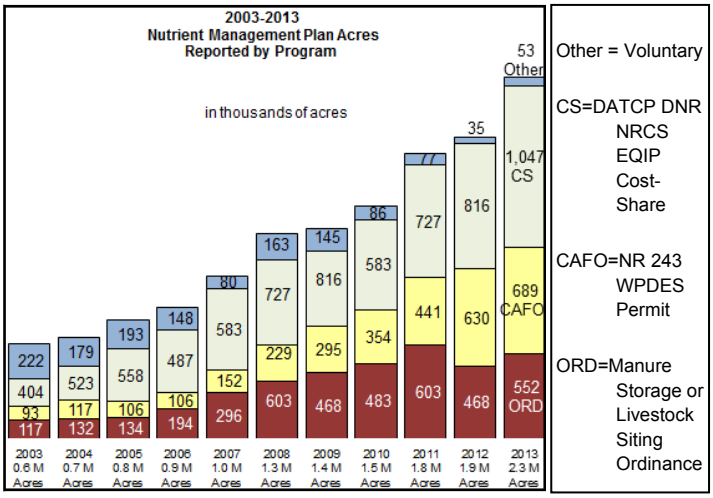
Wisconsin Nutrient Management Update

& Quality Assurance Team Review of 2013's Nutrient Management Plans

Prepared by the WI Department of Agriculture, Trade and Consumer Protection

November 2013

Nutrient management (NM) planning is one of the best practices farmers can use to reduce excess nutrient applications to their cropland and the water quality problems that result from nutrient runoff to lakes, streams and groundwater. The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) tracks farms that develop and update their 590 nutrient management (NM) plans when NM Plan Checklist forms are submitted to DATCP by farmers, agronomists, and public agency staff. In 2013, Wisconsin farmers made impressive strides toward implementing soil and water conservation through the development of **5,088 NM plans** on **2,341,382 acres**, covering 26.4% of Wisconsin's 9 million acres of cropland, a 20% increase from 2012.



Who Wrote 2013's Nutrient Management Plans?

1,241 farmers wrote their own plans on 350,131 acres, 92K (thousand) more acres than last year, a 36% increase in acres from 2012. In 2013, farmer-written plans accounted for 24% of all NMPs on 15% of Wisconsin's cropland acres.

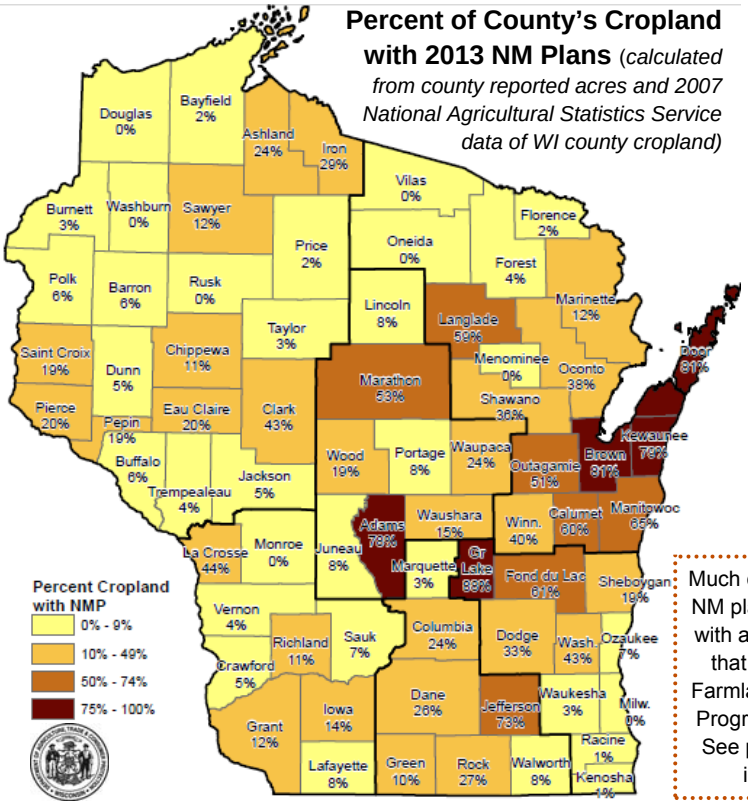
3,847 farmers hired 281 agronomists to assist them with nutrient management planning on 1,991,251 acres, 300K more acres than last year, an 18% increase in acres from 2012. In 2013, agronomists produced 76% of the total plans covering 85% of total acres.

Nutrient Management Reported by County

67 of 72 WI Counties Reported NM Plans in 2013

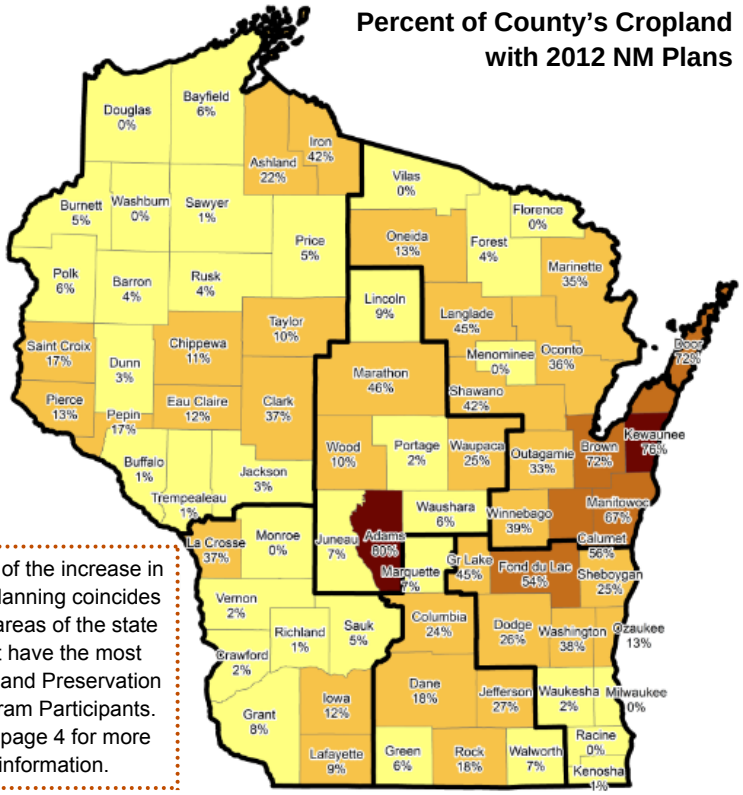
Most Acreage with NMPs	Over 50 % of cropland with NMPs
Fond du Lac (154K)	Adams
Marathon (153K)	Brown
Jefferson (126K)	Calumet
Brown (124K)	Door
Manitowoc (117K)	Fond du Lac
Clark (114K)	Green Lake
Dodge (105K)	Jefferson
Kewaunee (103K)	Kewaunee
Outagamie (98K)	Langlade
Dane (95K)	Manitowoc
Green Lake (83K)	Marathon
Calumet and Rock (75K)	Outagamie

Percent of County's Cropland with 2013 NM Plans (*calculated from county reported acres and 2007 National Agricultural Statistics Service data of WI county cropland)*



Much of the increase in NM planning coincides with areas of the state that have the most Farmland Preservation Program Participants. See page 4 for more information.

Percent of County's Cropland with 2012 NM Plans



2013 QAT Nutrient Management Plan Review Summary

Since 1995, the **Quality Assurance Team** (QAT) has conducted reviews of NM plans with the goal of improving planning and stewardship of our soil and water resources. The team is comprised of agency staff and private sector agronomists. *NM Plan Checklists,* one-page forms that represent each existing 590 plan, are submitted each spring to county conservation departments from agronomists and farmers. Plans were selected from this pool of *Checklists.* This year the QAT reviewed 50 plans covering 14,000 acres.

General Findings

Most Improved:

We found proper **soil testing** in 62% of the plans, a 20% improvement over 2012. Nutrient management plans must be based on soil tests performed by DATCP certified soil testing laboratories and must be tested every 4 years at a maximum of 5 acres per sample.

Most Problematic:

Every nutrient management plan needs to start with a map of the farm's field boundaries, field names, acres, and the soil map units. This year we found that 38% of the plans had **complete maps** and selected the proper soil map unit to plan the field, a 17% decline from 2012.

The maps help improve water quality protection when the planner addresses application restrictions like fall N restricted soils, conduits to groundwater like wells and sink holes, concentrated flow areas, slope to water, and distance to water for each field so seasonal manure applications can be planned to reduce runoff.

Nutrient Management Planning Maps available from:
www.manureadvisorysystem.wi.gov
Interactive maps help farmers identify vulnerable areas on their farm. They show 590 (and some 243) application restrictions related to slopes, soils, and surface waters. GIS users can download individual county layers at:
ftp://ftp.datcp.state.wi.us/GIS/COUNTY_590/.

Plan Review

Again this year we see many improvements over last year's plans!

In 2013, 92% of the plans reviewed were written with SnapPlus software. **SnapPlus** (Soil Nutrient Application Planner) is a nutrient management computer program that works with farmers to ensure that they properly credit legume sources of nitrogen and manure nutrients (N-P-K). The software aids with economically planning manure and fertilizer applications to cropland. SnapPlus2 reduces the risk of soil loss and water pollution by calculating fertilizer need by using:

[soil test crop need] - [nutrient credits from all manures and legumes]
= [the amount of fertilizer to apply]

Nitrogen applications complied with the 590 standard in 84% (42 of 50) of plans. A 5% increase from 2012.

Phosphorus applications complied with the 590 requirements in 78% (39 of 50) of plans. An 8% increase from 2012.

Calibrated manure application rates were used in 62% (31 of 50) of the plans. A 11% increase from 2012.

Surface water quality management areas adjacent to water followed 590 in 88% (44 of 50) of the plans. A 6% decline from 2012.

Winter applications followed 590 in 82% (41 of 50) of the plans. A 7% decline from 2012.

Nitrogen soil restrictions were properly planned & explained in 82% (41 of 50) of the plans, a 10% decline from 2012.

Applications near wells and other groundwater conduits followed 590 and were incorporated within 200 feet of these features in 68% (34 of 50) of the plans, a 6% decline from 2012.

Tolerable soil loss or "T" from sheet and rill soil erosion was controlled in 68% (34 of 50) of the plans with every field meeting tolerable soil loss (T), an 11% decline from 2012.

Concentrated flow channels were protected from gully erosion with perennial vegetation in 48% (24 of 50) of plans, about the same as last year.

Soil Testing Laboratories

Ask your DATCP certified soil lab to email your soil test results in SnapPlus format. Import the file into SnapPlus to save time and to reduce entry errors.

The UW Soils SnapPlus2 programmers are working to add a soil map unit column to the other soil sample information that can be imported into the software. When submitting your information about samples to any DATCP certified soil testing lab, be sure to use the soil map unit for the **dominant critical soil**.

UW Soil & Plant Analysis Laboratory
Verona, WI (608) 262-4364

UW Soil & Forage Lab
Marshfield, WI (715) 387-2523

A & L Great Lakes Laboratories, Inc.
Fort Wayne, IN (260) 483-4759

AgSource Cooperative Services
Bonduel, WI (715) 758-2178

Dairyland Laboratories
Arcadia, WI (608) 323-2123

Rock River Laboratory
Watertown, WI (920) 261-0446

Predominant vs. Dominant Critical Soil Types:

Use the soil map to select the **"Dominant Critical Soil"** or the steepest part of the field that covers 10% or more of the area. SnapPlus2 allows you to also select the "**predominant soil"** for determining the field's nutrient recommendation. This column automatically fills with the dominant critical soil type, but can be changed if the dominant critical soil is not the field's predominant agronomic soil type.

Soil Erosion Tip:

Soil conservation planning starts with protecting fields from gully erosion. Use SnapPlus' farm **narrative** in the **Farm Screen** to explain which fields have or will have waterways installed to control erosion. Show these areas on your maps so nutrients will not be applied in them.

Concentrated flow channel protection:
Field 2 will get a grassed waterway in the fall of 2013.

2013 QAT Members

Amy Haak—Agri Partners Coop	Andrew Craig—WI DNR	Veena Vaidyanath—UW Madison, Soil Science
Aimee Finley—Western Technical College	Gerald Breitsprecker—United Cooperative	Dirk Herr Hoyman—UW Madison, Soil Science
Perry Hickey—ADM Grain	John Easker—Jay-Mar, Inc.	Joe Wolter—UW Madison, Soil Science
Kevin Flyte—Dairyland Laboratories	Eric Blabaum—Premier Cooperative	Stephanie Schneider—DATCP, Eau Claire
Kim Meyer—UW NPM	Terence Kelly— NRCS, Madison	Mark Jenks—DATCP, Waukesha
Paul Kivlin—UW NPM	Laura Ward Good—UW Madison, Soil Science	Sue Porter—DATCP, Madison

Policy and Research Affecting Nutrient Management Planning

When and How ATCP 50 Changes Affect Nutrient Management Planning

We expect that ATCP 50 will become effective summer of 2014. At that time, farmers can be expected to implement the following practices if cost sharing is provided or if necessary because of a program, ordinance, or permit. Farmland Preservation Program participants will start complying with the new performance standards in 2016, at which time, county conservation staff will work with farmers to add these practices to those they are currently implementing, where required.

Phosphorus Index (PI)

Each field or pasture in the NM plan must implement the NR 151 performance standards requiring an average rotational PI of 6 or less and an annual PI of less than 12. An alternative method to the PI may be used if approved by DNR. Currently the soil test P assessment method is incorporated into Wisconsin's 590 NM Standard as an alternative to using the PI.

Pastures

ATCP 50 clarifies methods for implementing the PI on pastures. Whether the area is a feedlot or a pasture, it is informative to calculate the PI in SnapPlus2. SnapPlus2 assesses the pasture systems based on the vegetation present and the stocking rate during the winter or grazing season. Pastures stocked at a rate of 1 animal unit (AU) or less during the grazing season do not have to develop an NMP. Any pastures that receive mechanical applications of nutrients require soil tests and an NMP according to the 590 standard, as they always have. In lieu of soil testing pastures that do not receive mechanical applications of nutrients, an assumed soil test P of 150 PPM and organic matter of 6% can be used for pastures stocked with more than 1 animal unit per acre during the grazing season. Pastures that cannot comply with the PI and tolerable soil loss using these values should test the soil for accuracy. Pastures that are winter grazed will also need soil tests if they are not considered a feedlot. Feedlots must comply with applicable NR 151 requirements.

Tillage Setbacks from Streams

ATCP 50 clarifies methods for implementing the tillage setback to protect bank integrity of perennial streams, ponds, and lakes. The setback is 5 to 20 feet from surface water where tillage is prohibited and adequate vegetation must be maintained. All banks will have tillage setbacks starting at 5 feet.

A2809 Update

In the UWEX Publication A2809 *Nutrient application guidelines for field, vegetable, and fruit crops in Wisconsin* (2012) planners will notice some changes that are now incorporated into SnapPlus2. *A copy of A2809 can be downloaded for free from* http://learningstore.uwex.edu/Assets/pdfs/A2809.pdf .

Manure Nutrient & Dry Matter Changes

The "book values" for N, P_2O_5, K_2O, S, and dry matter content for manures in Wisconsin were modified to reflect the nutrient contents in manures tested in Wisconsin from 1998-2012. Planners using the default nutrient contents for manures will find:

- Dairy Solid manure (>20.0% dry matter (DM)) should be used for bedded pack manures. The "book value" DM content is 33% compared to 24% previously so soil loss could be noticeably reduced using the new Dairy Solid "book value".
- Dairy Semi-Solid (11.1—20.0 % DM) should be used for daily haul operations.
- The previous dairy liquid category is now broken into Dairy Slurry (4.1-11.0% DM) and Dairy Liquid (≤4.0% DM). The "book value" dry matter content for Dairy Slurry is 6%, while the "book value" for dairy liquid is 2% DM. Converting a SnapPlus1 databases to SnapPlus2 databases will convert old "book value" for liquid manure with 6% DM to the new name, Slurry.
- Nitrogen availability continues to be affected by time to incorporation. There are now three categories for incorporation: 1) injected or surface applied and incorporated within 1 hour of application; 2) surface applied and incorporated 1 to 72 hours after application; and 3) surface applied and incorporated more than 72 hours after application or never incorporated. The use of more categories for time to incorporation has changed first-year N availability. In some cases, first-year N availability will be greater than previously, in others it will be less.
- P_2O_5 is now credited as being 80% available in the year of application compared to 60% previously. Biosolids in SnapPlus2 are assumed to have the same P_2O_5 and K_2O % availability as manures.
- 2nd and 3rd year P_2O_5 and K_2O credits for manures are not supported by research and were therefore dropped. Soil testing is the best means to track these nutrients beyond the first year.

Soil Map Symbol (critical)	Soil Series Name (critical)	Soil Map Symbol (pre-lominant	Soil Series Name (pre-lominant	Field Slope (%)	Field Slope .ength (ft)	Below Field Slope to Water (%)	Distance to erennial Water (ft)	Re striction Features	T i l e d ?
BoD2	BOONE	CaA	CHAS...	14.0	150	Mo...	0 - ...	yes	☐
BeB2	BERTRAND	BeB2	BERT...	4.0	300	0 - 2	100...		☐
BoD2	BOONE	BoD2	BOONE	14.0	150	Mo...	100...	yes	☐
CuA	CURRAN	CuA	CURR...	1.5	200	0 - 2	100...		☑

Are your fields **Tiled** or Artificially Drained? SnapPlus2 has a new column on the **Field** screen called: **Tiled**? Checking this box indicates the field is artificially drained to get a crop and may increase the N recommendation for corn. Artificial drainage changes yield potential from medium to high for loamy soils that have no yield restriction other than drainage. All soils in the sandy soil group have a low yield potential unless irrigated. Organic soils have a high yield potential if the soil temperature regime is mesic, and has a medium corn yield potential if the soil temperature regime is frigid. More info in A2809.

N Recommendation Changes

Corn N recommendations are based on soil yield potential (high, medium, sandy). **All soils described as sandy (in general, sands, and loamy sands) have a low yield potential.** Soil yield potential interpretations (high or medium) for loamy, or finer textured soils, are based on: Soil drainage class; Available water in the upper 60"; and Depth to bedrock soil properties.

If at least one of these soil properties is limiting, then the yield potential is medium. If none are limiting, then the soil has a high yield potential. In some instances, growing degree days will limit soil yield potential to medium. Removing limitations to yield potential through irrigation and artificial drainage will change corn N rate guidelines. For a discussion of corn yield potential and corn N rate guidelines consult chapter 4 and 6 in UWEX Publication A2809. Wheat N rate guidelines have been updated using the Maximum Return to N (MRTN) philosophy.

2013 Nutrient Management Plans

What is a Nutrient Management (NM) Plan?

A NM plan is a crop practice record that is **annually reviewed**, and when necessary, updated. A NM plan follows Natural Resources Conservation Service's WI 590 Nutrient Management Standard and is prepared by a qualified planner, which may be the farmer or certified crop adviser. A NM plan **accounts for all N-P-K nutrients** applied, and planned to be applied, to each field over the crop rotation. Knowing where nutrients are needed and where they are not helps farmers allocate nutrients economically while also helping to ensure they are not over-applying nutrients, which could cause water quality impacts. If an item does not comply with the standard, planners should explain in the narrative when and how the problem will be resolved.

When can a NM Plan be Required?

Farms can be required to implement nutrient management with a $28/ac cost share offer or if:

1. Regulated by local manure storage or livestock siting ordinances, or by a DNR WPDES permit,
2. Participating in the Farmland Preservation Program,
3. Accepting manure storage cost share funds, or
4. Causing a discharge.

SnapPlus2 Makes NM Planning Easier

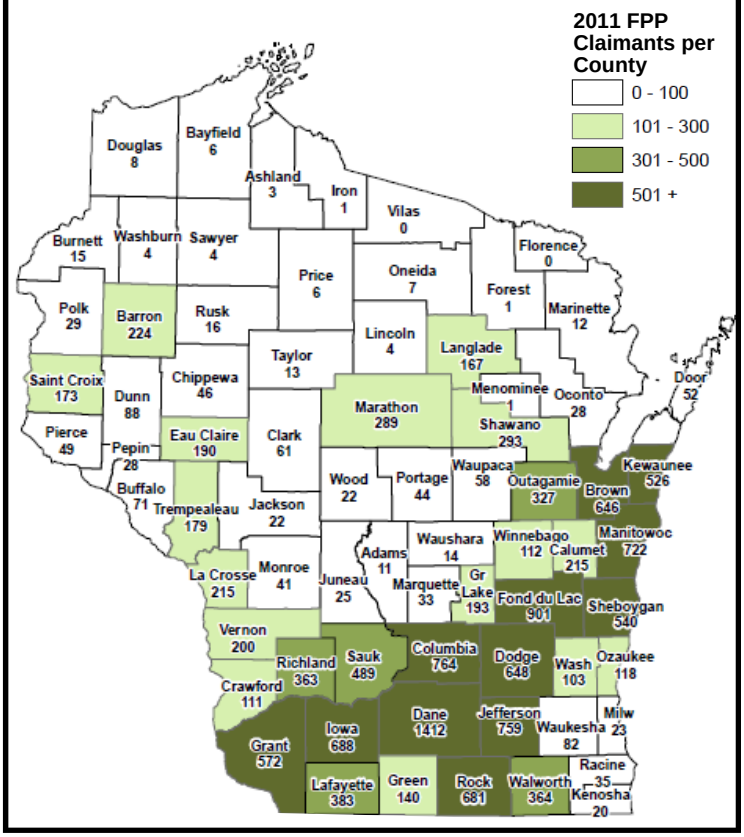
Visit http://www.snapplus.wisc.edu/ for SnapPlus2 downloads, training opportunities, and how-to videos. The new SnapPlus2:

- Puts all farm information into a single file and allows multiple farm files to be open at once
- Allows fields to be grouped by crop, soil, or unique features such as suitability for winter or summer manure applications
- Allows N need to be based on the predominant soil type in a field while soil erosion is still calculated from the dominant critical soil type
- Contains a daily manure application log that can be used to automatically update each fields manure application records
- Includes a more user-friendly grazing manure application rate calculator and more pasture crop options
- Updated UW nutrient recommendations and manure values are built in
- Shows if the field is over the P Index of 6 across the rotation or the P Index of 12 in a year on the Compliance Check Report
- Checking WPDES farm automatically turns on additional guidance, flags and calculations
- Most boxes and tables can be re-sized and sorted
- Vertical tillage options have been added
- Automatically adds Restriction features on the **Field** screen
    1. a Surface Water Quality Management Area nutrient application restriction feature when 0-300' to surface water is selected
    2. a winter spreading application restriction feature when soil map units are selected with more than 9% slope
    3. a fall N application restriction feature when those soil map units are selected for the field's soil

See the Help menu in Snap for a complete list of what's new.

Big NM Planning Increases Seen in Counties with High Farmland Preservation Program Participation

Much of the increase in nutrient management planning can be attributed to the requirement for landowners to implement conservation practices in exchange for claiming a $7.50 per acre per year income tax credit for all of their land in Farmland Preservation zoned areas. Almost 12,000 of the 15,000 total 2011 claimants had land in Farmland Preservation Zoned areas. Counties with more than 500 participants increased their NMP acreage by an average of 16,000 acres, with the largest increase of nearly 80,000 acres seen in Jefferson County. Collectively, the 12 darkest counties on the map have more than half of all 2011 claimants.



Implementation

When NM plans are updated annually, actual crop management practices replace what was planned. The future years are planned so the past, present, and future crop management decisions result in tolerable soil loss levels, economic optimum nutrient applications, and protected water quality. Our database shows almost 4,000 plans on 2 million acres since 1995 have had at least 3 plan updates. For the 2013 alone, 2,815 plans were updated at least 3 times on 1.6 million acres.

For More Nutrient Management Information and Forms:
http://datcp.wi.gov/Farms/Nutrient_Management/Planning/
or Sue Porter, DATCP at (608) 224-4605; sue.porter@wi.gov