prices (price ratio of N and corn).
- Choose State (Minnesota).
- Choose the rotation, either corn following soybean or corn following corn.
- Check if you want to include non-N responsive sites (sites that had no yield increase to N application).
- Choose the N fertilizer product and price, and corn grain price. If you use the multiple price ratio option, then you can choose four prices for N and corn grain (four ratios). The prices for N and corn have default values already entered. You may enter either the product cost ($/ton) or unit cost ($/lb N).
- Hit the calculate button to run the calculations. This will take you to the results section. If you choose N or corn prices that are too high or low, you may get an error message in the results section. If that happens, please try another set of prices.

Example of Corn N Rate Calculator Web Pages





http://extension.agron.iastate.edu/soilfertility/nrate.aspx

Nutrient Management and USDA-NRCS Conservation Programs

by Jeff St. Ores, Water Quality Specialist, USDA-NRCS in Minnesota

Various USDA-NRCS programs offer payments to producers to improve the environment. Two programs include payments for managing nutrients: the Environmental Quality Incentives Program (EQIP) and the new Conservation Stewardship Program (CSP) announced on August 6, 2009.

The EQIP addresses numerous conservation practices including providing 3 annual nutrient management payments of up to $8.54 per acre on up to 320 acres. NRCS nutrient management specifications must be followed. The specifications focus on rates on all acres and on application method and timing in environmentally sensitive areas.

The new CSP is different. Payment rates are based on the amount of existing conservation and the amount of new conservation scheduled in the next 5 years. The annual payment is lump sum for all practices combined and will likely range from $12- $22 per acre per year for contracts funded with federal fiscal year 2009 money. Potential participants are encouraged to first use a self-screening checklist to determine whether the new CSP is suitable for them or their operation. The checklist is found at: http://www.nrcs.usda.gov/programs/new_csp/special_pdfs/CSP_Producer_Self-Screening_Checklist.pdf or at your county USDA-NRCS field office.

More than 75 conservation activities can be implemented under the new CSP including approximately 20 nutrient management related activities. A complete listing of eligible activities can be found at: http://www.nrcs.usda.gov/programs/new_csp/special_pdfs/CSP_Conservation_Activity_List-081409.pdf

The nutrient management activity list was developed nationally and the activities are called enhancements because they are in addition to nutrient management practices

offered through the EQIP. This national list should be reviewed by Minnesota producers for applicability to their location, operation and enterprise. The remainder of this article focuses on several on these technologies.

Nitrification Inhibitors. N inhibitors slow the conversion of ammonium to nitrate and are used mainly in Minnesota to reduce N leaching in sandy soils. Their use may be applicable in South-Central Minnesota when anhydrous is fall applied on poorly drained soils. N-inhibitors in fall are not appropriate where fall N applications aren't recommended (sandy soils or Southeastern Minnesota) or if the fall N source contains nitrate. Impact on net incomes is year and site specific.

Leaf Tissue Tests. Use of hand held chlorophyll meters to predict in-season N need is included in this CSP activity. Sampling numerous sites may be required. Land Grant University guidance on interpreting results is limited. In Minnesota it may be difficult to apply N in a timely manner to dryland corn by the time notable differences between reference strips and the rest of the field are consistently observed. Impact on net incomes is year and site specific.

Precision Application Technology. Soil tests and maps and yield monitor results are increasingly used to help determine precision nutrient rate applications. Recently tractor or applicator mounted optical reflectance sensors along with vegetative indices have been used to help determine need for in season N applications. Use of reflectance sensors or vegetative indices is problematic. Most Minnesota research has been conducted on corn and vegetative indices are still being evaluated by land grant universities. The in-season application window can be narrow by the time notable differences between reference strips and the rest of the field are consistently observed.

Controlled Release Nitrogen Fertilizer. Controlled release urea, also referred to as poly-coated urea (PCU) applies primarily to corn in Minnesota but is being evaluated for wheat production and has been used in potato production. PCU is generally used as a pre-plant application to limit or eliminate the need for in-season applications. Use of PCU on corn ground for spring pre-plant applications is recognized in Minnesota's N-BMP documents for South-Central and South-Eastern Minnesota but may be economically risky in years when environmental factors have already reduced N loss potential. Fall application of PCU may be an option on the western side of the state for producers who currently fall apply ammonia or urea. But only if PCU's performance equals fall applied ammonia or consistently exceeds fall applied urea. Impact on net income is year and site specific.

Split N Application Rate Based on Pre-Sidedress Nitrogen Test (PSNT). The PSNT is an early season soil test taken when the corn crop reaches 6-12 inches in height. It is used in some states to determine the need for additional nitrogen to be applied during a sidedress N application. The University of Minnesota did not find consistency when testing this procedure under Minnesota conditions and did not develop nitrogen recommendations based on the results of the PSNT. Impact on net income is year and site specific.

Expect Smaller Swings In Fertilizer Prices

by Tim Chrislip, Director of Product Management and Business Development, CHS Crop Nutrients

Over the next six to nine months, most fertilizer prices will probably remain flat relative to the extreme volatility seen last year. One key factor that could impact that would be a dramatic change in grain prices.

Beyond that, we need to look to the global markets for indicators of how price and supply could be affected in the months ahead. The biggest change we've seen here in the past year is that the market is now trading much closer to the cost of production.

Looking at urea, for instance, the United States imports about 66 percent of the product our growers need each year. The two high-cost producers in the world are now China and the Ukraine, and they basically set the trading range. Currently, China will not sell product for less than $250 per metric ton FOB. The Ukraine's base is close to $230 per metric ton FOB. So when world prices hit that floor, they have to rebound, otherwise Ukrainian producers pull out of the market. When prices subsequently rise to the level at which China reenters the market, prices will move back down.

For all practical purposes, the trading range in the international market is now between $220 and $260 per metric ton FOB. That's a much more narrow range than we've seen in a while. It's much less likely that we'll see the $200 to $400 swings in price this next year.

In the phosphate market, I wouldn't expect prices to go down too much lower than they are now. One-third of the phosphate produced in the world is made by non-integrated producers – they buy their rock and other inputs, so they have a higher cost of production and the current market is not trading far above that cost.

Supply is the other major concern this fall, and in the coming year. Again, urea is a good example of how both growers and dealers have taken a more conservative buying approach this season. The normal U.S. rolling supply of urea, over 12 months, is about eight million tons a year. At the present pace of imports, by the end of March 2010, we would have only about six million tons, largely due to the fact that the U.S. market won't have attracted much urea from the world spot market.

Right now, U.S. supplies are tight and we don't expect a lot more product to arrive in time for the fall season. We will be starting the fall season with an emptier system, mainly due to the delayed decision-making of growers and dealers. That could significantly limit how much product we can move within what will probably be a shorter application window this fall.

In a typical fall, we count on about three to four weeks of application after harvest. But with many crops two to three weeks behind in development, that application window could be pretty small this year. If the long-range weather forecast proves accurate and we get above-normal temperatures and below-normal precipitation across much of the Cornbelt this fall, there might not be enough of all products in place to meet demand.

Other wild cards that could influence fertilizer markets in the short term would be an early frost this fall in major parts of the country, and what South American growers choose to plant in the next month or two. Right now it would appear that there will be a lot of soybean acres planted in Brazil and Argentina this fall, and that could certainly impact corn and soybean prices enough to alter U.S. planting next year.

While the market conditions of the last few years have created real buying challenges, the grower's risk in calling the fertilizer markets wrong will likely be much less in the year ahead. Rather than trying to call the fertilizer markets and hit the lows, it would be more profitable for growers to focus on when they sell their grain, and to buy inputs when they do.

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Fall Nitrogen Best Management Practices and Soil Temperature Network Pilot Project

by Russell Derickson & Kevin Kuehner, Agricultural Advisors, Minnesota Department of Agriculture

Applying nitrogen in the fall has been a common practice for many years in some parts of Minnesota. Farmers and dealers realize the importance for spreading out the work load and the advantage of lower prices. However, there are some environmental considerations to think about. Nitrogen best management practices (BMP's) in Minnesota vary depending on areas of the state. Fall application of anhydrous ammonia and urea is a recommended practice in south-west Minnesota. However, when comparing fall applications of N in south-central Minnesota, anhydrous ammonia is allowed but with greater risk and no fall applications of urea is recommended. Fall N applications in south-central Minnesota are at greater risk for loss because of higher precipitation and potential losses through subsurface drainage. In south-eastern Minnesota, fall applied nitrogen is not a recommended practice due to groundwater contamination risks. The sub-surface geology in areas of south-eastern Minnesota is comprised of fractured limestone which creates a greater risk for nitrate leaching.

If you live in south-central or western Minnesota, fall nitrogen might be an option. It is imperative that the nitrogen is applied after the soil bacteria become relatively dormant. Soil bacteria are responsible for converting your ammonium to nitrate form which can eventually leach to groundwater, subsurface tiles or even lost to the atmosphere through denitrification. Fall N applications should be delayed until soil temperatures at the 6-inch depth stabilize **below 50°F**.

The Minnesota Department of Agriculture, in cooperation with the Minnesota Department of Natural Resources, have developed a soil temperature reporting tool to make this information much more accessible to farmers and crop consultants. Six soil temperature-reporting sites in southern Minnesota have been instrumented as a pilot project for 2009.

All of the new 6-inch soil temperature sites are located at DNR stream gauging stations. Soil temperature information is collected by DNR data logging equipment every 15 minutes, up-linked to the G.O.E.S. satellite, and then down-linked to the National Weather Service computer servers. From the NWS the data is archived and delivered via website.

The MDA website will display the current soil temperature readings as well as charting the last 7 days' values. Cumulative rainfall at the site will also be charted. To see the data proceed to the MDA homepage (www.mda.state.mn.us) and search for "6-inch soil temps". Current temperature recording sites are in the following counties: Blue Earth, Chippewa, Freeborn, McLeod, Pipestone, and Rock.

The first site went online in June. If the system is successful and data proves useful to producers and crop consultants, the network will be expanded. The DNR plans to upgrade another 37 sites in the next year. As these sites are upgraded with new equipment, MDA can add soil temperature monitoring to these stream gauging stations.

The University of Minnesota, in cooperation with the Minnesota Department of Agriculture, updated the Nitrogen Best Management Practices (BMPs) in 2007. Nitrogen BMPs serve as guidance to assist crop producers in optimizing yields while protecting water quality. For a complete listing of nitrogen BMP recommendations for specific regions across the state please visit the following webpage: http://www.mda.state.mn.us/protecting/bmps/nitrogen-bmps.htm

<table>
<tr><th>South-west/ West-central Counties</th><th>South-central Counties</th><th>South-east Counties</th></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>NOT RECOMMENDED
✔ Fall application of UAN (28-0-0) or any fertilizer containing nitrate-nitrogen.
✔ Shallow or no incorporation of urea (46-0-0) when applied in the fall.</td><td>NOT RECOMMENDED
✔ Fall application of urea and ammonia without N-Serve.
✔ Fall application of UAN (28-0-0).</td><td>NOT RECOMMENDED
✔ Fall application of ammonia, urea, and UAN (with or without N-Serve)</td></tr>
<tr><td></td><td colspan="2">✔ Side-dressing all N when corn follows corn.</td></tr>
<tr><td colspan="3">✔ Fall application of any N fertilizer to coarse textured (sandy) soils.
✔ Application of nitrogen fertilizers including MAP and DAP on frozen soils.</td></tr>
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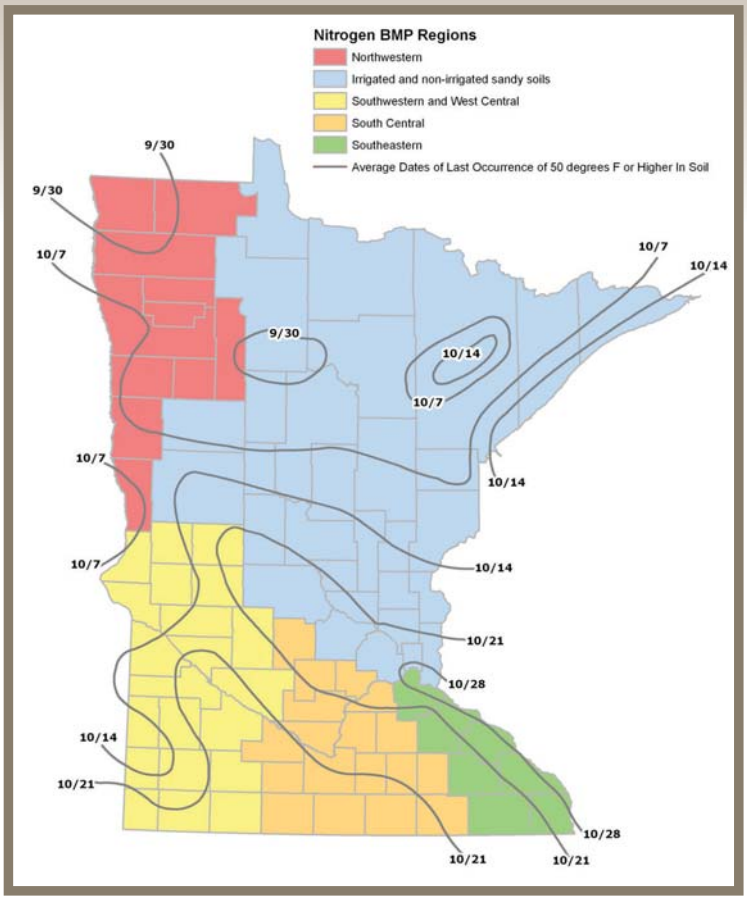
Table 1: summarizes nitrogen practices that can increase the potential for nitrogen loss to the environment and therefore are strongly discouraged.



2009 Fall Nutrient Management Newsletter compliments of:

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