WISCONSIN NUTRIENT MANAGEMENT REPORT 2001

Improving and maintaining water quality is the focus of Wisconsin's water quality programs. Implementing a nutrient management plan is a cost-effective means of reducing nutrient losses from cropland and controlling erosion. A nutrient management plan also stimulates adoption of related environmental practices and is an ideal stepping-stone to a systems approach for environmental management and improved water quality. Nutrient management plans balance nutrients available in manure, legumes, and commercial fertilizer with the field's soil test nutrient need. To implement nutrient management statewide, the Department of Agriculture, Trade and Consumer Protection (DATCP) has authority under Chapter 92.05 (3)(k) Wis. Stats., to promulgate rules for a nutrient management program that must include incentives, educational and outreach provisions, and compliance requirements. Wisconsin's future nutrient management program will be contained within the upcoming revision to ch. ATCP 50, Wis. Admin. Code for soil and water resource management.

The department's nutrient management program provides grants to the University of Wisconsin (UW), county land conservation departments, and the private sector. These grants may fund research, provide producer's cost-share, or promote nutrient management in other ways. The resulting nutrient management plans are based on the March 1999 United States Department of Agriculture - Natural Resources Conservation Service's 590 nutrient management standard which determines the crop's nutrient (N-P-K) needs through the University of Wisconsin Extension publication A-2809, *Soil Test Recommendations for Field, Vegetable and Fruit Crops* (copyright 1998). The 590 nutrient management standard requires:

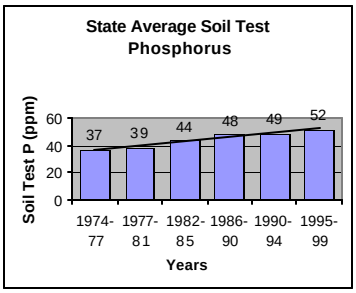
- Soil-testing following UW recommendations at least every four years.
- Applying manure or other organic byproducts to not more than 75 pounds of P_2O_5 per acre per year unless incorporate within 72 hours. If manure or other organic byproduct applications are incorporated, they can be applied following UW recommendations for the nitrogen need of the crop or document a reasonable agronomic need to exceed these nutrient applications.
- Do not apply manure or other organic byproducts in waterways; or on fields exceeding "T"; or on frozen slopes greater than 9%--except up to 12% with grassed waterways having contour strips or contour farming with all residue from corn-grain remaining on surface.
- Do not apply manure or other organic byproducts within 200 feet of streams, rivers, lakes, sinkholes, creviced bedrock, and wells--unless incorporated in 72 hours.

Statewide Nutrient Use Trends

Showing long-term water quality changes due to implementing nutrient management plans is difficult. However, we can establish general statewide trends in nutrient management planning and implementation in hopes of showing progress. This report discusses the state of Wisconsin's nutrient management program with summaries of certified soil testing laboratory samples, producer surveys, annual reporting of acres planned through conservation programs, commercial fertilizer sales, estimating crop uptake and manure production, and statewide trends in nitrate detection.

Prepared by Sue Porter Wisconsin DATCP, December 2001

Soil Testing and Phosphorus Levels



Since 1974, the University of Wisconsin has summarized USDA-Farm Service Agency (FSA) approved lab data from over 3 million samples. The University of Wisconsin provides quality control through periodic blind samples sent to each lab to standardize testing procedures and to ensure that instruments are functioning properly. Using the 650,000 soil samples tested in the last 4 years, we can determine that 72% (6.5 million acres) of Wisconsin's 9 million acres of cropland are being soil tested every 4 years. This totals about 18% (1.6 million acres) annually, assuming the average sample covers 10 acres. Using these assumptions, approximately 2.5 million acres of Wisconsin cropland is not being soil tested.

The average soil test phosphorus (P) level 25 years ago was 38 PPM, 50 PPM in 1990-1994, and 52 PPM in 1995-1999. However, since 1990, excess phosphorus applications have been reduced to where 26 of 72 counties had either no increase or showed decreases up to 7 PPM in soil test P. In most Wisconsin soils 8 pounds of phosphorus would need to be removed by the crop to lower soil test P levels by 1 PPM. The phosphorus needs for crops grown in Wisconsin are met through organic byproducts such as manure and applications of commercial fertilizers.

The following are Wisconsin's certified laboratories.

UW Soil & Plant Analysis Lab, 5711 Mineral Point Rd, Madison, WI 53705,

UW Soil & Forage Lab, 8396 Yellowstone Drive, Marshfield, WI 54449

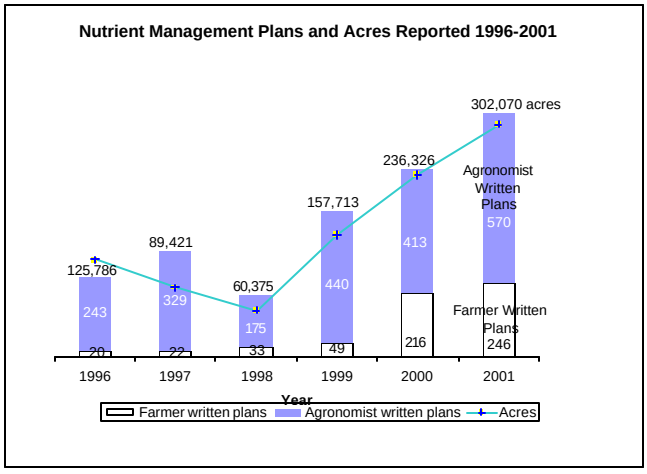
Rock River Laboratory, Route 3, N8741 River Rd, Watertown, WI 53904

Dairyland Laboratories, 217 E. Main Street, Arcadia, WI 54612

Agsource Soil &Forage Lab, 106 N. Cecil Street, Bonduel, WI 54107

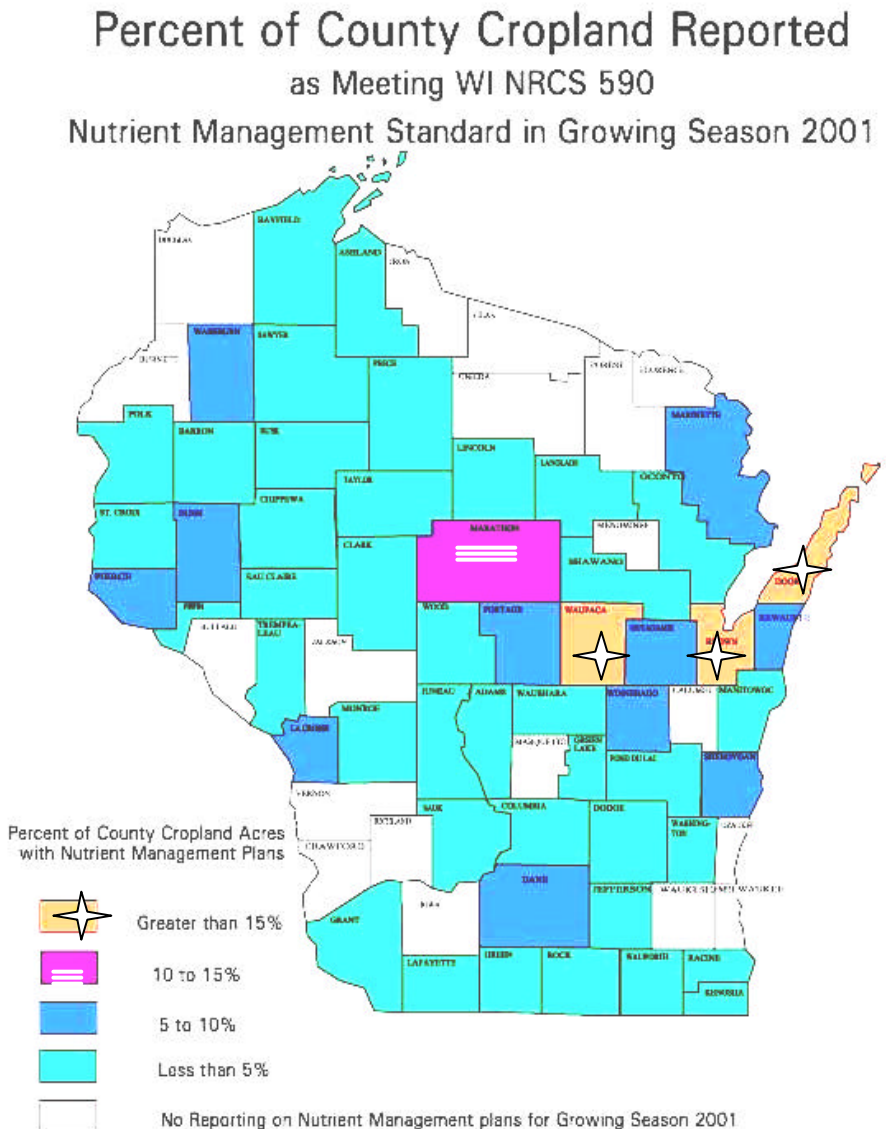
A&L Great Lakes Laboratories, 3505 Conestoga Dr., Fort Wayne, IN 46808

Acres of Plans and Planners



Since 1995, Wisconsin farms have developed and reported, mostly because of program requirements, over 3,000 nutrient management plans on approximately 1,000,000 acres. Plans are being developed at an increasing rate and the percentage of farmer developed plans has picked up dramatically in the last two years. DATCP tracks nutrient management (NM) acreage planned and the number of crop advisors developing plans through the NM Plan Checklists submitted by farmers, agronomists, and conservation staff for every plan written under county, state, or federal programs.

Farmers developed and reported, 246 plans on 64,932 acres for the 2001 growing season due to county, state, or federal programs. This is a 12% increase in planners and a 25% increase in their acres from 2000. As of October 2000, 689 individuals in Wisconsin hold certifications through the American Society of Agronomy or National Association of Independent Crop Consultants. This is an increase of 80 or (13%) from the 609 certified planners from 1999. We have come far since 1996 when 463 planners held certifications.



We found that Door (15,347 acres), Brown (33,821 acres), and Waupaca (20,958 acres) Counties have more than 15% of their acres reported with nutrient management plans. Marathon County reported 10% to 15% of their acreage (27,222 acres) as having nutrient management plans.

In 2001, 53 counties reported nutrient management planning on 302,070 acres. The acreage reported has increased by 22% from 2000's 236,326 acres. The number of counties reporting is also up from 38 counties in 2000, and 21 counties in 1998. The 2001 season involved 143 private agronomists developing plans on 237,138 acres. This is a 31% increase in planners and a 21% increase in their acres from 2000.

Updating conservation plans to current cropping systems has been a "bottleneck" slowing progress in nutrient management implementation. Today we are seeing more corn silage, more soybeans, and less alfalfa than there was just 10 years ago (WI Agricultural Statistics Service, 2000). Reduced crop residue means increased erosion and probably a needed update to the conservation plan in order to maintain tolerable soil loss. Currently 82% of the Wisconsin is at tolerable soil loss or less. The nutrient management plan needs to coordinate the conservation system, such as no-till, with the manure application techniques, such as surface application, to provide a total system that makes sense to the producer.

Producer Surveys

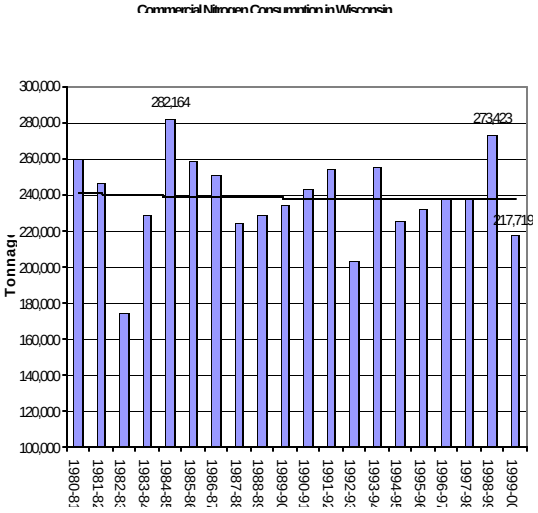
According to the University of Wisconsin - Madison's Program on Ag Technology Studies 1999 WI Farm Poll, 19% of the 1407 respondents currently have nutrient management plans. It is unknown if these plans comply with the 590 nutrient management standard.

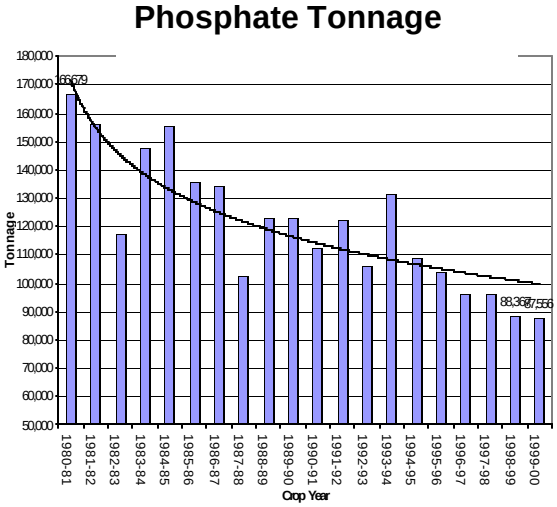
As part of the department's education and outreach strategy, the Quality Assurance Team, made of 20 conservation staff and private agronomists, review 15 nutrient management plans every year for adherence to the 590 nutrient management standard. This team promotes quality planning through constructive reviews of the season's plans and highlights strengths and weaknesses that may need adjusting to improve the quality of future plans.

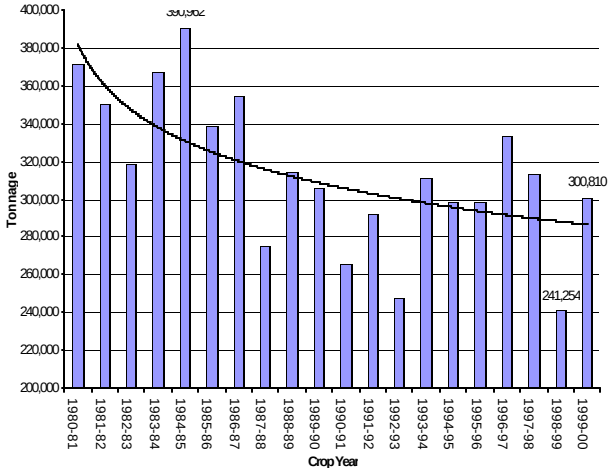
The producers are contacted to determine the level of implementation, planning service value, and how NM planning could be more widely implemented. We are consistently finding that 14 of the 15 farmers intend to update their plans. They say these plans are good record keeping tools and educational.

When we asked how to increase nutrient management planning this year's producers responded: **[**–Provide more education and awareness. 5 times**] [**–Cost share the first year to get people started and they will see the benefit and maintain the plan. 4 times**] [**–Need to push the economics and give examples of growers who have plans and have saved money. –Produce plans with less paper. 3 times each**] [**–Keep farmer training classes going.–Hold everyone to the same standard. –Provide more cost share funding.–Enforce against violators at the county level to get people to do things right.–Keep regulations reasonable. 2 times each**] [**–Make nutrient management mandatory.–Provide plan early in year.–Show that farmers are stewards of the land, their cows, and their community with these plans.–The threat of regulation will push this practice. Each mentioned once.**]**

Commercial Fertilizer Consumption in Wisconsin

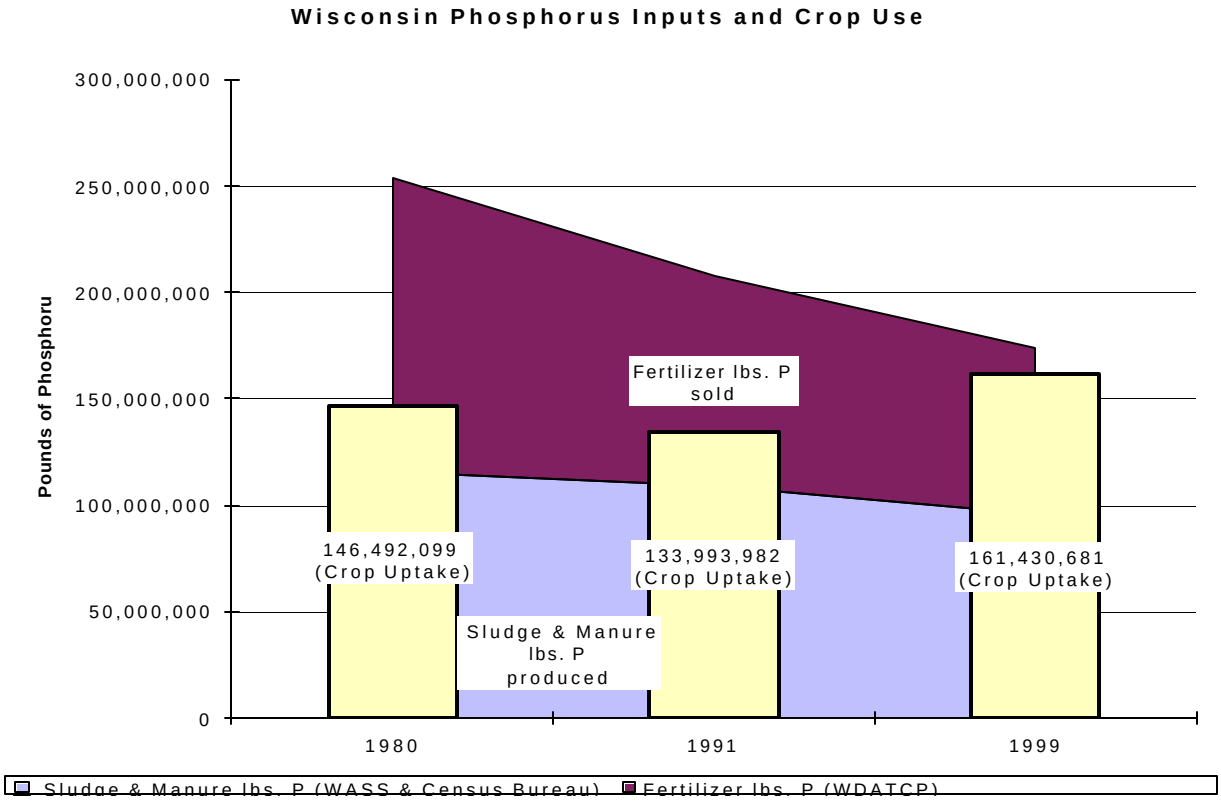






The fertilizer consumption graphs show trends in reduced consumption for phosphate and potash. While nitrogen consumption remains constant (DATCP, 2001).

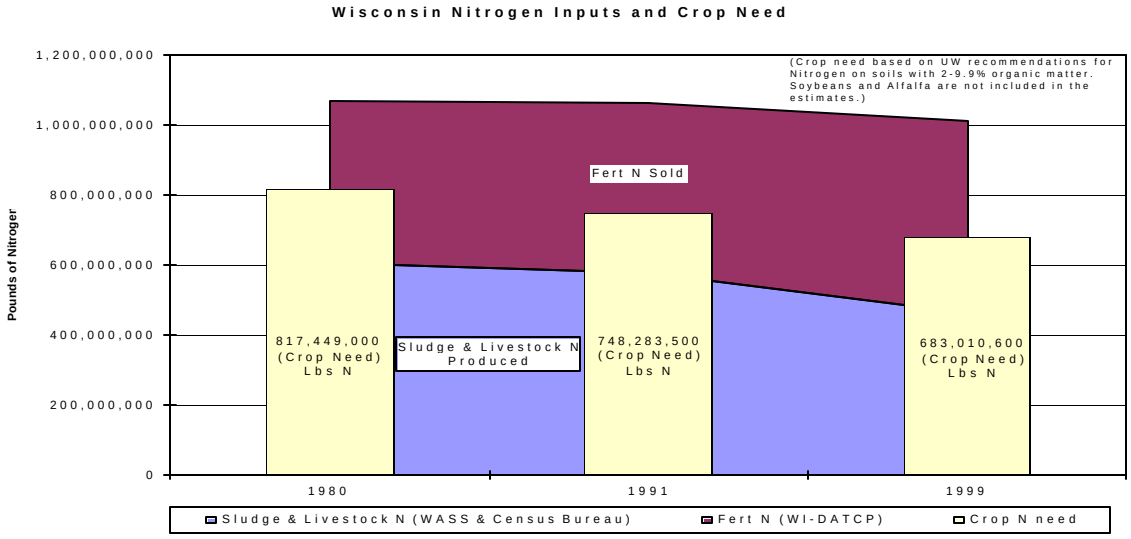
	Peak Year Consumption		1998-1999 Consumption		
Nitrogen N	1984-1985	282,164 tons	273,423 tons	or	547 million lbs. N
Phosphate P_2O_5	1980-1981	166,679 tons	88,367 tons	or	78 million lbs. P
Potash K_2O	1984-1985	390,962 tons	241,254 tons	or	400 million lbs. K



Phosphorus Inputs and Crop Use

Phosphorus manure production and phosphorus crop uptake are estimated for years 1980 and 1991 from "A Phosphorus Budget for Wisconsin Cropland" (Bundy 1998). Estimates for 1999 animal numbers and crop uptake for acres harvested are from Wisconsin Agricultural Statistics Service (WASS). The sludge estimates are generated from the Madison Metropolitan Sewage District and Wisconsin Census Bureau data for 1980, 1990, and 2000. Sewage sludge production from people is approximately 50 lbs. sludge per person per year and the phosphate and potash are assumed to be 90% available.

Phosphorus Inputs	**Ton/Yr/Animal**	**Lbs. of Nutrient/ Ton**			**Lbs. of Phosphorus in 1999**
	Manure Input	**N**	**P_2O_5**	**K_2O**	
Dairy Cows (1400 lb.)	21.9	4	3	8	
Other Cattle (1250 lb.)	13.7	4	5	8	
Hogs and Pigs (200 lb.)	2.4	5	3	7	
Poultry (Chicken and Turkey)	.038	15	14	9	
Total livestock and poultry manure P produced					96.1 million lbs.
Sludge	.025	4	2	1	
Total sludge P produced					.1 million lbs.
Phosphorus fertilizer sold					78 million lbs.
Phosphorus crop use					161 million lbs.
Excess phosphorus statewide					13.2 million lbs.



Nitrogen Inputs and Crop Need

The nitrogen (N) production from livestock is based on Livestock Waste Facilities Handbook, from Midwest Plan Service (1985) and animal numbers from WASS for 1980, 1991, and 1999. The sludge estimates are generated from the Madison Metropolitan Sewage District and Wisconsin Census Bureau data for 1980, 1990, and 2000. Crop nutrient needs are based on UW recommendations for nitrogen including 20 lbs. N as starter fertilizer per acre for corn, crops harvested on soils with 2-9.9% organic matter, and high/very high yield potential. Alfalfa and soybeans are not included in crop N need estimates.

Crop	**2 - 9.9% OM**	Crop	**2 - 9.9% OM**
	Lbs. N recommended		**Lbs. N recommended**
Alfalfa / red clover	0	Barley	50
Oats, grain	40	Potatoes	125
Corn for grain	160	Tobacco	120
Corn for silage	160	Sweet Corn	130
Soybeans	0	Green peas	30
Winter wheat	60	Snap beans	40

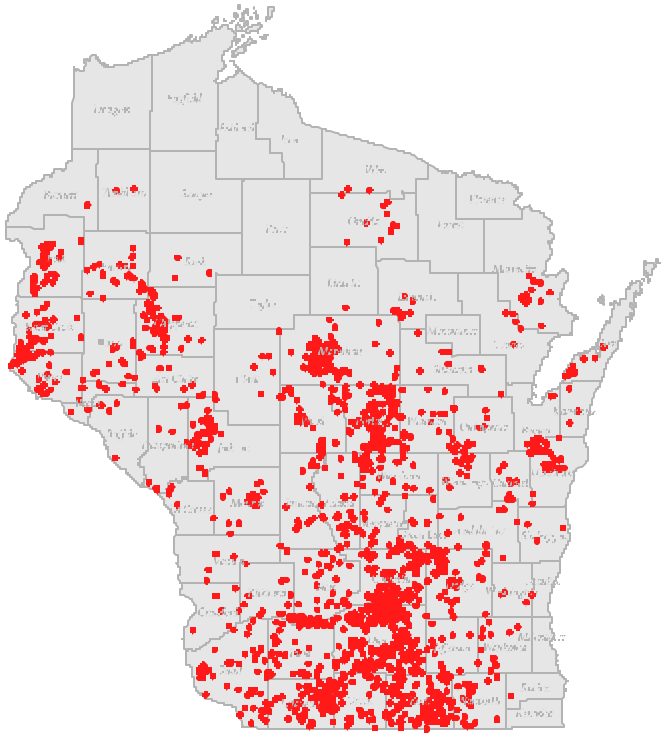
Nitrogen Inputs	**Ton/Yr/Animal**	**Lbs. of Nutrient/ Ton**			**Lbs. of Nitrogen in 1999**
	Manure Input	**N**	**P_2O_5**	**K_2O**	
Dairy Cows (1400 lb.)	21.9	4	3	8	
Other Cattle (1250 lb.)	13.7	4	5	8	
Hogs and Pigs (200 lb.)	2.4	5	3	7	
Poultry (Chicken and Turkey)	.038	15	14	9	
Total livestock and poultry manure N produced					465 million lbs.
Sludge	.025	4	2	1	
Total sludge N produced					.5 million lbs.
Nitrogen fertilizer sold					547 million lbs.
Nitrogen crop need					683 million lbs.
Excess nitrogen statewide					330 million lbs.

Groundwater Nitrate-Nitrogen Levels

In Wisconsin, About 10% to 15% of the private drinking wells exceed the enforcement standard and health advisory level of 10 PPM nitrate nitrogen. Nitrate-nitrogen levels have not changed significantly statewide since 1994, when the department began a series of statistically designed well sampling programs for agricultural nutrients and chemicals.

The nitrogen needs for crops grown in Wisconsin are met through organic byproducts such as manure, legume credits, and applications of commercial fertilizers. The primary factors for establishing the University of Wisconsin's nitrogen (N) recommendations are the soil's potential to yield and the soil's organic matter content. As N rates increase to the economic optimum, crop recovery of N decreases and the potential of nitrate loss to the environment increases (University of Wisconsin Publication A2809, *Soil test recommendations for field, vegetable, and fruit crops, copyright 1998*).

Nitrate detections > 10 ppm



PROPOSED NUTRIENT MANAGEMENT RULES

Landowners applying nutrients (N-P-K)

A nutrient management plan is required when a landowner is regulated under a county ordinance or a Wisconsin pollution discharge elimination system permit (WPDES) from Wisconsin's Department of Natural Resources (DNR). A nutrient management plan is also required when a landowner accepts government cost-share dollars for implementing this practice, installing manure storage facilities, or installing barnyard runoff control systems. Cost-sharing has been limited to 50% of the cost or about $3 per acre to develop a nutrient management plan. Within the upcoming revision to ch. ATCP 50 and NR 151, Wis. Admin. Codes, the minimum cost-share to require nutrient management on existing operations or cropping practices will be 70% of the cost or 90% in the case of "economic hardship." *s. 281.16, Stats.*

The proposed nutrient management performance standard in NR 151 requires the nutrient concentrations in soil and water to meet surface and groundwater standards through nutrient management plans. ATCP 50 clarifies how to implement the performance standards for nutrient management. Landowners applying nutrients must follow an annual NRCS 590 nutrient management plan that includes every field on which the landowner mechanically applies nutrients.

To determine how many producers are implementing nutrient management across Wisconsin, a person selling bulk fertilizer to a producer must record the name and address of the producer's nutrient management planner, if a plan exists. *Proposed s. ATCP 40.11*

Compliance timeframe

The nutrient management (NM) performance standard first applies to all <u>new operations one year</u> after the effective date of this rule. New operations include fields without a crop history from anytime in the last 10 years and changes to non-complying cropping practices at and after the effective date of NR 151. New operations also include newly constructed portions of the facility to accommodate a change in livestock, replaced manure storage liner, or a 20% increase in volume or capacity of the facility. New operations are not required to receive cost-sharing for compliance with the performance standard.

This performance standard later applies to <u>existing operations located within watersheds containing outstanding or exceptional resource waters, watersheds containing 303(d) listed waters, or source water protection areas on January 1, 2005.</u> <u>All other existing operations can not be required to comply until January 1, 2008</u>. Existing operations or practices, at and after the effective date of NR 151, are entitled to cost sharing if the practice or operation is out of compliance and they have not received cost-sharing to comply in the past. If cropland or livestock operations go out of compliance, the producer must come back into compliance and maintain compliance in perpetuity by all owners of that land, regardless of whether cost-sharing is available. *Proposed s. NR 151.09.*

Costs to implement nutrient management plans on 9 million acres of cropland

Time-frame	New acres needed each year	New acres needed per county per year (50 counties)	Yearly cost-share needs (4 years cost-share per acre, @ $7 per acre)
30 years	300,000 acres	6,000 new acres	$2.1 million/ year ($8.4 m 4 year cost)
15 years	600,000 acres	12,000 new acres	$4.2 million/ year (16.8 m 4 year cost)
10 years	900,000 acres	18,000 new acres	$6.3 million/ year (25.2 m 4 year cost)

Qualified planner

Anyone with the following knowledge and skills may demonstrate their qualifications by preparing a sound nutrient management plan. A qualified nutrient management planner must prepare the plan. *Proposed s. ATCP 50.48.* To be qualified the planner shall be knowledgeable and competent in the following. *Compliance with the NRCS technical guide nutrient management standard 590. Calculating nutrient needs on a field-by-field basis using UW recommendation publication A-2809. Soil testing. Crediting manure, residual legume nitrogen and other nutrient sources on a field-by-field basis. Using conservation plans. Understanding relevant laws related to nutrient management. Preparing nutrient management plans based on soil nutrient test conducted at a laboratory certified under this rule.*

Planners presumptively qualified to prepare nutrient management plans are those holding certifications as professional crop consultants by the *National Alliance of Independent Crop Consultants*, or are recognized as C*ertified Crop Advisors* by the American Society of Agronomy, or are registered as a *crop scientist*, *crop specialist*, *soil scientist*, *soil specialist* or *professional agronomist* in the *American Registry of Certified Professional in Agronomy, Crops and Soils*. A landowner may prepare their own plan--and be presumed qualified--after completing an approved training course with the instructor approving the first annual plan and updating their training at least once every 4 years to maintain their presumptive qualification.

DATCP may disqualify a nutrient management planner if the planner lacks knowledge and skills or does not comply with the 590 standard, UW recommendations, or using soil testing laboratories certified under this code. *Proposed s. ATCP 50.48*

Soil testing laboratories

A nutrient management plan shall be based on soil tests conducted at the University of Wisconsin or another soil testing laboratory certified by the department. Certified soil testing laboratories shall keep records of all soil tests conducted and all nutrient application recommendations made by the laboratory for at least 4 years. Laboratory certification may be denied if the lab fails to submit a complete application, perform soil tests with reasonable accuracy, comply with certification requirements, falsifies information. *Proposed s. ATCP 50.50*

If a certified laboratory recommends nutrient applications to a landowner that exceed the amounts required to achieve applicable crop fertility levels recommended by the University of Wisconsin Extension publication A-2809, *Soil Test Recommendations for Field, Vegetable and Fruit Crops* (copyright 1998), the laboratory shall make those recommendations in writing and shall disclose in the same document the landowner's name and address and the nutrient application amounts recommended by the University of Wisconsin for comparison.

A disclaimer stating: *"Our recommended nutrient applications exceed the amounts required to achieve applicable crop fertility levels recommended by the University of Wisconsin. The amounts required to achieve the UW's recommended crop fertility levels are shown for comparison. Excessive nutrient applications may increase your costs, and may cause surface water and groundwater pollution. If you apply nutrients at the rates we recommend, you will not comply with state soil and water conservation standards. You may contact your county land conservation committee for more information." Proposed s. ATCP 50.50(4).*