KIC Progress Report
February 2014

This report highlights progress during from October 2013 through February 2014:

Educating the Next Generation on the 4Rs

Illinois Farmers Engaged in KIC Nitrogen Rate Trials

KIC Software to Track 4R Trends in the Priority Watersheds

Lake Springfield Project

NREC Funding New Era of Nutrient Research & Education in Illinois

Educating the Next Generation of Nutrient Stewards

One of the priorities listed in the KIC strategy is to educate the next generation on the 4Rs of nutrient stewardship.

Dan Schaefer (center) surrounded by students in the Soil Fertility & Fertilizer class at Parkland Community College.

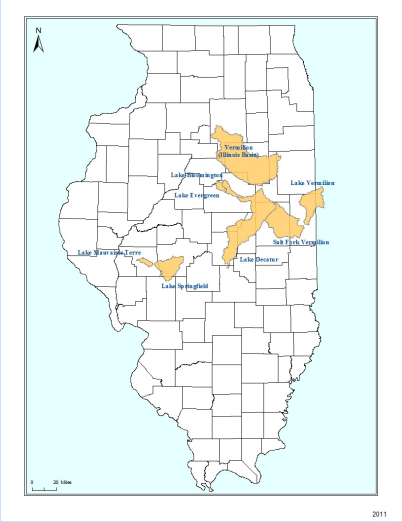
In January, Dan Schaefer, CBMP's Director of Nutrient Stewardship, began serving as a guest instructor at Parkland Community College in Champaign, IL for instructor Don Bergfield's AGB 213 Soil Fertility & Fertilizer Class. This is an eight week class meeting three days a week and Dan instructs in five of those weeks. A big thank you to Don Bergfield and Parkland for allowing us time with these students, who will likely go on to careers in agriculture.

The students learned about Nitrogen Management as a system using the 4Rs: right source, right rate, right time, right place. In order to understand the concept of a system they first had to understand the nitrogen cycle, and were tested on this. They also took soil nitrate and ammonium samples and placed the results in a tracking form similar to the one we use with N-WATCH®. This allows them to follow the nitrification process and the movement of nitrate into the soil or taken up into the plant. They also learned about mineralization and immobilization of organic and inorganic nitrogen. With Dan's help, they have a deeper understanding on nitrogen loss pathways including leaching, denitrification and volatilization and the factors that cause those losses. GROWMARK supplied kits that the students used to simulate urea volatilization loss and preventing the loss using an urease inhibitor. The students got a healthy dose of MOM: Minimize environmental impact, Optimize Harvest Yield and Maximize Nutrient Utilization.

Managing Nitrogen as a System

By Dan Schaefer, CBMP Director of Nutrient Stewardship

I can hardly believe I have been the CBMP Director of Nutrient Stewardship for two full years. It has been a challenging but extremely fulfilling job; I am frequently amazed but not surprised by the way ag retailers and farmers have embraced the program.
Here's what we are focusing on for the 2014 crop year in our eight priority watersheds. Our work began on this in the fall of 2013.

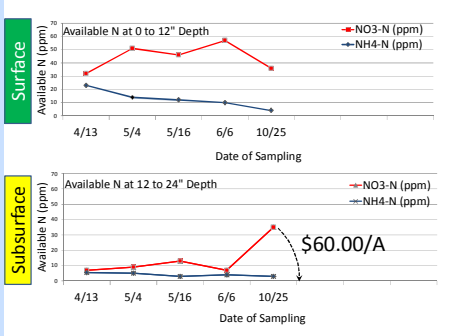


Promoting Nitrogen Management Systems. I meet with the retailers in the priority watersheds to discuss managing nitrogen as a system, not as an application. The analogy I use is this: In agriculture, we don't know when the corn price will be at its peak, so we market corn over time to hedge risk.
We also don't know what the weather will do, so why not make multiple nitrogen applications over time to reduce the risk of nitrogen loss from major weather events like excessive rain or drought?

I promote making N applications at strategic times, and to start by using the appropriate nitrogen rate. We use the slogan "Split Your N Rate and Calculate" and direct retailers and farmers to the MRTN iPad and Droid application that allows them to do just that. This tool enables them to enter three different nitrogen splits, enter the cost of the product at each application and the cost of the nitrogen stabilizers and urease inhibitors. Enter "MRTN Calculator" in the iTunes store or just do a search for "Illinois CBMP" on your smartphone or computer and you will find the tool.

The nice thing about the nitrogen management system is that a fertilizer retailer can adapt the program to their product selection and equipment they utilize. For example, some companies specialize in liquid nitrogen; this form of fertilizer can be stabilized and applied before planting, after planting, and after the crop emerges. Anhydrous ammonia can be stabilized and injected into the soil after soil temperatures fall to 50 degrees, and in this program we recommend reducing the rate and then coming back in the spring with a pre-plant N source and side-dressing after emergence with anhydrous or another source of nitrogen. Most retailers have liquid nitrogen solutions (UAN) and some also offer urea (a form of dry nitrogen) as a source, which can also be stabilized and applied before planting and incorporated, or after emergence over the top of the corn. Having all these options of nitrogen sources allows a retailer to offer unique programs to their customers that embrace the nitrogen management systems approach.
There are a myriad of choices for retailers and farmers, it's not one size fits all.

N-WATCH®. In the fall of 2013, we again took soil samples after harvest to evaluate residual nitrogen remaining in the fields. We even took some samples in the winter in frozen soil, although this is quite an endeavor and requires a power drill! Our plan once the soil thaws is to continue to track ammonium and nitrogen levels in the soil in fields where fall nitrogen was applied and after spring nitrogen is applied. The N-WATCH results provide an outstanding educational tool for farmers; the graphics on the reports reveal the N applications and also how it moves through the soil profile during the growing season. Education is the focus of the KIC program, and more and more farmers are partaking in the valuable tools provided by KIC, gaining a far better understanding of the impact of the 4Rs (source, rate, time, place) in their farming operations, in their overall profitability and in their understanding of nutrient movement and how to minimize nutrient loss.



An Update on the On-Farm Nitrogen Rate Trials

In 2012, the first full year of the KIC program, Dan Schaefer worked with local ag retailers to enroll seven farmers in the on-farm Nitrogen Rate Trials. These on-farm trials have existed for some time under the direction of Dr. Emerson Nafziger at the University of Illinois. Dr. Nafziger received funds from the old Fertilizer Research & Education Council (FREC) for this effort, and the on-farm results have been used to feed the Maximum Return to Nitrogen Rate (MRTN) Calculator, a joint effort of several Midwest land grant universities.

Software in tractor showing N rate strip trials

Dan works with ag retailers to promote the program extensively, focusing on the knowledge that farmers and their fertilizer suppliers can gain from doing these on-farm studies. Interest has grown substantially, and in 2013 KIC engaged with 30 farmers in the priority watersheds, some signing up for multiple trials on their farms. Ag retailers are able to utilize nitrogen rate controllers on their toolbars and mapping software in their tractors to implement the trials; the nitrogen tool bar will change rates in each strip based on a pre-loaded program. These trials are also a combination of fall and spring nitrogen applications using different N sources applied at different times and at different rates (the 4Rs!).

At harvest time, the coordinates of the trials are loaded into the combine, and yields are matched to the different rates. This provides farmers with a printout showing the optimum nitrogen rate of N that year as a comparison to yield. Dan continues to work with Dr. Nafziger to feed these results into the overall MRTN calculator, further improving that tool.

Analysis of the 30 rate trials conducted in 2013 indicate variability in optimum N rates, requiring us to look further at what other factors may be affecting nitrogen utilization by the crop. For example in two fields, with the same soil type less than one mile apart and farmed by the same farmer with the same practices, the yields were the same but the optimum N rate differed by 30 lbs of nitrogen per acre. It is important that we repeat the N rate trails for a period of at least 3 years to provide a reasonable expectation for consistency in determining a nitrogen rate recommendation that provides the best optimum use of the nitrogen under different weather and crop response conditions. We have a goal of establishing 50 N rate trials in 2014.

The Lake Springfield Project

The KIC program is assisting a new effort in Lake Springfield to ensure that nitrate levels in this drinking water supply remain far below 10 ppm. This partnership includes CBMP, Springfield City, Water, Light & Power (CWLP), the Sangamon County Soil & Water Conservation District, students from Lincoln Land Community College and the local Springfield watershed committee. The program began in November 2013. The new effort includes working with ag retailers to educate and encourage farmers in the watershed to adopt a nitrogen management systems approach (split nitrogen applications) utilize N-Watch to evaluate nitrogen levels in the soil, plant cover crops to sequester nitrogen and protect against soil erosion, and monitor rainfall events and nitrate levels in the streams that feed lake Springfield on a consistent basis to determine trends and events that may be leading to nitrogen losses from agricultural fields.

CBMP is utilizing a grant from the National Fish & Wildlife Foundation to fund this effort and CWLP is also providing financial assistance. For more information on this project go to www.illinoiscbmp.org.

KIC Reporting: Ag Retailers Helping Measure 4R Trends

CBMP works diligently to ensure that the strategy we defined in the KIC by 2025 document outlining milestones for the adoption of best management practices has accountability measures. One of these measures is to track the implementation of the 4Rs by farmers in the priority watersheds.

It may sound easy, but this is a very challenging task. However, we believe we have figured out a way. With the help of the Illinois Fertilizer & Chemical Association, we have partnered with a software company called Software Solutions Integrated in Shelbyville, IL to design a program that ag retailers can use to track adoption of the 4Rs by the retailers' farmer customers.

We are fortunate in Illinois that nearly 90% of ag retailers in the state use a SSI software program called Agvance to keep track of their fertilizer mixing, blending, sales and inventory. The software magicians at SSI have been working with IFCA, Dan Schaefer, Dr. Howard Brown and a pilot group of ag retailers to design and test this software, which we call the "KIC Report" (probably needs a more catchy name).

The goal is to enable ag retailers to easily generate a report that shows the types of fertilizer sold, stabilizers sold, dates of sales and rates of application on the acres within each priority watershed. A database management company called PAQ Interactive in Monticello, IL will then take the information that the KIC report generates and create a series of digital dashboards to illustrate progress on the 4Rs based upon the information provided by the retailers. These reports will protect the anonymity of the retailers and their farmer customers, and provide vital information on how nutrient use practices and adoption of the 4Rs are occurring over time in each watershed. CBMP will also "ground truth" the KIC reports by surveying farmers in the watershed to assess their nutrient practices and match them up to what the KIC reports are indicating. The Nutrient Research & Education Council (NREC) provided a grant to Illinois State University to conduct a farmer survey in the Lake Bloomington watershed and compare its results with the KIC retailer reports.

NREC Supporting KIC and Vital Nutrient Research

When CBMP launched the KIC program in September 2011, one of the first objectives listed in the KIC document was to establish a new and sustainable way to fund not only nutrient education programs like KIC, but scientific research to discover new ways to minimize environmental impact, optimize harvest yield and maximize input utilization (MOM). The ag industry supported legislation to create the Nutrient Research & Education Council (NREC) within the Illinois Fertilizer Act, and Governor Quinn signed it into law in August 2012. NREC was able to fund its first projects in 2013, including the KIC program. In 2014, NREC has truly hit its stride, dedicating $2.55 million to 15 projects to significantly address nutrient utilization to improve water quality and crop production in Illinois.

Please go to www.illinoisnrec.org to view a description of these 15 projects. Several projects being investigated by researchers at the University of Illinois, Illinois State University and Southern Illinois University are directly focused on research that will assess the level of nutrient reduction and enhanced crop yields that may be accomplished by farmers adopting a nitrogen management system, using cover crops and implementing 4R practices that the KIC program promotes. When farmers purchase fertilizer, they support NREC. Thank you Illinois farmers!