

MAXIMIZING YIELD, INCOME, AND WATER QUALITY

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Those involved with Midwest production agriculture are aware that applications of nitrogen fertilizer can have unintended consequences upon water quality. It is our focus to minimize the potential of such environmental risks by working together to optimize harvest yields, and to maximize nitrogen utilization through the use of science-based initiatives, such as development of nitrogen management systems and N-WATCH.

Sustainability of voluntary efforts to minimize the environmental impact of nitrogen applications must occur through both accountability and profitability. Change will not be sustained through a focus on reduction, but by a focus on **Minimizing** environmental impact by **Optimizing** harvest yield and **Maximizing** input utilization. Focusing on **M.O.M** provides a united message and keeps us focused on what is important to all of us.

The following documents are used to promote a change in the way many farmers manage nitrogen applied for commercial corn production. The focus on M.O.M. effort is currently focused on a few priority watersheds with the hope to expand the program as we learn together.



NITROGEN MANAGEMENT SYSTEM

Objective: To improve farm profitability and minimize environmental impact of nitrogen (N) use by reducing N losses and increasing harvest yield.

Nitrogen Management System: A planned approach to N use that achieves better plant utilization and higher harvest yield with less environmental loss. It promotes a multiple application approach to N Management. It reduces early N application rates while emphasizing post-emerge N nutrition. It is about making incremental N applications that will **M**inimize environmental impact, **O**ptimize harvest yield, and **M**aximize input utilization. It is about focusing on **M.O.M.**

Components of a Nitrogen Management System

- Plan on a N System with two or more N applications
- Fall Applications: Apply no more than 50 to 60% of total N
- Start with land-grant guidelines for N rate
- Use a nitrification inhibitor with fall and early pre-plant N applications
- Include applications with differences in placement of N (knifed and surface broadcast)
- Include a late pre-plant, pre-emerge or post-emerge N application as part of the system
- Utilize **N-WATCH**¹ to inventory and track plant-available N from harvest to knee-high corn
- Search for the optimum N rate for your specific farming practices (N Rate Studies)
- Stay focused on sound scientific principles and strategies

Impact of a Nitrogen Management System

- ✓ Increased investment in N input. Cost of different N sources, application, and use of N enhancements will add to the N input cost.
- ✓ Improved farm profitability and minimized N losses. Split application of N has provided over an average of 15 bushels per acre across 60+ sites over four years (2009-2012).
- ✓ Provides a convincing reason to change the way N is managed through **M**aximizing N utilization, **O**ptimizing harvest yield, while **M**inimizing environmental impact (**M.O.M.**).

*“To sustain higher corn yields will require a change in the way crop inputs are managed. It is not about applying more N to produce more grain, but how the N is utilized. It is not about managing the field, but managing environments within the field. Adoption of an N Management System is one step toward **Maximizing Every Acre.**”*

For more information about a N Management System for your farming operation contact your local Ag retailer or the Illinois Council for Best Management Practices (leslief@ifca.com or 309-827-2774).

¹ N-WATCH is a management tool that provides an estimate of plant-available N over time at one point in a field. Visit with your participating Ag retailer or the CBMP (leslief@ifca.com or 309-827-2774) for more information about N-WATCH.



A Tool to Estimate the Where, What, and How Much

N-WATCH is a management tool designed for N Management Systems to inventory, track, and verify plant-available N in the soil. N Management Systems hedge the risk of N loss by splitting up the N application following the 4Rs of Nutrient Management (Right source, Right rate, Right time, and Right place). It is all about **M**inimizing environmental impact by **O**ptimizing harvest yield, and **M**aximizing nutrient utilization. It is all about focusing on **M.O.M.**

Who is eligible: Ag Producers that are adopting N Management Systems

How to participate:

- ✓ Register with a participating local Ag retailer or the Illinois Council for Best Management Practices (309-827-2774 or leslief@ifca.com).
- ✓ Collect samples according to provided protocol
- ✓ **Completely** fill-out each submittal form (ex. attached)
- ✓ Test Results – Emailed two business days upon receipt of samples
- ✓ Tracking Report – E-mailed two business days of receiving results

What is needed to register:

- a. *UPS shipping address* – Your name and shipping address will be used to send you the shipping boxes, pre-paid shipping labels, sample bags, and submittal forms you will need to participate in the program.
- b. *Number of N-WATCH sites requested* – Each customer can request up to two N-WATCH sites. If special circumstances exist and more sites are needed, visit with your local crop specialist to request an exemption.
- c. *Whether or not you need a soil probe and template. See images for probe choices. Soil probes are not provided. They can be ordered through IL-CBMP (leslief@ifca.com or 309-827-2774).*
- d. *Your commitment to finish what is started*

WANT TO PARTICIPATE? To learn more about the value of N-WATCH contact your local Ag retailer or the IL-CBMP (leslief@ifca.com or 309-827-2774).



Answers to Common Questions

How was N-WATCH created? Heavy rains in the spring of 2009 left many southern Illinois farmers with the question of how much spring-applied anhydrous ammonia N was lost to the saturated soil conditions. It was determined that if we could determine the concentrations of plant-available N in the upper 12 inches of the soil profile, we could generate an estimate of how much plant-available N was available to the plant, based upon Pm-1714 from Iowa State University (Nitrogen Fertilizer Recommendations for Corn in Iowa). A modified testing protocol was created and a significant concentration of the spring-applied N was found, avoiding the application of unnecessary N fertilizer in several fields.

Why is a template necessary? Knifed-in or banded sources of N fertilizer leave a concentrated band of plant-available N over time. The template allows a sample to be collected that represents the area one knife or band delivers N to (templates are designed for 30-inch N applicator spacing). Without the template, random samples could be collected from the concentrated N bands or from areas with no N application, resulting in the sample having elevated or abnormally low plant-available N concentrations.

What is “plant-available” N? Nitrogen is one of 17 elements considered essential for plant growth. The plant can take up two forms of N; nitrate-N and ammonium-N. N-WATCH inventories and tracks both to estimate total plant-available N.

Can N-WATCH be used to make N recommendations? Although N-WATCH can be used as a way to estimate N loss or movement, is not designed to make an N recommendation for a field. It only provides an estimate of plant-available N concentration over time at a specific point. Farmers are still encouraged to use the N recommendation system suggested by their state land-grant university.

Where do I get extended soil probes and how much do they cost? There are some options to consider when purchasing an extended tube soil probe. The basic 15” tube probe is available through Oakfield Apparatus is <http://www.soilsamplers.com>. The Back-Saver probe is another extended tube probe that makes sample collection at the 1-2 foot depth somewhat easier. The Back-Saver is available through IL-CBMP for \$325 (includes soil tube) while supplies last. Contact Leslie Forrest for more information (leslief@ifca.com or 309-827-2774).

Why are all the samples sent to the same lab? The system we established during the 2011-2012 program with A&L Great Lakes Laboratory made it obvious that working with the same lab streamlined the program and greatly improved efficiency of the program both in time savings and costs. *The costs associated with samples submitted to other labs other than A&L Great Lakes Laboratories will be the responsibility of the person submitting the samples.*

Can I check random spots in other fields for Nitrate-N as part of this program? No. Soil samples must be collected as defined by the published N-WATCH protocol and must be registered N-WATCH sites. Soil samples collected for other reasons or from sites not registered are not included in this program as well as any tissue or stalk samples submitted for analysis. *The cost of sample shipping and analysis will be the responsibility of the person submitting samples that are not included as part of this program.*



FILL OUT FORM COMPLETELY BEFORE SUBMITTING

LOCATION SUBMITTAL FORM

Account No.		
Submitted by	Grower:	
Address	Field I.D.	
City/State/Zip	Nearest Town:	
Cell Phone	County:	
E-Mail	Latitude (required):	
Sampling Date	Longitude (required):	
Growth Stage of Crop	Rain (in) since last sampling:	Soil Type: <input type="checkbox"/> Tiled <input type="checkbox"/> Surface <input type="checkbox"/>

FIELD INFORMATION

SAMPLES (nitrate and ammonium NO ₃ NH ₄)		2013 CROP (History)	Crop:	Harvest Yield:
Sample Depth	Sample Number (Max. 6 char.)	Lab Number (Lab use only)		
0 - 1 ft				
1 - 2 ft				

LAST YEAR'S N APPLICATIONS (only needed on first sampling date)

Date	N Source*	Placement	Rate N Applied	Stabilizer

TILLAGE SINCE LAST TESTING DATE

Date	Type of Implement	Depth (in)	Direction (Relative to N)

NITROGEN APPLIED SINCE LAST TESTING DATE

Date	N Source*	Placement	Rate N Applied	Stabilizer

* Include manure (type). Rates are actual N, not product.

Sampling Instructions: Knifed N Applications:

1. Place the template perpendicular to N application.
2. Collect 12" soil cores from each of 11 holes (1 row).
3. Thoroughly mix in bucket.
4. Fill labelled sample bag with soil.
5. Discard remaining soil and repeat for 1-2 ft. sample
6. Mark site for return sampling.

Sampling Instructions: Broadcast N Applications:

1. Identify 20 ft. x 20 ft. site for sample collection
2. Collect 4 random cores at 1 ft. depth.
3. Mark each sampling point for return sampling.
4. Place 4 soil cores in labelled sample bag.
5. Repeat for 1-2 ft. sample.

Additional Information or Instructions

Ship soil samples and this **completed** form to:
 A&L Greate Lakes Laboratories, Inc.
 3505 Conestoga Drive, Fort Wayne, IN 46808



Inventory of and Tracking Plant-Available N (When N is Broadcast)

Purpose: Purpose: A program sponsored by the Illinois Council for Best Management Practices (CBMP) to provide local growers an estimate of the location, form, and concentration of plant-available N remaining in the soil. Plant-available N at a point in a field and a point in time can be estimated utilizing this technique and provide information that may help minimize environmental impact by improving harvest yield and maximizing nitrogen utilization. *(This is not to be used as a stand-alone N recommendation system.)*

1. Register N-WATCH sites through Illinois CBMP (Leslie Forrest, leslief@ifca.com or 309-827-2774). She will need: contact name, cell phone, UPS shipping address, whether knifed or broadcast sites, and number of sites. Request templates (no charge) or extended probes (at cost) through Illinois CBMP as well.
2. Identify a 20 ft. x 20 ft. site after harvest of corn where samples will be collected. Collect 4 random cores from the designated area at a depth of 0-1 foot and place the cores in a labeled sample bag. No exceptions on depth. Must be 1 foot cores.
3. Collect a 2nd sample at 1 to 2 feet as described above using the same holes. Mark the probe with a permanent marker or a metal file when the first 1-2 foot core is removed. This can serve as a guide for the remaining core depths.

Note: *Some surface soil may fall into the hole prior to pulling the 1-2 foot sample. Observe the core as it is extracted from the soil. If you note loose, dry soil sitting on top of the 1-2 foot core, remove it with your fingers prior to placing the sample in the mixing bucket. Use good judgment.*

4. **Tracking plant-available N over time:** Mark the sample sites with a flag to easily identify the location. You will need to collect the next sample in the same way from the same location, moving a few inches away from the previous hole. Pull a set of samples (0-1 ft. and 1-2 ft.) periodically or following a significant rain event. Pull samples from the same area in the same way. **No reason to sample soils when dry and hard.**
5. Submit all samples with the provided shipping materials within 24 hours of collection. Refrigerate over weekend if pulled on a Friday and ship on Monday. Do not ship samples to the lab unless they will arrive and be processed prior to the weekend (ship no later than the last UPS pick-up on Thursday).
6. Complete the provided sample submittal forms **completely**. Any incomplete forms will delay the return of the N-WATCH report showing the test results. Forms will be provided with sampling and shipping materials sent when sites are registered. You can obtain additional supplies by contacting the Illinois CBMP through Leslie Forrest (leslief@ifca.com or 309-827-2774).
7. The cost of shipping and laboratory analyses (estimated at \$120/site) will be covered by Illinois CBMP.
8. Results will be e-mailed to originator usually within two business days after the lab receives samples.
9. Reports will be generated and e-mailed to originator within two business days of receiving sample results.



Tracking Plant-Available N (When N is knifed-in)

Purpose: A program sponsored by the Illinois Council for Best Management Practices (CBMP) to provide local growers an estimate of the location, form, and concentration of plant-available N remaining in the soil. Plant-available N at a point in a field and a point in time can be estimated utilizing this technique and provide information that may help minimize environmental impact by improving harvest yield and maximizing nitrogen utilization. (*This is not to be used as a stand-alone N recommendation system.*)

1. Contact the Illinois CBMP through Leslie Forrest (309-827-2774 or leslief@ifca.com) to register sites for the program. She will need: contact name, cell phone, UPS shipping address, whether knifed or broadcast sites, and number of sites.
2. Use a template (Image 1) to pull soil samples. Place the template perpendicular to the direction of N application if knifed or dribbled-in. Use only one set of holes to collect the sample. Combine all 11 cores in a bucket, thoroughly mix and fill a labeled soil sample bag. Pull samples to a 1 foot depth with a sampler specifically designed to pull 1 foot soil samples. No exceptions on depth. Must be 1 foot core. Make sure the 11 cores are thoroughly mixed before filling a soil sample bag with the subsample. **Please, no short cuts with the sampling protocol.** Request templates (no charge) or extended probes (at cost) through Illinois CBMP (Leslie Forrest, leslief@ifca.com or 309-827-2774).
3. Collect a 2nd sample at 1 to 2 feet as described above using the same holes. Mark the probe with a permanent marker or a metal file when the first 1-2 foot core is removed. This can serve as a guide for the remaining core depths.

Note: *Some surface soil may fall into the hole prior to pulling the 1-2 foot sample. Observe the core as it is extracted from the soil. If you note loose, dry soil sitting on top of the 1-2 foot core, remove it with your fingers prior to placing the sample in the mixing bucket. Use good judgment.*

4. **Tracking plant-available N over time:** Mark the sample site with a flag to easily identify the site's location. You will need to collect the next sample in the same way from the same location, moving the template a few inches. Pull a set of samples (0-1 ft. and 1-2 ft.) periodically or following a significant rain event. Pull samples from the same area in the same way. **No reason to sample soils when dry and hard.**
5. Submit all samples with the provided shipping materials within 24 hours of collection. Refrigerate over weekend if pulled on a Friday and ship on Monday. Do not ship samples to the lab unless they will arrive and be processed prior to the weekend (ship no later than the last UPS pick-up on Thursday).
6. Complete the provided sample submittal forms **completely**. Any incomplete forms will delay the return of the N-WATCH report showing the test results. Submittal forms will be provided with sampling and shipping materials sent when sites are registered. You can obtain additional supplies by contacting the Illinois CBMP through Leslie Forrest (leslief@ifca.com or 309-827-2774). Register **all** N-WATCH sites.
7. The cost of shipping and laboratory analyses (estimated at \$120/site) will be covered by Illinois CBMP.
8. Reports will be generated and e-mailed to site contact within two business days of receiving sample results.

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