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Details:

(FORM UPDATED: 07/12/2010)

WISCONSIN STATE LEGISLATURE ...
PUBLIC HEARING - COMMITTEE RECORDS

2007-08

(session year)

Assembly

(Assembly, Senate or Joint)

Committee on ... Agriculture (AC-Ag)

COMMITTEE NOTICES ...

- Committee Reports ... **CR**
- Executive Sessions ... **ES**
- Public Hearings ... **PH**
- Record of Comm. Proceedings ... **RCP**

INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

- Appointments ... **Appt**
- Clearinghouse Rules ... **CRule**
- Hearing Records ... bills and resolutions
  (**ab** = Assembly Bill) (**ar** = Assembly Resolution) (**ajr** = Assembly Joint Resolution)
  (**sb** = Senate Bill) (**sr** = Senate Resolution) (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

State of Wisconsin
Jim Doyle, Governor

Department of Agriculture, Trade and Consumer Protection
Rod Nilsestuen, Secretary

DATE: January 29, 2007

TO: The Honorable Fred Risser
President, Wisconsin State Senate
Room 220, South, State Capitol
PO Box 7882
Madison WI 53707-7882

The Honorable Michael Huebsch
Speaker, Wisconsin State Assembly
Room 211 West, State Capitol
PO Box 8952
Madison WI 53708-8952

FROM: Rodney J. Nilsestuen, Secretary
Department of Agriculture, Trade and Consumer Protection

SUBJECT: **Agricultural Nutrient Management; Final Draft Rule**
(Clearinghouse Rule #05-013)

The Department of Agriculture, Trade and Consumer Protection is transmitting this rule for legislative committee review, as provided in s. 227.19(2) and (3), Stats. The department will publish notice of this referral in the Wisconsin Administrative Register, as provided in s. 227.19(2), Stats.

This final draft rule was unanimously approved by the Board of Agriculture, Trade and Consumer Protection on January 10, 2007 and has been endorsed by the Wisconsin Farm Bureau, the Wisconsin Pork Producers Association, the Wisconsin Cattlemen's Association, the Wisconsin Cranberry Growers Association, and the Wisconsin Potato and Vegetable Growers Association.

SUMMARY:

Background

The Department of Agriculture, Trade and Consumer Protection ("DATCP") currently administers nutrient management rules for farms. DATCP adopted the current rules in 2002, as part of a redesign of state nonpoint pollution abatement programs mandated by the Legislature.

Under *current* DATCP rules (ch. ATCP 50, Wis. Adm. Code), all farmers who apply manure or commercial fertilizer to cropland (not just livestock operators) must have a nutrient management plan. This requirement took effect on January 1, 2005 in certain watersheds, and will take effect on January 1, 2008 elsewhere. However, state law makes enforcement contingent on cost-sharing. Enforcement is therefore limited by the availability of cost-share funds.

Under *current* DATCP nutrient management rules, a nutrient management plan must comply with all of the following requirements:

- It must be prepared or approved by a qualified nutrient management planner. A farmer may prepare his or her own plan if the farmer has completed a DATCP-approved training course within the preceding 4 years, or is otherwise qualified under current rules.

- It must identify the lands on which the operator will apply manure and other nutrients.

- It must be based on soil tests that determine the nutrient needs of the affected cropland. A soil test laboratory, certified by DATCP, must conduct the soil tests.

- It may not call for nutrient applications in excess of amounts needed to achieve crop fertility levels recommended by the University of Wisconsin (there are limited exceptions).

- It must comply with nutrient management standards published by the Natural Resource Conservation Service of the United States Department of Agriculture ("NRCS"). The current rules incorporate a 1999 version of the NRCS standards based on nitrogen, not phosphorus.

NRCS updated its nutrient management standard in September 2005. Farmers must comply with the new federal standard in order to qualify for federal cost-share grants. The new federal standard is based on nitrogen *and phosphorus*. Phosphorus is a key component of manure, and an important crop nutrient. But when applied in excessive amounts, it poses a serious runoff and water pollution threat.

DATCP proposes to incorporate the updated federal standard in state nutrient management rules, for the following reasons:

- It will help prevent manure and phosphorus runoff, and improve water quality.
- It will help ensure that manure, an important crop nutrient, is applied in a cost-effective and environmentally sound manner.
- It will help limit long-term nutrient management costs.
- It will reduce fish kill and well contamination risks.
- It will maintain consistent state and federal standards. DATCP made a commitment, when it adopted nonpoint rules in 2002, to try to keep Wisconsin rules consistent with federal standards.
- It will not add significant costs for most farm operations. Most farmers who comply with current rules will be able to comply with the new rules at little additional cost.
- Farmers must follow essentially the same steps under the new standard as under the current standard (the new standard does not complicate procedures, and provides more flexibility).
- Enforcement will be contingent on cost-sharing, as under current rules.
- Farmers who comply can receive federal, as well as state, cost-share funds.

Rule Contents

This rule modifies current DATCP nutrient management rules as follows:

Updated Federal Standard

The current ATCP 50 Wis. Admin. Code incorporates an outdated version (March, 1999) of the NRCS nutrient management standard. This rule incorporates an updated NRCS standard (Sept. 2005), except that the rule does not incorporate certain portions of the new standard. A nutrient management plan (*if required*) must adhere to the following provisions in the new standard as incorporated in this rule (many, but not all, of these provisions *already apply* under the current standard):

- The nutrient management plan must consider all primary nutrients – nitrogen, phosphorus, and potassium. The older NRCS standard focused on nitrogen rather than phosphorus and potassium. Phosphorus is a key nonpoint pollutant, and has been applied in excessive amounts (as reflected in rising average soil-test phosphorus levels in Wisconsin). The new standard will limit excessive phosphorus applications.

- Nutrient applications may not exceed the amounts needed to achieve soil fertility levels recommended by the University of Wisconsin for crops in the farmer's rotation (there are some exceptions). Phosphorus and potassium needs are generally determined over a crop rotation, so that some buildup of these nutrients is permitted in anticipation of future crop needs during the rotation.

- The nutrient management plan must consider all nutrient sources, including existing nutrients in the soil, manure applications, fertilizer applications, and nitrogen from legumes. The plan must account for relevant limitations on nutrient applications -- for example, on frozen land, near water bodies, or on highly eroding fields (see below).

- Nutrient calculations must take into account the amount and timing of nutrient applications from all sources.

- Soil tests must be used to determine existing soil fertility levels (soil tests must be not more than 4 years old). Soil tests must be conducted at labs certified by DATCP (this rule updates certification standards).

- Nutrient management plans must be updated annually (to account for relevant changes in cropping patterns, land base, nutrient applications, soil test results, etc.). Each annual update must document and consider relevant cropping patterns and nutrient applications from the preceding year.

- Manure nutrient content may be determined by laboratory analysis or from standard "book values" specified in the NRCS standard. Labs performing manure analyses must meet requirements specified in the rule.

- Nutrients may not run off the field during application.

- Nutrients may not be spread in certain areas, including the following:

  - Fields eroding in excess of "T-value" levels (the standard specifies acceptable methods for calculating erosion rates).
  - Surface water areas, or areas of established concentrated flow.
  - Permanent non-harvested vegetative buffers or wetlands.
  - Areas within 50 feet of drinking water wells shall not receive mechanical application of manure.
  - Areas within 200 feet up-slope of direct conduits to groundwater (such as wells, sinkholes, fractured bedrock, tile inlets or mine openings), unless the nutrients are effectively incorporated within 72 hours.

- Nutrients may not be applied to frozen or snow-covered land within 1,000 feet of a navigable lake or within 300 feet of a navigable stream. This prohibition does not apply to manure deposited directly by grazing animals.

- Liquid manure may not be applied to frozen or snow-covered land at a rate of more than 7,000 gallons per acre.

- Manure may not be applied to frozen or snow-covered land at a rate that provides more phosphorus than will be used by crops in the next growing season.

- Manure may not be applied to frozen or snow-covered land that has a slope greater than 9% (12% if contour-cropped).

- Manure applications to frozen or snow-covered land must comply with supplementary local restrictions, if any, spelled out in an individual farm conservation plan agreed upon between the farmer and the county land conservation committee.

- Commercial fertilizer may not be applied to frozen or snow-covered land, except on pasture or surfaces planted in winter grains.

- At least one of the following practices must be used when applying nutrients to *unfrozen* surfaces within 1,000 feet of a navigable lake or within 300 feet of a navigable stream:

  - Install or maintain permanent vegetative buffers.
  - Maintain 30% crop residue or vegetative cover on the soil surface after application.

- Incorporate nutrients within 72 hours, leaving adequate residue so that erosion does not exceed "T-value."
- Establish cover crops promptly following application.

- Unincorporated liquid manure (less than 12% solids) applied to unfrozen soil within 1,000 feet of a navigable lake or 300 feet of a navigable stream is restricted in the following ways:

  - If the soil is saturated, applications are prohibited.
  - If the soil is not saturated, any single application may not exceed the following applicable rates (farmer may apply more after 7 days):

Soil Type	*Maximum Application Rate (Unincorporated Gallons Per Acre)*	
	% Residue on Soil Surface ≥ 30%	*% Residue on Soil Surface < 30%*
Fine texture soil (clay)	*5,000*	*3,000*
Medium texture soil (loam or silt)	*7,500*	*5,000*
Coarse texture soil (sand, peat or muck)	*10,000*	*7,000*

- In order to minimize nitrogen loss to groundwater in certain sensitive areas, most crop nitrogen must be applied to those areas *after* the crop is established in the spring. This applies to areas with coarse soils, areas with less than 20 inches to bedrock or 12 inches to water table, and areas within 1000 feet of a municipal well.

- In order to minimize phosphorus losses to surface water, a farmer must use one of the following strategies (*and* establish perennial vegetative cover where there are recurring gullies):

  - Maintain a phosphorus index, calculated according to the Wisconsin phosphorus index model, over a maximum crop rotation period of 8 years, at or below a level of 6. Stop phosphorus applications to fields that exceed that index level, unless UW recommendations call for additional phosphorus applications (based on soil tests and crop needs).

  - Regulate phosphorus applications based on soil tests. Forego or limit phosphorus applications as necessary, based on soil test levels and phosphorus removal by relevant crops over a maximum crop rotation period of 8 years (the standard specifies application limits based on soil test levels).

Excess Nutrient Applications

Under current DATCP rules, a nutrient management plan may not recommend nutrient applications that exceed the amounts needed to achieve fertility levels recommended by the university of Wisconsin for relevant crops. However the current rules allow certain exceptions. This rule clarifies the current exceptions. This rule, like the current rules, permits excess nutrient applications based on special agronomic conditions documented by the nutrient management planner.

Cost-Sharing and Initial Applicability Not Affected

This rule does *not* change the previously-established effective dates for DATCP nutrient management rules (2005 in some watersheds, and 2008 elsewhere), nor does it change current cost-sharing requirements (enforcement of nutrient management standards is normally contingent on cost-sharing). Those effective dates and cost-sharing provisions are required by state statutes and still apply under this rule.

Federal and Surrounding State Regulations

The federal government does not regulate nutrient management on farms except that, under the federal Clean Water Act, certain concentrated animal feeding operations are subject to federal regulation as water pollution "point sources." DNR regulates these operations by permit, under authority delegated from the United States Environmental Protection Agency (EPA).

NRCS has adopted nutrient management standards for farms that receive cost-share grants from NRCS. NRCS updated its nutrient management standard effective September 14, 2005. This rule incorporates the updated NRCS standard as a regulatory standard for Wisconsin, subject to cost-sharing.

Surrounding states regulate nutrient management in a variety of different ways. Most of the states regulate phosphorus, as well as nitrogen. A description of other state programs is found in the plain language *analysis* that accompanies this rule.

Public Hearings

DATCP and NRCS held joint public hearings on this rule and on the NRCS nutrient management standard that is incorporated in this rule. DATCP and NRCS held 12 public hearings. Hearings were held on the following dates, at the following locations:

- On March 17, 2005 in Richland Center, including an afternoon session (108 attendees) and an evening session (13 attendees).
- On March 22, 2005 in Manitowoc, including an afternoon session (118 attendees) and an evening session (68 attendees).

- On March 14, 2005 in Jefferson, including an afternoon session (92 attendees) and an evening session (25 attendees).
- On March 15, 2005 in Green Lake, including an afternoon session (60 attendees) and an evening session (21 attendees).
- On March 24, 2005 in Eau Claire, including an afternoon session (160 attendees) and an evening session (20 attendees).
- On March 23, 2005 in Wausau, including an afternoon session (89 attendees) and an evening session (10 attendees).

A total of 441 individuals provided hearing comments. Hearing testimony may be summarized as follows:

Summary of Hearing Testimony

Support	Support with changes	Oppose	Undecided	Information only	Total
76 (17%)	114 (26%)	95 (21%)	66 (15%)	90 (20%)	441

Rank	Major Comments and Suggested Changes	Number of Comments
1	P based 590 costs more in hauling, N, land, planning, storage.	73
2	Costshare funds are needed.	50
3	It is not the Amish way to accept money from farm programs. This will be too costly. We will consider using voluntary guidelines based on sound science and reason.	45
4	Do more research with Discovery Farms. Use N based 590 until we know more about P.	34
5	Allow manure spreading on frozen/snow covered ground.	28
5	Don't allow liquid/solid manure spreading on snow covered, frozen, thawing ground.	28
6	Balance P over 6-8 years instead of just 4 years.	25
7	Make nutrient management planning simple, practical, flexible, and producer-friendly.	24
8	Address emergency manure spreading.	20
8	Soil testing is too costly and should be done once every 4 years or once per rotation whichever is longer.	20
9	Additional county winter spreading restrictions must be based on science.	19
10	Don't like using UW recommendations in regulations.	16
11	Allow more nutrients with documented higher yields.	15

Changes from Hearing Draft

DATCP and NRCS made the following changes, among others, following the public hearings:

DATCP Changes

- Expanded exemption for farms that apply municipal and industrial waste according to DNR rules.

- Deleted, from the DATCP nutrient management rule, portions of the NRCS standard related to particulate air emissions *(section V.D)*, "additional criteria" to protect soil condition *(section V.E)*, and "discretionary considerations" *(Section VI)*.

- Deleted a pH test method that uses a carcinogenic chemical.

- Gave farmers the option of applying nutrients to maximum levels provided in 1998 UW recommendations (as under the current rules), or in subsequent editions of the UW recommendations, whichever the farmer prefers.

- Clarified that a farmer who follows a nutrient management plan prepared or approved by a qualified nutrient management planner, other than the farmer, is presumed to comply with the nutrient management standards under this rule. The planner is responsible for ensuring that the plan complies with rule standards.

- Clarified certification standards for soil testing laboratories. This rule clarifies the lab certification application form, and incorporates the application form as an appendix to this rule.

- Eliminates a map of DNR's "303(d) list of impaired waters" (the map was somewhat inaccurate, and was not a necessary part of the rule).

- Other changes to clarify the hearing draft rule.

NRCS Changes (incorporated in final NRCS standard adopted in September, 2005)

- Modified provisions related to manure applications to frozen or snow-covered land. Those applications must comply with supplementary local restrictions, if any, spelled out in an individual farm conservation plan agreed upon between the farmer and the county land conservation committee.

- Clarified provisions related to liquid manure applications near lakes and streams.

- Clarified provisions related to winter manure applications near lakes and streams. Exempted manure deposited by grazing animals.

- Allowed phosphorus calculations over a maximum 8-year, rather than 4-year, crop rotation. This change better reflects the length of a typical dairy rotation.

- Allowed tissue analysis as a way to determine nutrient recommendations for cranberries and other fruit crops.

- Clarified provisions related to crop yield goals.

- Clarified provisions related to irrigated nitrogen applications.

Response to Rules Clearinghouse Comments

The Legislative Council Rules Clearinghouse made minor editorial comments on the proposed rule. DATCP incorporated these suggestions in the final draft rule. DATCP will incorporate an agency contact name and address in future rules.

Fiscal Impact

This rule will not, by itself, have a significant fiscal impact on DATCP or local units of government. But enforcement of this rule is generally contingent on cost-sharing. DATCP estimates that approximately $25 million in *additional* cost-share funding would be needed each year in order to fully implement this rule within 10 years. A complete *Fiscal Estimate* is attached.

This rule will have the greatest impact on livestock operators, who may incur additional costs related to the disposal of manure (which provides more phosphorus than nitrogen, compared to crop needs). Current nutrient management rules apply to all farms, not just livestock operations. DATCP and the University of Wisconsin ("UW") have analyzed the cost to comply with the new standard. Findings are as follows (see *Business Impact Analysis* for more detail):

- Most dairy operations will be minimally affected.
- Swine operations, and beef operations with alfalfa rotations, will be affected to approximately the same degree as dairy operations.
- Crop farmers who do not use manure will not be significantly affected.
- Perennial fruit crop producers, like cranberry growers, will benefit because the new standard is more flexible.
- Some poultry operations will be significantly affected, but others will not. Most turkey and laying chicken operations will not be affected, because they are separately regulated by DNR. However, broiler chicken operations will be affected, and compliance costs may be significant. Broiler operations have not yet adopted, to any great degree, the more advanced

manure management techniques used in the turkey and laying chicken sectors. However, broiler operations are often combined with other livestock operations, and may have manure spreading options that could reduce costs.

The total estimated annual cost to comply with the proposed standard is show below:

Dairy (2.5 million animal units):	=	$ 1.7 million
Beef (400,000 animal units):	=	$ 1.7 million
Swine (210,000 animal units):	=	$ 0.3 million
Chickens (390,000 animal units):	=	$ 2.0 million
Ducks (33,000 animal units):	=	$ 0.3 million
Turkeys (47,000 animal units):	=	$ 0.4 million
Sheep/Goats (11,000 animal units):	=	$ 0.05 million
		$ 6.5 million

The total statewide cost of $6.5 million per year, divided by the total number of cropland acres in the state (about 9 million), yields an average cost of $0.72 per cropland acre per year. Some farms will have lower costs, and others will have higher costs. Most of the costs represent increased manure hauling costs. The cost for an individual livestock operation will depend on a number of factors, but the existing level of soil-test phosphorus is critical. If livestock producers prevent further increases in soil-test phosphorus levels, and reduce soil-test phosphorus levels in high-testing soils, costs will be lower over time.

The cost estimate of $6.5 million per year ($0.72 per acre) assumes full, voluntary statewide compliance with this nutrient management rule. Actual costs in the short term will be lower, because some farmers will not comply voluntarily and rule enforcement is contingent on cost-sharing (the current shortage of cost-share dollars effectively limits enforcement). However noncompliance will drive up soil-test phosphorus levels over time, and that will increase long-term compliance costs.

A UW study (summary attached) evaluated the likely impact of the new standard on the dairy industry. The study evaluated 33 representative dairy farms, including a range of herd sizes and geographic settings. The study concluded that the impact on dairy farms will be modest:

- Most (approximately 2/3) of Wisconsin dairy farms are self-sufficient in grain and forage production, and therefore have more-than-adequate cropland for manure spreading under the new phosphorus-based standard.

- On the 33 dairy farms studied:

  - Nitrogen applications comply with the new standard on 89% of corn acreage (the new nitrogen standard is essentially identical to the current standard).
  - Phosphorus applications generally comply with the new phosphorus standard.

- Farmers will need to modify winter manure applications on about 7% of their crop acres to comply with the new standard. The farmers were generally willing and able to make the necessary changes.

Due to cost-share funding limitations, implementation of the new standard (like the current standard) will be largely voluntary. Information and education programs will be expanded. Cost-sharing and enforcement will be mainly targeted at farms where runoff has caused fish kills or well contamination, or which are located in highly vulnerable areas. Current cost-share funding levels make it possible to target about 20,000 acres per year (less than 1% of Wisconsin's crop acreage).

There are some exceptions to the cost-sharing requirement. The following farms must comply with nutrient management requirements *regardless of cost-sharing*:

- Farms that hold pollution discharge permits from the Department of Natural Resources (about 140 livestock operations, mainly over 1,000 animal units). *See* ch. NR 243, Wis. Adm. Code.
- Farms that claim farmland preservation tax credits (about 12,000 farms). *See* ch. 91, Stats., and ATCP 50.54(2)(c)2., Wis. Adm. Code.
- Farms that hold local manure storage facility permits (about 150 livestock operations per year). *See* ATCP 50.54(2)(b), Wis. Adm. Code.
- Farms that require local livestock facility siting permits, under new Livestock Facility Siting Law (about 50-70 livestock operations per year, mainly over 500 animal units). *See* ch. ATCP 51, Wis. Adm. Code.

Business Impact

This rule may have a substantial impact on agricultural producers and other businesses. However, the rule will have a smaller impact than originally estimated (see discussion above). A revised *Business Impact Assessment* is attached.

Environmental Impact

This rule will protect the environment by preventing excess nutrient applications that can result in nonpoint source pollution of surface water and groundwater. Nonpoint source pollution from farms has a major impact on surface water and groundwater quality. This rule will also reduce the risk of an acute manure runoff event that could result in well contamination or a fish fill. A complete *Environmental Assessment* is attached.

DATCP Docket No. 04-R-05
Rules Clearinghouse No. 05-013

Proposed Final Draft
December 22, 2006

PROPOSED ORDER OF THE STATE OF WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION ADOPTING RULES

The Wisconsin department of agriculture, trade and consumer protection proposes the following order to repeal ATCP 50.04(3)(f)5. to 9. and (h)2.(note); to amend ATCP 50.04(3)(d), (e), (e)(note), (f)(intro.), (f)3., (f)(note) and (g), 50.12(2)(f)(note), 50.30(2)(a)(note), 50.48(2)(a)3., 50.50(title), (2)(intro.), (2)(b), (2)(c), (2)(d)2. and (f), 50.62(3)(d) and (note), 50.78(3)(a) and (note), and ATCP 50 Appendix G; to repeal and recreate ATCP 50.04(3)(f)4. and ATCP 50 Appendices A to D; and to create ATCP 50.04(3)(dm), (dm)1.(note)and (i), and 50.50(2)(note) and (8) and (notes); relating to nutrient management on farms and affecting small business.

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

The Wisconsin Department of Agriculture, Trade and Consumer Protection ("DATCP") currently administers nutrient management rules for farms. The rules are designed to minimize excessive nutrient applications that may cause nutrient runoff and water pollution.

This rule modifies DATCP's current nutrient management rules. This rule incorporates updated federal nutrient management standards, which are based on phosphorus as well as nitrogen. Phosphorus is a key nonpoint pollutant.

Statutory Authority

Statutory authority: ss. 93.07(1), 92.05(3)(k) and 281.16(3)(b), Stats.
Statutes interpreted: ss. 92.05(3)(k) and 281.16(3)(b), Stats.

DATCP has general authority to adopt rules interpreting statutes under its jurisdiction (see s. 93.07(1), Stats.). DATCP is specifically authorized to adopt farm conservation standards, including standards for nutrient management on farms (see ss. 92.05(3)(k) and 281.16(3)(b), Stats.).

Background

Under *current* DATCP rules (ch. ATCP 50, Wis. Adm. Code), all farmers who apply manure or commercial fertilizer to cropland (not just livestock operators) must have nutrient management plans. This requirement took effect on January 1, 2005 in certain watersheds, and takes effect on January 1, 2008 elsewhere. Under current state law, enforcement of nutrient management requirements is contingent on cost-sharing.

Under *current* DATCP nutrient management rules, a nutrient management plan must comply with all of the following requirements:

- It must be prepared or approved by a qualified nutrient management planner. A farmer may prepare his or her own plan if the farmer has completed a DATCP-approved training course within the preceding 4 years, or is otherwise qualified under current rules.
- It must identify the lands on which the operator will apply manure and other nutrients.
- It must be based on soil tests that determine the nutrient needs of the affected cropland. A soil test laboratory, certified by DATCP, must conduct the soil tests.
- It may not call for nutrient applications in excess of amounts needed to achieve crop fertility levels recommended by the university of Wisconsin (there are limited exceptions).
- It must comply with *NRCS nutrient management technical standard 590 (version dated March, 1999)*, published by the Natural Resource Conservation Service of the United States Department of Agriculture ("NRCS"). The NRCS standard specifies management practices to minimize excessive nutrient applications, and prevent pollution of surface water and groundwater.

Rule Contents

This rule modifies current DATCP nutrient management rules as follows:

Updated Federal Standard

Current DATCP rules incorporate an outdated version (March, 1999) of the NRCS nutrient management technical standard 590. This rule incorporates an updated NRCS standard (September, 2005), except that this rule does not incorporate certain portions of the new standard.

A nutrient management plan (*if required*) must adhere to the following provisions in the new standard (many, but not all, of these provisions *already apply* under the current standard):

- The nutrient management plan must consider all primary nutrients – nitrogen, phosphorus, and potassium. The older NRCS standard focused on nitrogen rather than phosphorus and potassium. Phosphorus is a key nonpoint source pollutant that many farmers have applied in excessive amounts (as reflected in rising average soil-test phosphorus levels in Wisconsin). Average soil test phosphorus levels now exceed 50 parts per million (which is excessive for most crops, according to university of Wisconsin recommendations). The new standard will limit excessive phosphorus applications.

- Nutrient applications may not exceed the amounts needed to achieve soil fertility levels recommended by the university of Wisconsin for crops in the farmer's rotation (there are some exceptions). Phosphorus and potassium needs are generally determined over a crop rotation, so that some buildup of these nutrients is permitted in anticipation of future crop needs during the rotation.

- The nutrient management plan must consider all nutrient sources, including existing nutrients in the soil, manure applications, fertilizer applications, and nitrogen from legumes. The plan must account for relevant limitations on nutrient applications -- for example, on frozen land, near water bodies, or on highly eroding fields (see below).

- Nutrient calculations must take into account the amount and timing of nutrient applications from all sources.

- Soil tests must be used to determine existing soil fertility levels (soil tests must be not more than 4 years old).

- Nutrient management plans must be updated annually (to account for relevant changes in cropping patterns, land base, nutrient applications, soil test results, etc.). Each annual update must document and consider relevant cropping patterns and nutrient applications from the preceding year.

- Manure nutrient content may be determined by laboratory analysis or from standard "book values" (see below).

- Nutrients may not run off the field during application.

- Nutrients may not be spread in certain areas, including the following:

    - Fields eroding in excess of "T-value" levels (the standard specifies acceptable methods for calculating erosion rates).
    - Surface water areas, or areas of established concentrated flow.
    - Permanent non-harvested vegetative buffers or wetlands.
    - Areas within 50 feet of drinking water wells (applies only to mechanical applications of manure).

- Areas within 200 feet up-slope of direct conduits to groundwater (such as wells, sinkholes, fractured bedrock, tile inlets or mine openings), unless the nutrients are effectively incorporated within 72 hours.

- Nutrients may not be mechanically applied to frozen or snow-covered land within 1,000 feet of a navigable lake or within 300 feet of a navigable stream. This prohibition does not apply to manure deposited by grazing animals, provided that applications do not exceed standards for nitrogen or phosphorus.

- Liquid manure may not be applied to frozen or snow-covered land at a rate of more than 7,000 gallons per acre.

- Manure may not be applied to frozen or snow-covered land at a rate that provides more phosphorus than will be used by crops in the next growing season.

- Manure may not be applied to frozen or snow-covered land that has a slope greater than 9% (12% if contour-cropped).

- Manure applications to frozen or snow-covered land must comply with supplementary local restrictions, if any, spelled out in an individual farm conservation plan agreed upon between the farmer and the county land conservation committee.

- Commercial fertilizer may not be applied to frozen or snow-covered land, except on pasture or surfaces planted in winter grains.

- A farmer must use at least one of the following practices when applying nutrients to *unfrozen* surfaces within 1,000 feet of a navigable lake or within 300 feet of a navigable stream:

  - Install or maintain permanent vegetative buffers.
  - Maintain 30% crop residue or vegetative cover on the soil surface after application.
  - Incorporate nutrients within 72 hours, leaving adequate residue so that erosion does not exceed "T-value."
  - Establish cover crops promptly following application.

- Unincorporated liquid manure (less than 12% solids) may not be applied to *unfrozen* soil, within 1,000 feet of a navigable lake or 300 feet of a navigable stream, if the soil is saturated.

- Unincorporated liquid manure (less than 12% solids) may not be applied to *unfrozen* soil, within 1,000 feet of a navigable lake or 300 feet of a navigable stream, in excess of the following applicable rates *in any single application* (farmer may apply more after 7 days):

Soil Type	Maximum Application Rate (Unincorporated Gallons Per Acre)	
	% Residue on Soil Surface ≥ 30%	% Residue on Soil Surface < 30%
Fine texture soil (clay)	5,000	3,000
Medium texture soil (loam or silt)	7,500	5,000
Coarse texture soil (sand, peat or muck)	10,000	7,000

- In order to minimize nitrogen loss to groundwater in certain sensitive areas, most crop nitrogen must be applied to those sensitive areas *after* the crop is established in the spring. Sensitive areas include areas with coarse soils, areas with less than 20 inches to bedrock or 12 inches to water table, and areas within 1,000 ft. of a municipal well (these areas are more specifically described in the Wisconsin technical note that accompanies the federal standard).

- In order to minimize phosphorus losses to surface water, a farmer must establish perennial vegetative cover in recurring gullies and, when applying manure during the crop rotation, must use one of the following strategies:

  - Maintain a phosphorus index, calculated according to the Wisconsin phosphorus index model over a maximum crop rotation period of 8 years, at or below a level of 6. A farmer must avoid phosphorus applications to fields that exceed that index level, unless UW recommendations call for additional phosphorus applications (based on soil tests and crop needs).

  - Regulate phosphorus applications based on soil tests. A farmer must limit phosphorus applications as necessary, based on soil test levels and phosphorus removal by relevant crops over a maximum crop rotation period of 8 years (the standard specifies application limits based on soil test levels).

Manure Nutrient Values

Under this rule, manure nutrient values used in a nutrient management plan must be based on one of the following:

- Standard "book values" specified in *Wisconsin conservation planning technical note WI-1(December, 2006)*, a companion document to the *NRCS technical guide nutrient management standard 590.*

- Manure analyses conducted at a laboratory that meets the following standards:

  - The laboratory participates in the manure analysis proficiency program offered by the Minnesota department of agriculture or the university of Wisconsin, and provides copies of proficiency reports to DATCP upon request.

- The laboratory can perform manure analyses according to methods prescribed by the university of Wisconsin-extension in *"Recommended Methods of Manure Analysis," UWEX Publication A3769 (2003).*
- The laboratory can estimate "total" and "available" nutrient levels based on the manure tests ("available" nutrients are in a form that plants can use).

Excess Nutrient Applications

Under current DATCP rules, a nutrient management plan may not recommend nutrient applications that exceed the amounts needed to achieve fertility levels recommended by the university of Wisconsin for relevant crops. However the current rules allow certain exceptions if the planner can justify the recommended application.

One current exception allows for higher soil nutrient values caused by manure applications in prior years. This rule limits that exception, so that it only applies to manure applications in the year immediately preceding implementation of the nutrient management plan.

Current rules also permit excess nutrient applications for the following reasons:

- The farmer applies only organic nutrients (such as manure).
- Excess nutrients from organic nutrient applications will be used later in the planned crop rotation.
- Corn after corn is conservation tilled with greater than 50% residue after planting.
- Starter fertilizer is properly applied to row crops.
- The crop is irrigated.

This rule eliminates these exceptions, because these conditions are more precisely addressed in the (updated) NRCS technical guide nutrient management standard 590 (incorporated in this rule). This rule, like the current rules, permits excess nutrient applications based on special agronomic conditions documented by the nutrient management planner.

Qualified Nutrient Management Planner

Under current rules, a qualified nutrient management planner must prepare a nutrient management plan. Under this rule, a farmer is presumed to comply with nutrient management standards if the farmer follows a nutrient management plan prepared or approved by a qualified nutrient management planner other than the farmer (the planner is responsible for ensuring that the plan complies with nutrient management standards).

Current rules identify a number of ways by which a planner may be qualified. One way is to be registered as a "crop scientist, crop specialist, soil scientist, soil specialist or professional agronomist in the American registry of certified professionals in agronomy, crops and soils." This rule re-formulates this particular qualification option.

Under this rule, a person may no longer qualify by being on the American registry of certified professionals in agronomy, crops and soils. But a person may qualify by being registered as "a soil scientist by the soil science society of America, or as a professional agronomist by the American society of agronomy." This reflects a change in registration practices by the relevant professional societies.

Cost-Sharing and Initial Applicability Not Affected

This rule does *not* change the previously-established effective dates for DATCP nutrient management rules (2005 or 2008 for most croplands), nor does it change current cost-sharing requirements (enforcement of nutrient management standards is normally contingent on cost-sharing). Those effective dates and cost-sharing requirements still apply.

Under current law, some livestock operators must comply with nutrient management requirements regardless of cost-sharing. They include:

- Operators who need a "point source" pollution discharge permit (WPDES permit) from the Department of Natural Resources (DNR) under NR 243 (mainly operations over 1,000 "animal units").

- Operators who claim farmland preservation tax credits.

- Operators who need a permit, under a local manure storage ordinance, for a voluntarily constructed manure storage facility (see current ATCP 50.54(2)(b)).

- Operators who need a local permit for a new or expanded livestock facility with 500 or more "animal units," according to DATCP's livestock facility siting rule (not this rule).

Expanded Exemption for Municipal and Industrial Waste

Under *current* DATCP rules, a farmer is not required to have a nutrient management plan in any growing season if, during that growing season, the farmer *only* applies septage, municipal sludge, industrial waste or industrial by-products according to DNR rules. This rule expands the current exemption. Under this rule, a farmer is exempt from the nutrient management plan requirement under DATCP rules if the farmer *primarily* applies septage, municipal sludge, industrial waste or industrial by-products according to DNR rules.

Standards Incorporated by Reference

DATCP has incorporated the updated *NRCS technical guide nutrient management standard 590 (September, 2005)* as Appendix D to this rule. This rule incorporates the entire reprinted standard *except for the following sections:*

- Section V.D., related to additional criteria to minimize nitrogen *air emissions* and particulate *air emissions*.

- Section V.E., related to additional criteria to protect the physical, chemical and biological condition of the soil.
- Section VI, related to discretionary considerations.

This NRCS standard was published in September, 2005. Copies are available at the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*

Pursuant to s. 227.21, Stats., DATCP will request permission from the attorney general and revisor of statutes to incorporate the following standards by reference in this rule, without reproducing the standards in full in this rule. Copies of these documents will be on file with DATCP and the revisor of statutes, and are available at the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*

- *Wisconsin conservation planning technical note WI-1 (December, 2006).* This is a companion document to the *NRCS technical guide nutrient management standard 590.*

- *Recommended methods of manure analysis, UWEX publication A3769 (2003).*

- *Soil test recommendations for field, fruit and vegetable crops, UWEX publication A-2809 (1998).* A convenient summary of this publication (not the full publication) is included as *Appendix B* to this rule ("Nutrient Management Fast Facts").

- *Nutrient Application Guidelines for Field, Vegetable, and Fruit Crops in Wisconsin UWEX publication A-2809 (2006).*

- *Wisconsin Procedures for Soil Testing, Plant Analysis and Feed and Forage Analysis, Department of Soil Science, University of Wisconsin-Madison (December, 2006).*

Fiscal Impact

This rule will not have a major fiscal impact on DATCP or local units of government. This rule updates nutrient management standards for Wisconsin farms. But it does not mandate additional nutrient management plans. Nor does it mandate additional state or local review of nutrient management plans (beyond what already exists).

County conservation staff currently monitor nutrient management plans as necessary, on farms that are required to have those plans. This rule will change applicable standards for nutrient management plans, but will not increase the number of nutrient management plans required.

DATCP and county land conservation staff will need to become familiar with the new standards. Staff will need to provide information and education about the new standards, and respond to questions from farmers and others. DATCP will undertake these new responsibilities with existing staff. DATCP estimates that counties will also be able to implement the revised standards with existing staff. A complete fiscal estimate is attached.

Business Impact

General

This rule may have a significant impact on farm operators and other businesses in this state. Many of the affected operations are "small businesses." Because this rule may have a significant economic impact on small businesses, it is subject to the delayed small business effective date provision in s. 227.22(2)(e), Stats. (delays rule application to small businesses by 2 months, compared to effective date for other businesses). A complete business impact analysis, including a small business analysis ("initial regulatory flexibility analysis") is attached.

Under 2003 Wis. Act 145, DATCP and other agencies must adopt rules spelling out their rule enforcement policy for small businesses. DATCP has not incorporated a small business enforcement policy in this rule, but has adopted a separate rule on that subject.

Under current state statutes, including s. 281.16(3)(e), Stats., enforcement of nutrient management rules is contingent on cost-sharing (there are limited exceptions). This rule does not change the current cost-sharing requirement.

Affected Farmers

This rule, if enforced, may increase costs for some farmers. But enforcement of this rule is subject to statutory cost-sharing requirements. Actual enforcement will therefore depend on the availability of cost-share funds, which are currently quite limited.

This rule will generally have more impact on livestock farmers than other farmers. Some livestock farmers will be significantly affected, but others will not. Many farmers will actually save money by complying with this rule.

The primary impact of this rule relates to phosphorus management, and its effect on manure applications. Manure generally provides more phosphorus than nitrogen compared to crop needs for those nutrients. So farmers who apply manure based solely on nitrogen needs may end up applying too much phosphorus. Some livestock operators may need more acreage for manure disposal, to avoid excessive phosphorus applications.

Costs will vary widely by livestock species (poultry manure, for example, is especially high in phosphorus). Costs will also vary by size of livestock operation, geographic location, cropping patterns, availability of acreage for manure disposal, and (importantly) current soil-test phosphorus levels.

Livestock operations affected by this rule include dairy cattle, beef, hog, sheep, goat and poultry operations. Those operations collectively account for approximately 3.5 million equivalent "animal units" in the state (for example, a dairy cow equals 1.4 "animal units" while a chicken equals 0.01 "animal unit" based on their respective size and manure production). Dairy cattle represent about 2.5 million of the 3.5 million "animal units" in the state.

Dairy Farms

Relatively few dairy farms will have to change current practices to comply with this rule. Most (approximately 2/3) of Wisconsin's dairy farms are self-sufficient in grain and forage production, and therefore have ample cropland area for manure spreading. Legume forage production helps meet crop demands for nitrogen, and liquid dairy manure has a relatively high ratio of nitrogen to phosphorus. Those factors make it less likely that manure applications to meet nitrogen needs will result in excessive phosphorus applications. A recent University of Wisconsin study of 33 representative dairy farms shows that most dairy farmers already comply with the standards in this rule.

This rule will affect winter spreading of manure, especially in water quality management areas (within 300 feet of a perennial stream or within 1,000 feet of a lake). However, winter applications currently affect a relatively small share of dairy farm acreage, and the vast majority of winter applications are made outside water quality management areas. UW survey results indicate that many farmers who winter-spread manure in water quality management areas are willing (and able) to change their manure application practices to comply with this rule.

Other Livestock Operations

DATCP estimated nutrient management compliance costs under this rule, compared to current rules, for a wide variety of livestock operations. DATCP simulated compliance costs for 80 hypothetical livestock operations representing 8 different livestock types (dairy, beef, swine, chickens, ducks, turkeys, and sheep and goats), 5 different soil types (representing soils in Chippewa, Adams, Outagamie, Jefferson and Lafayette counties), and 2 different soil-test phosphorus levels (52 ppm and 105 ppm). DATCP used typical nutrient values for the manure of each livestock species, common crop rotations, and various tillage options used on Wisconsin farms. Simulation scenarios, analyses and results are shown at the following website: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp*

About 63% of Wisconsin farm acreage tests below 50 ppm phosphorus (the median state soil test for phosphorus is 38 ppm and the average is 50 ppm). DATCP therefore assumes that about 63% of Wisconsin livestock operations have soil-test phosphorus below 50 ppm. According to DATCP's analysis, those operations will incur no added cost to comply with the proposed phosphorus-based standard compared to the current nitrogen-based standard.

About 26% of all livestock operations have soil-test phosphorus between 50 ppm and 100 ppm. With the exception of dairy operations, nearly all of those operations will need to reduce phosphorus applications per acre to comply with the new standard. Most dairy operations will be unaffected, for reasons discussed above. Other operations will experience added costs per "animal unit" (for manure hauling, added land spreading area, substituting nitrogen fertilizer for manure, etc.) ranging from $0 for dairy to $26 for poultry.

About 11% of Wisconsin livestock operations have soil-test phosphorus over 100 ppm. Essentially *all* of those operations (*including* dairy operations) will need to reduce phosphorus applications per acre in order to comply with the new phosphorus standard. That will add costs per "animal unit" (for manure hauling, added land spreading area, nitrogen fertilizer rather than manure, etc.) ranging from $5 for dairy to $38 for poultry.

The total estimated annual cost to comply with the proposed standard is show below:

Dairy (2.5 million animal units):	=	$ 1.7 million
Beef (400,000 animal units):	=	$ 1.7 million
Swine (210,000 animal units):	=	$ 0.3 million
Chickens (390,000 animal units):	=	$ 2.0 million
Ducks (33,000 animal units):	=	$ 0.3 million
Turkeys (47,000 animal units):	=	$ 0.4 million
Sheep/Goats (11,000 animal units):	=	$ 0.05 million
		$ 6.5 million

This cost estimate represents the most restrictive, high-cost scenario. It includes costs to meet *both* the soil-test phosphorus management standard *and* the phosphorus index standard, when in fact farms are required to comply with *only one* of these 2 alternative standards.

The cost estimate assumes that soil-test phosphorus values will *not* continue to rise as they have been doing steadily for the last 40 years. If farmers allow their soil-test phosphorus levels to rise above 100 ppm, subsequent costs to comply with the nutrient management standard will be much higher.

Hearing comments suggested that DATCP's estimates of manure hauling costs were too low, and that DATCP had failed to consider costs of substituting nitrogen fertilizer for manure (substitution will be necessary in some cases to prevent excessive phosphorus application from manure). On the other hand, the DATCP simulations also ignored potential *cost-savings* related to:

- Manure processing and sale as commercial fertilizer (an option widely used in the poultry industry).

- Use of the phosphorus index standard, rather than the soil-test phosphorus standard (farmers may opt to use the phosphorus index standard, which is less likely to limit phosphorus applications).

DATCP believes that any underestimated costs are offset by underestimated savings, so that the cost estimates are on balance reasonably accurate. DATCP prepared nutrient management plans for a number of actual farms, and its cost analyses for those farms are consistent with its overall estimates.

The total statewide cost of $6.5 million per year, divided by the total number of cropland acres in the state (about 9 million), yields an average cost of $0.72 per cropland acre per year. Some farms will have lower costs, and others will have higher costs. Most of the costs represent increased manure hauling costs. The cost for an individual livestock operation will depend on a number of factors, but the existing level of soil-test phosphorus is critical. If livestock producers prevent further increases in soil-test phosphorus levels, and reduce soil-test phosphorus levels in high-testing soils, costs will be lower over time.

The cost estimate of $6.5 million per year ($0.72 per acre) assumes full, voluntary statewide compliance with this nutrient management rule. Actual costs in the short term will be lower, because some farmers will not comply voluntarily and rule enforcement is contingent on cost-sharing. However noncompliance will drive up soil-test phosphorus levels over time, and that will increase long-term compliance costs.

Cost-Sharing Required

Under current state law, enforcement of nutrient management standards is generally contingent on cost-sharing. This rule does not change the current cost-sharing requirement. Although farmers are theoretically required to have and comply with nutrient management plans (beginning in 2005 for some farmers and 2008 for others), current statutes prevent enforcement against most farmers unless those farmers receive cost-sharing.

A shortage of cost-share funding effectively limits enforcement. In cases where a farmer is actually forced to comply, the cost must be shared. Farmers may also receive cost-sharing for voluntary compliance.

The cost-share offer must cover 70% of the cost to conduct soil tests and prepare a nutrient management plan (90% if there is financial hardship), or $7 per cropland acre, *whichever amount is greater* (the farmer chooses). The percentage rate applies only to costs of writing a nutrient management plan and performing soil tests (not manure hauling, etc.). The flat-rate payment ($7 per acre) applies regardless of actual costs.

Cost-share payments (whether flat-rate or percentage) are limited to 4 years. After that, the farmer assumes the full cost of compliance. Once a farmer achieves compliance, the farmer must maintain compliance regardless of cost-sharing. If a farmer falls out of compliance, the farmer is not eligible for cost-sharing to regain compliance.

In cost-share transactions to date, nearly all farmers have chosen the flat-rate ($7 per acre) payment. If farmers need additional acres to spread manure (as some will under a phosphorus standard), the total cost-share payment will increase accordingly (even if the rate per acre does not change). The limited availability of state cost-share funds will limit actual enforcement of nutrient management requirements. Available funds will be allocated among fewer operations.

Some farmers must comply with nutrient management requirements, *regardless* of cost-sharing. These include:

- Farmers who claim farmland preservation tax credits (about 12,000 farms).
- Livestock operators who need "point source" pollution discharge permits from DNR (about 140 farms).
- Livestock operators who need a local manure storage permit for a voluntarily constructed manure storage facility (about 150 farms per year). See current ATCP 50.54(2)(b).
- Livestock operators who need a local permit for a new or expanded livestock facility (about 50-70 farms per year). See current ATCP 51.

Nutrient Management Planners and Soil Testing Laboratories

This rule will marginally increase the demand for professional nutrient management planning and soil testing services. While farmers can qualify to write their own nutrient management plans, they will likely retain professional services because greater expertise is needed to develop phosphorus-based plans. Soil tests (and manure tests if used to determine the nutrient contents of manure) must be conducted at qualified laboratories.

Under this rule, a farmer is presumed to comply with nutrient management standards if the farmer follows a plan prepared or approved by a qualified nutrient management planner other than the farmer (the planner is responsible for ensuring that the plan complies).

Manure Haulers

This rule will increase demand for manure hauling services. Some livestock operators will not be able or willing to haul all of their own manure, and will hire commercial haulers to transport and apply manure to appropriate fields.

Commercial Fertilizer Dealers

This rule will reduce sales of commercial *phosphorus* fertilizer, but may increase sales of commercial *nitrogen* fertilizer to meet crop needs (where manure applications are curtailed because of phosphorus constraints).

Construction Contractors and Conservation Planners

This rule may increase demand for construction projects and conservation planning to reduce soil erosion on farmland. This rule does not change farm conservation construction standards or requirements, but may result in a slight increase in demand for practices that help reduce soil erosion to "T-value" (the rule limits nutrient applications to lands on which soil erosion exceeds "T-value").

Environmental Impact

This rule will protect the environment by preventing excess nutrient applications that can result in nonpoint source pollution of surface water and groundwater. Nonpoint source pollution from farms has a major impact on surface water and groundwater quality. A complete environmental assessment is attached.

Federal Regulation

The federal government does not regulate nutrient management on farms except that, under the federal Clean Water Act, certain concentrated animal feeding operations are subject to federal regulation as water pollution "point sources." The Wisconsin department of natural resources (DNR) regulates these operations by permit, under authority delegated from the United States environmental protection agency (EPA).

This rule incorporates NRCS nutrient management standards for farms. NRCS recently updated its nutrient management standards based on phosphorus as well as nitrogen. NRCS does not enforce its standards as mandatory standards, except for farms that apply for and receive cost-share funding from NRCS. However, DNR and DATCP have incorporated the federal standards in state nutrient management rules. EPA and DNR also incorporate NRCS standards as mandatory standards for animal feeding operations that are required to hold "point source" pollution discharge permits under the federal Clean Water Act.

DNR has proposed changes in current DNR rules for animal feeding operations that need "point source" pollution discharge permits from DNR (including concentrated animal feeding operations with 1,000 animal units or more). The DNR rules, if adopted as proposed, could vary from the latest NRCS nutrient management standards. DATCP is proposing to incorporate the NRCS standards, *without* potential DNR variations, in this rule.

EPA requires states to identify "impaired" waters that are not expected to achieve water quality standards after implementing required "point source" controls. States must establish allowable levels or "total maximum daily loads" for non-point source pollutants, such as sediment and phosphorus, to meet water quality standards in these impaired waters.

DNR has identified "impaired" waters in Wisconsin. Under current DATCP rules, DATCP nutrient management requirements first apply to "impaired" watersheds on January 1, 2005 and to other areas on January 1, 2008.

Surrounding State Programs

- Illinois sets requirements for waste management plans. Livestock facilities with fewer than 1,000 "animal units" are not required to prepare a waste management plan. Livestock facilities with more than 1,000 but fewer than 5,000 "animal units" must prepare, maintain, and implement a waste management plan. Livestock facilities with more than 5,000 "animal units" must prepare a plan and submit it for approval. Manure applications must be based on crop need for nitrogen (and phosphorus if soil-test phosphorus levels are 150 ppm or more). Plans must be updated annually.

- Iowa spells out manure management requirements for livestock operators. Confined feeding operations with more than 500 "animal units" must submit an annual manure management plan. By August 25, 2008, those plans must use a phosphorus index to determine manure application rates. On fields with a low phosphorus index rating (0-2), manure may be applied to the nitrogen need of the crop. On fields with a medium phosphorus index rating (2-5), manure may be applied to the nitrogen need of the crop only if the applications do not raise the rating above 5. Manure may not be applied to fields with a phosphorus rating of 5-15 unless the farmer adopts management practices to reduce the rating below 5. Manure may not be applied to fields with a phosphorus rating above 15.

- Michigan uses its Right to Farm Act as the foundation for its non-point source pollution prevention programs. The Michigan Right to Farm Act encourages the voluntary adoption of best management practices. Voluntary adoption of best management practices provides a defense against nuisance claims and lawsuits. Michigan has developed 7 best management practices, 2 of which are related to nutrient management. These best management practices generally permit manure applications up to the nitrogen need of the crop until soil-test phosphorus levels reach 75 ppm. Above this level, the phosphorus content of manure applications may not exceed the phosphorus need of the next season's crop. When soil-test phosphorus reaches 150 ppm, manure applications must be discontinued until soil-test phosphorus levels are drawn down.

- Under Minnesota's revised feedlot rule, feeding operations with more than 100 "animal units" must have a manure management plan in order to obtain certain permits. Manure can be applied to the nitrogen need of the crop. However, for fields on which soil-test phosphorus levels are high, plans must include approved strategies to minimize phosphorus runoff to surface waters. Operators must keep records of manure applications for at least 3 years, and must update plans on an annual basis.

SECTION 1. ATCP 50.04(3)(d) is amended to read:

ATCP 50.04(3)(d) The plan shall be based on soil nutrient tests conducted at a laboratory that is certified under s. ATCP 50.50 to conduct those tests.

SECTION 2. ATCP 50.04(3)(dm) and (dm)1.(note) are created to read:

ATCP 50.04(3)(dm) If the nutrient management plan uses manure nutrient values, other than nutrient values of organic by-products regulated under ch. NR 113, 204 or 214, the manure nutrient values shall be based on one of the following:

1. Standard values specified in Wisconsin conservation planning technical note WI-1 (December, 2006), companion document to the NRCS technical guide standard 590.

NOTE: Wisconsin conservation planning technical note WI-1 is on file with the department and the revisor of statutes. Copies are available from your county land conservation department or the following web address: ***http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*** The NRCS technical guide standard 590 (September, 2005) is reproduced, without the companion technical note, in Appendix D.

2. Manure analyses conducted at a laboratory that complies with s. ATCP 50.50(8).

SECTION 3. ATCP 50.04(3)(e) and (note) are amended to read:

ATCP 50.04(3)(e) The plan shall comply with the NRCS technical guide nutrient management standard 590 ~~dated March, 1999~~ (September, 2005), except for sections V.D, V.E and VI, and shall also comply with the Wisconsin conservation planning technical note WI-1 (December, 2006).

NOTE: The checklist in Appendix C may be used to gather information for a nutrient management plan. NRCS technical guide nutrient management standard 590 (~~March, 1999~~) (September, 2005) is reproduced in Appendix D. ~~That standard is a nitrogen-based standard. However, NRCS is in the process of revising it to incorporate a phosphorus-based standard. The department will initiate rulemaking to adopt the NRCS phosphorus-based standard by January 1, 2005 if NRCS has adopted that standard by that date.~~ The Wisconsin conservation planning technical note WI-1 (December, 2006) is not reproduced in Appendix D but is on file with the department and the revisor of statutes. Copies are available from your county land conservation office or the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*

SECTION 4. ATCP 50.04(3)(f)(intro.) and (f)3. are amended to read:

ATCP 50.04(3)(f)(intro.) The plan may not recommend nutrient applications that exceed the amounts required to achieve applicable crop fertility levels recommended by the university of Wisconsin-extension in the 1998 edition of Soil Test Recommendations for Field, Vegetable and Fruit Crops, UWEX publication A-2809 ~~(1998)~~, or in the latest subsequent edition of that publication if preferred by the landowner, unless the nutrient management planner can show that one or more of the following circumstances justifies the recommended application:

(f)3. Excess nutrients are the result of ~~prior~~ manure applications made in the last year prior to the implementation of the nutrient management plan.

SECTION 5. ATCP 50.04(3)(f)4. is repealed and recreated to read:

ATCP 50.04(3)(f)4. Other special agronomic conditions documented by the planner. A planner who wishes to justify higher applications shall include credible information to show that the higher applications will not materially increase environmental damage.

SECTION 6. ATCP 50.04(3)(f)5. to 9. are repealed.

SECTION 7. ATCP 50.04(3)(f)(note) is amended to read:

NOTE: *Appendix B* contains a convenient summary of UWEX publication A-2809, for selected crops. You may obtain the complete publication and the summary from your county extension agent. The complete publication is also on file with the department~~, the secretary of state~~ and the revisor of statutes. Copies are available from your county land conservation office or the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp*.

SECTION 8. ATCP 50.04(3)(g) is amended to read:

ATCP 50.04(3)(g) The plan shall be consistent with any nutrient management plan required under ch. NR 113, NR 204 or NR 214 if the landowner applies septage, municipal sludge, industrial waste or industrial by-products to the land. A landowner is not required to have a nutrient management plan under this subsection if the landowner applies ~~only~~ primarily

septage, municipal sludge, industrial waste or industrial byproducts according to ch. NR 113, NR 204 or NR 214.

SECTION 9. ATCP 50.04(3)(h)2.(note) is repealed.

SECTION 10. ATCP 50.04(3)(i) is created to read:

ATCP 50.04(3)(i) A landowner is rebuttably presumed to comply with this section if the landowner complies with a nutrient management plan that is prepared or approved by a nutrient management planner, other than the farmer, who is qualified under s. ATCP 50.48.

SECTION 11. ATCP 50.12(2)(f)(note)(3rd bullet) is amended to read:

- Farms located in watersheds that DNR has listed pursuant to 33 USC 1313. This is also known as the "303(d) list of impaired waters." ~~*Appendix A* contains a map showing the watersheds that drain to listed waters.~~

SECTION 12. ATCP 50.30(2)(a)(note) is amended to read:

NOTE: The list of waters under par. (a) is also known as the "303(d) list of impaired waters." ~~*Appendix A* contains a map showing watersheds that drain to the listed waters.~~

SECTION 13. ATCP 50.48(2)(a)3. is amended to read:

ATCP 50.48(2)(a)3. Registered as a ~~crop scientist, crop specialist, soil scientist, soil specialist or professional agronomist in the American registry of certified professionals in agronomy, crops and soils~~ soil scientist by the soil science society of America or as a professional agronomist by the American society of agronomy.

SECTION 14. ATCP 50.50(title) is amended to read:

ATCP 50.50(title) Soil and manure testing laboratories.

SECTION 15. ATCP 50.50(2)(intro.), (b), (c), (d)2. and (f) are amended to read:

ATCP 50.50(2)(intro.) A laboratory operator may apply to the department for certification under sub. (1). An operator shall submit a separate application, using the form

shown in *Appendix A*, for each laboratory for which the operator seeks certification. ~~The operator shall apply on a form provided by the department.~~ The application shall include all of the following:

(b) The address of ~~every~~ the laboratory ~~in this state for which the operator seeks certification~~.

(c) The name and telephone number of the individual who is responsible for on-site administration of ~~each~~ the laboratory ~~under par. (b)~~.

(d)2. Buffer pH ~~(SMP)~~.

(f) ~~An agreement to comply~~ License conditions specified by the department, including compliance with subs. (4) to (6).

SECTION 16. ATCP 50.50(2)(note) is created to read:

NOTE: A list of approved soil testing laboratories can be found at the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*

SECTION 17. ATCP 50.50(8) and (notes) are created to read:

ATCP 50.50(8) MANURE TESTING LABORATORIES. Manure nutrient values determined by laboratory analyses do not qualify under s. ATCP 50.04(3)(dm)2. unless the laboratory performing those analyses complies with all of the following:

(a) The laboratory participates in the manure analysis proficiency program administered by the Minnesota department of agriculture, or in an equivalent proficiency program administered by the university of Wisconsin soil analysis laboratory, and provides copies of proficiency reports to the department upon request.

NOTE: A manure testing laboratory may qualify under sub. (8), regardless of whether the laboratory is certified as a soil testing laboratory under sub. (1). A laboratory may contact the department, at the following address, for information on how to enroll in a manure analysis proficiency program under par. (a):

Wisconsin Department of Agriculture, Trade and Consumer Protection
Agricultural Resource Management Division
Nutrient Management Program
PO Box 8911
Madison, WI 53708-8911

(b) The laboratory is capable of performing all of the following manure analyses according to methods prescribed by the university of Wisconsin-extension in *Recommended Methods of Manure Analysis*, UWEX publication A3769 (2003):

1. Percent dry matter (DM).

2. Total nitrogen.

3. Total phosphorus expressed as P_2O_5.

4. Total potassium expressed as K_2O.

NOTE: The university of Wisconsin-extension publication, *Recommended Methods of Manure Analysis*, UWEX publication A3769 (2003), is on file with the department and the revisor of statutes. Copies may be obtained from the university of Wisconsin-extension at the following address: University of Wisconsin-Madison, Department of Soil Science, 1525 Observatory Drive, Madison, WI 53706-1299.

(c) The laboratory is capable of estimating total and available nutrient levels based on the manure tests under par. (b) and the availability percentages shown in Table 3 of part III of the Wisconsin conservation planning technical note WI-1 (December, 2006), a companion document to the NRCS technical guide nutrient management standard 590.

NOTE: The NRCS technical guide nutrient management standard 590 (September, 2005) is reproduced in Appendix D. The Wisconsin conservation planning technical note WI-1 is not reproduced in Appendix D but is on file with the department, the secretary of state and the revisor of statutes. Copies may be obtained from your county land conservation department or at the following web address: *http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.*

SECTION 18. ATCP 50.62(3)(d) and (note) are amended to read:

ATCP 50.62(3)(d) Any manure storage system costs related to an animal feeding operation if all of the manure from the operation could be applied to land according to the NRCS technical guide nutrient management standard 590 ~~dated March, 1999,~~ (September, 2005) without causing or aggravating nonattainment of water quality standards.

NOTE: The NRCS technical guide nutrient management standard 590 (~~March, 1999~~ September, 2005) is reproduced in Appendix D. The feasibility of applying manure to land under par. (d) will be determined in light of existing topographic, climatological and management factors.

SECTION 19. ATCP 50.78(3)(a) and (note) are amended to read:

ATCP 50.78(3)(a) The nutrient management practice complies with NRCS technical guide nutrient management standard 590 ~~dated March, 1999~~ (September, 2005).

NOTE: The NRCS technical guide nutrient management standard 590 (~~March, 1999~~ September, 2005) is reproduced in Appendix D.

SECTION 20. Chapter ATCP 50 *Appendices A* to *D* are repealed and recreated to read as shown in *Appendices A* to *D* attached.

SECTION 21. *Appendix G* to ch. ATCP 50, primary standard category number 1, bullet-paragraph related to Nutrient Management Standard 590, is amended to read:

- Nutrient Management Standard 590 (~~March, 1999~~ September, 2005).

EFFECTIVE DATE AND INITIAL APPLICABILITY. (1) Except as provided in sub. (2), this rule takes effect on the first day of the month following publication in the Wisconsin administrative register, as provided under s. 227.22(2)(intro.).

(2) This rule first applies to small businesses as defined in s. 227.114(1), Stats., on the first day of the third month commencing after the rule publication date, as required by s. 227.22(2)(e), Stats.

Dated this _____ day of _____, _____.

STATE OF WISCONSIN
DEPARTMENT OF AGRICULTURE,
TRADE AND CONSUMER PROTECTION

By _____
Rodney J. Nilsestuen, Secretary

ARM-LW-264 (Rev. 12/06)

Appendix A

	Application for **Soil Testing Laboratory Certification** Wis. Stats. s. 92.05(3)(k) and Wis. Adm. Code s. ATCP 50.50 Mail Application to: Wisconsin Department of Agriculture, Trade and Consumer Protection Division of Agricultural Resource Management – Nutrient Management PO Box 8911, Madison WI 53708-8911	For Office Use Only Certification No. _____ Date Issued _____

Personal information on this application may be used for purposes other than laboratory certification (Wis. Stats. s. 15.04(1)(m)).

1. Applicant (Laboratory Operator):

Legal Name: _____

Business Form (Check One):

□ Individual □ Corporation □ Partnership □ Cooperative □ LLC □ LLP

□ Other _____

State of Formation (if other than individual): _____

Trade Name (if different from legal name): _____

2. Laboratory:

Laboratory Administrator (Name of Individual): _____

Mailing Address: _____ State:_____ Zip:_____

Telephone Number: (_____)_____ Fax Number ( )

3. Soil Tests and Services that the Laboratory Can Provide(Check All that Apply):

REQUIRED FOR CERTIFICATION:

□ Soil pH □ Buffer pH □ Phosphorus(P) □ Potassium(K) □ Organic Matter(OM)

□ Nutrient Recommendations (N, P, K) □ Lime Recommendations

OTHER TESTS AND SERVICES:

□ Other Plant Nutrient Tests □ Manure Analysis

□ Other Tests or Services _____

4. Laboratory Qualification to Perform Required Tests:

The applicant certifies that the laboratory is qualified and able to perform all soil tests required for certification (see 3. above), and performs those tests according to applicable standards and methods specified in the following publications:

a. *Nutrient Application Guidelines for Field, Vegetable and Fruit Crops, UW-Extension Publication A2809 (2006).*

b. *Wisconsin Procedures for Soil Testing, Plant Analysis and Feed & Forage Analysis, Department of Soil Science, University of Wisconsin-Madison (December, 2006).* A copy can be found at the following web address: http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/planning.jsp.

5. Certification Conditions:

The applicant agrees to the following certification conditions (failure to comply may result in de-certification):

a. The laboratory will comply with applicable requirements in Wis. Adm. Code ch. ATCP 50, including ss. ATCP 50.50(4) to (6) related to nutrient recommendations, laboratory records and laboratory evaluation.

b. Twice each year, in February and August, the laboratory will analyze check samples provided by the University of Wisconsin Soil and Plant Forage Analysis Laboratories (SPAL). The laboratory will assume all costs of the analyses. The laboratory will analyze the SPAL check samples for soil pH, buffer pH, phosphorus (P), potassium (K), and organic matter (OM). The laboratory may also submit additional soil test analysis for Ca, Mg, B, Mn, Zn, SO_4-S, and NO_3-N with required semi annual check sample results, but is not required to do so. Based on these analyses, and other information provided by SPAL, the laboratory will report all of the following to SPAL within the time period set by SPAL:

- Test results for soil pH, buffer pH, phosphorus (P), potassium (K) and organic matter (OM).
- Lime and nutrient recommendations (N, P, K) according to 4. above.
- The laboratory may also submit additional soil test results for Ca, Mg, B, Mn, Zn, SO_4-S, and NO_3-N with required semi annual check sample results, but is not required to do so.

c. At least 66% of the check sample results under par. b. must be within one standard deviation of the mean, and at least 40% of the check sample results for each parameter must be within one standard deviation of the mean.

d. Each month, except in January, February and August, the laboratory will submit 5-10 of its own soil samples to SPAL, together with the results of its tests on those samples. Test results will include soil pH, buffer pH, phosphorus (P), potassium (K) and organic matter (OM). The laboratory may submit results for other plant nutrient tests, but is not required to do so. SPAL will analyze the samples and provide the laboratory with SPAL's test results for comparison.

e. Laboratory staff will attend educational soil testing meetings sponsored by SPAL.

f. SPAL representatives may visit the laboratory, and review laboratory procedures, as SPAL deems necessary. SPAL may send double blind soil samples to the laboratory, under the name of another lab client, to evaluate the accuracy of the laboratory's test results and recommendations. The laboratory will waive the cost of analyzing the double blind samples, if SPAL requests a waiver.

g. The laboratory will submit periodic reports to SPAL, summarizing the results of all soil tests conducted by the laboratory since the end of the period covered by the last periodic report. The laboratory will submit the reports in a format, and according to a schedule, specified by SPAL. SPAL may include the soil test data in its statewide summary of soil test data.

h. Upon request, the laboratory will make available to SPAL and the Department of Agriculture, Trade and Consumer Protection, for inspection and copying by SPAL or DATCP, copies of all test records that the laboratory is required to keep under Wis. Adm. Code s. ATCP 50.50(5).

The applicant certifies that all information contained in this application is true, correct, and complete.

SIGNATURE OF APPLICANT OR AUTHORIZED REPRESENTATIVE	TITLE	DATE

Recommendation of the UW Diagnostic Services Committee	**Action By DATCP**
I recommend ( ) approval ( ) disapproval (see attachment)	This request is ( ) approved ( ) disapproved (see attachment)
Date and Authorized Signature	Date and Authorized Signature

If you have any questions regarding this application, contact Sue Porter at (608) 224-4605.

Appendix B

Nutrient Management Fast Facts

(UWEX Publication)

SOYBEAN nutrient recommendations

SOIL TEST LEVEL OF THE FIELD

	Yield goal (bu/A)	Very Low	Low	Optimum	High	Very High	Ex. High
		LB (P_2O_5) OR (K_2O) /ACRE TO APPLY					
Phosphate (P_2O_5)	15-25	--	25	15	10	--	0
	26-35	--	35	25	15	--	0
	36-45	--	40	30	15	--	0
	46-55	--	50	40	20	--	0
	56-65	--	60	50	25	--	0
	66-75	--	65	55	30	--	0
	76-85	--	75	65	35	--	0
Potash (K_2O)	15-25	90	45, 70*	30	15	10	0
	26-35	100	55, 80*	40	20	10	0
	36-45	115	70, 95*	55	30	15	0
	46-55	130	85, 110*	70	35	20	0
	56-65	145	100, 125*	85	45	20	0
	66-75	160	115, 140*	100	50	25	0
	76-85	170	125, 150*	110	55	30	0

-- Very low and very high category does not exist for soil test phosphorus
* Use lower values on sandy or organic soils

ALFALFA nutrient recommendations

SOIL TEST LEVEL OF THE FIELD

	Yield goal (TONS/A)	Very Low	Low	Optimum	High	Very High	Ex. High
		LB (P_2O_5) OR (K_2O) /ACRE TO APPLY					
Phosphate (P_2O_5)	1.0-2.5	65	50	25	15	--	0
	2.6-3.5	80	65	40	20	--	0
	3.6-4.5	90	75	50	25	--	0
	4.6-5.5	105	90	65	35	--	0
	5.6-6.5	120	105	80	40	--	0
	6.6-7.5	130	115	90	45	--	0
	7.6-8.5	145	130	105	55	--	0
Potash (K_2O)	1.0-2.5	155	145	105	55	25	0
	2.6-3.5	230	220	180	90	45	0
	3.6-4.5	290	280	240	120	60	0
	4.6-5.5	350	340	300	150	75	0
	5.6-6.5	410	400	360	180	90	0
	6.6-7.5	470	460	420	210	105	0
	7.6-8.5	530	520	480	240	120	0

-- Very high category does not exist for soil test phosphorus

Legume Forage

Where an alfalfa stand is to be maintained for more than three years increase the annual top-dressed K_2O by 20%.
Apply 30 lb N/acre in the seeding year if grown on soils with less than 2% organic matter.
Apply 40 lb N/acre to legume pasture in seeding year on sandy soils and 20 lb N/acre on soils with more than 2% organic matter.

Nurse Crops

Where barley or oats are seeded with a forage legume, eliminate or reduce N for the small grain by 50%.

CORN nutrient recommendations

SOIL TEST LEVEL OF THE FIELD

	Yield goal (TONS/A)	Very Low	Low	Optimum	High	Very High	Ex. High
		LB (P_2O_5) OR (K_2O) /ACRE TO APPLY					
Phosphate (P_2O_5)	71-90	65	55	30	15	--	0
	91-110	75	65	40	20	--	0
	111-130	80	70	45	25	--	0
	131-150	90	80	55	30	--	0
	151-170	95	85	60	30	--	0
	171-190	105	95	70	35	--	0
	191-220	110	100	75	40	--	0
Potash (K_2O)	71-90	70	55	25	15	5	0
	91-110	75	60	30	15	10	0
	111-130	80	65	35	20	10	0
	131-150	85	70	40	20	10	0
	151-170	90	75	45	25	10	0
	171-190	95	80	50	25	15	0
	191-220	105	90	60	30	15	0
	@ 35% DM (TONS/A)						
Phosphate	10 - 16	85	70	45	25	--	0
	16 - 20	105	90	65	35	--	0
	20 - 25	120	105	80	40	--	0
	25 - 35	150	135	110	55	--	0
Potash	10 - 16	160	150	110	55	30	0
	16 - 20	200	190	150	75	40	0
	20 - 25	235	225	185	95	45	0
	25 - 35	300	290	250	125	65	0

-- Very high category does not exist for soil test phosphorus

SOIL pH liming recommendations

Crop	Target pH
Alfalfa	6.8
Corn, silage or grain	6.0
Pastures (grass or legume-grass)	6.0
Red Clover	6.3
Soybeans	6.3
Wheat	6.0

1. Lime should be applied and incorporated at least 6 to 12 months prior to planting an acid sensitive crop such as alfalfa.
2. Lime recommendations are made using the target pH for the most acid sensitive crop in a 4-year rotation.
3. Application rates for lime should never exceed 12 ton/acre (8 ton/acre for potatoes).
4. No additional lime should be applied until the most recent application has had 2-3 years to equilibrate with the soil.

LEGUME nitrogen credits

medium/fine textured | sandy soils

FORAGE

Alfalfa 1st Year		LB N /ACRE TO CREDIT			
STAND DENSITY: 70-100% alfalfa, more than 4 plants/ft²	Good	190	150	140	100
30-70% alfalfa, 1.5 - 4 plants/ft²	Fair	160	120	110	70
0-30% alfalfa, less than 1.5 plants/ft²	Poor	130	90	80	40

In the second cropping year following a fair or good stand on a fine/medium textured soil, take a 50 lb N/acre credit.

Red Clover, Birdsfoot Trefoil, 80% of alfalfa credit for similar stands.

GREEN MANURE, lb N/a

Alfalfa, 60-100	Use 40 lb N/acre credit if less than 6 inches of growth before tillage. Use upper end of range for spring seedings that are plowed under the following spring; use low end for fall seedings.
Sweet Clover, 80-120	
Red Clover, 50-80	

FIELD CROPS, lb N/a

Soybean, 40	No credit on sandy soils. Soy credit applies to non-legume crops other than corn; soybean N for corn is accounted in Corn Nitrogen Guidelines.
Pea, Snap or Lima bean, 20	

Corn Nitrogen Guidelines

Soil		N:Corn Price Ratio 0.05	0.10	0.15	0.20
	Previous Crop	LB N /ACRE (TOTAL TO APPLY)[3]			
High/very high yield potential soils	Corn, Forage legumes, Legume vegetables, Green manures[4]	165[1] 135----------190[2]	135 120------155	120 100------135	105 90-----120
	Soybean, Small grains[5]	140 110---------160	115 100-----130	100 85-----115	90 70-----100
Medium/low yield potential soils	Corn, Forage legumes, Legume vegetables, Green manures[4]	120 100-------140	105 90-----120	95 85----110	90 80---100
	Soybean, Small grains[5]	90 75------110	60 45----70	60 40---60	45 35---55
Sands/loamy sands	Irrigated—All crops[4]	215 200-----230	205 190-----220	195 180-----210	190 175----200
	Non-irrigated—All crops[4]	120 100-------140	105 90-----120	95 85----110	90 80---100

To determine soil yield potential, consult UWEX publication A2809 or contact your agronomist or county agent.

[1] Maximum return to N (MRTN) rate.
[2] Range within $1/acre of MRTN rate.
[3] Includes N in starter.
[4] Subtract N credits for forage legumes, legume vegetables, animal manures, green manures.
[5] Subtract N credits for animal manures and second year forage legumes.

Additional Guidelines:

- ✓ For max. silage yield, use N rate for 0.05 price ratio. To adjust rates for silage, use price ratio that reflects typical prices for N and grain.
- ✓ If >50% residue at planting, use upper end of range.
- ✓ If all N is from organic sources, use top end of range. Plus, up to 20 lb N/acre as starter may be used.
- ✓ For medium & fine-textured soils with >10% soil organic matter, use low end of range; <2% OM, use high end of range.
- ✓ For coarse-textured, medium yield potential soils with <2% OM, use high end of range; >2% OM, use mid to low end of range.
- ✓ When corn follows small grains on medium & fine-textured soils, use the mid to low end of range.
- ✓ For irrigated, medium yield potential soils, use rates for high yield potential soils.
- ✓ If potential for carry-over (residual) N, use low end of range or use the high end and subtract preplant soil nitrate test (PPNT) credits.

N:Corn Price Ratios

Price of N[1]	Price of Corn ($/bu corn)						
$/lb N	1.80	2.00	2.20	2.40	2.60	2.80	3.00
0.24	0.13	0.12	0.11	0.10	0.09	0.09	0.08
0.26	0.14	0.13	0.12	0.11	0.10	0.09	0.09
0.28	0.16	0.14	0.13	0.12	0.11	0.10	0.09
0.30	0.17	0.15	0.14	0.13	0.12	0.11	0.10
0.32	0.18	0.16	0.15	0.13	0.12	0.11	0.11
0.34	0.19	0.17	0.15	0.14	0.13	0.12	0.11
0.36	0.20	0.18	0.16	0.15	0.14	0.13	0.12
0.38	0.21	0.19	0.17	0.16	0.15	0.14	0.13
0.40	0.22	0.20	0.18	0.17	0.15	0.14	0.13
0.42	0.23	0.21	0.19	0.18	0.16	0.15	0.14
0.44	0.24	0.22	0.20	0.18	0.17	0.16	0.15

[1] Price of N = [$/ton fertilizer x (100 / % N in fertilizer)] / 2000

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This publication is available from the Nutrient and Pest Management Program. For more copies, please contact us at:
email (npm@hort.wisc.edu)
phone (608) 265-2660
website (ipcm.wisc.edu)
i-11-06-6.5M

NPM

University of Wisconsin-Extension, College of Agricultural and Life Sciences.

MANURE information

APPROX. AVAILABLE NUTRIENT CONTENT

1st YEAR [2nd YEAR]

	N	N*	P_2O_5	K_2O
Dairy				
Solid (lb/ton)	3 [1]	4 [1]	3 [1]	7 [1]
Liquid (lb/1000 gal)	7 [3]	10 [2]	5 [1]	16 [2]
Beef				
Solid (lb/ton)	4 [1]	5 [1]	5 [1]	9 [1]
Liquid (lb/1000 gal)	5 [2]	7 [2]	5 [1]	16 [2]
Swine				
Solid (lb/ton)	7 [1]	9 [2]	6 [1]	7 [1]
Liquid (lb/1000 gal)				
Indoor Pit	25 [5]	33 [5]	25 [4]	24 [3]
Outdoor Pit	17 [3]	22 [4]	10 [1]	16 [2]
Farrow-nursery				
Indoor Pit	13 [2]	16 [3]	14 [2]	18 [2]
Poultry				
Solid (lb/ton)	20 [4]	24 [4]	30* [5]	24 [3]
Liquid (lb/1000 gal)	8 [2]	10 [1]	6 [1]	10 [1]
Horse				
Solid (lb/ton)	3 [1]	4 [1]	4 [0]	8 [1]

* Manure incorporated within 3 days
* 24 for turkey

MANURE OUTPUT*

Animal	weight	lb/day	ton/year	gal/day	1000 gal/year
Dairy	1400 lb	148	27	17.7	6.5
Beef	1100 lb	80	15	9.5	3.5
Swine	150 lb	9.5	1.7	1.2	0.44
Chicken (broiler)	2 lb	0.18	0.031	0.02	0.008
Horse	1000 lb	50	9.1	6.0	2.2

*Volume as excreted.

DETERMINING MANURE APPLICATION RATE

Step 1: Figure load size:

Weigh spreader in tons for solid or semi-solid manure
Use 90% tank capacity in gallons for liquid manure

Step 2: Determine field acreage:

$$\frac{\text{field length (ft)} \times \text{field width (ft)}}{43{,}560\ \text{ft}^2/\text{a}} = \text{acres}$$

Step 3: Calculate manure application rate:

$$\frac{[(\#\ \text{of loads}) \times (\text{load size})]}{\text{field acreage}} = \text{tons or gallons / acre}$$

NPM Program contacts:

Northwest Region	Paul Kivlin	(800)228-8672
Southeast Region	Richard Proost	(800)994-5852
Southwest Region	Karen Telaroczyk	(800) 745-9712
South Central Region	Kevin Shelley	(800)994-5853
Madison	Scott Sturgul	(877) 426-0176

Nutrient Management FAST FACTS

indicates information pertains to Wisconsin only

PLANTING & HARVEST information

DETERMINING PLANT POPULATIONS

Row Width	20"	28"	30"	32"	36"	38"	40"
Row Length*	26'1"	18'8"	17'5"	16'4"	14'6"	13'9"	13'1"

*Row length required to equal 1/1000 acre.

Calculation: (# of plants in row length) x 1000 = **plants/acre**

NUTRIENTS REMOVED BY CROP AT HARVEST

	P_2O_5	K_2O
	lb per yield unit	
Alfalfa* / Red Clover, per ton (dry matter)	13	60
Barley,		
Grain, per bu (1 bu = 48 lb @ 14.5% moisture)	0.40	0.35
Straw, per ton (dry matter)	10	32
Corn		
Grain, per bu (1 bu = 56 lb @ 15.5% moisture)	0.38	0.29
Silage, per ton (65% moisture)	3.6	8.3
Sweet, per ton (fresh)	3.3	6.0
Oatlage, per ton (dry matter)	11	44
Oats		
Grain, per bu/a (1 bu = 32 lb @ 14% moisture)	0.29	0.19
Straw, per ton (dry matter)	9.4	47
Potatoes, per cwt (fresh)	0.12	0.50
Rye		
Grain, per bu/a (1 bu = 56 lb @ 14% moisture)	0.41	0.31
Straw, per ton (dry matter)	3.7	21
Sorghum, Grain, per bu (1bu = 56 lb @ 14% moisture)	0.40	0.40
Sorghum-Sudan, Forage, per ton (65% moisture)	15	60
Soybean*		
Grain, per bu (1 bu = 60 lb @ 13% moisture)	0.80	1.4
Straw, per ton (dry matter)	5.4	19
Wheat		
Grain, per bu (1 bu = 60 lb @ 13.5% moisture)	0.50	0.35
Straw, per ton (dry matter)	6.0	28

*Nitrogen removal by alfalfa is 60 lb N/ton and by soybeans is 4 lb N/bu.

CONVERTING POUNDS HARVESTED TO BUSHELS WITH % MOISTURE CONTENT CORRECTIONS

Shelled Corn

[lbs harvested x (1 - % moisture in corn)] + 47.32 = bu @ 15.5% moisture

Ear corn

lbs harvested + number from chart below = bu @ 15.5% moisture

moisture %	15	15.5	16	17	18	19	20	21	22	23	24	25	26	27
equation #	68.1	68.6	69.2	70.4	71.6	72.8	74.1	75.4	76.6	78.0	79.4	80.7	82	83.4

Soybeans or wheat

lbs harvested x (1 - % foreign matter) = adjusted lbs harvested
[adjusted lbs x (1 - % moisture)] + 52.2 = bu soybeans @ 13% moisture
bu wheat @ 0% moisture

CALCULATING ACRES HARVESTED:

acres harvested =
[row length(ft) x row width(ft) x # of rows harvested] +43,560 ft²/acre

Example with corn harvested by combine :

Step 1: 12,580 lbs corn harvested @ 21.35% moisture
12,580 lbs x (1 - .2135) ÷ 47.32 = 209 bu of corn @ 15.5 % moisture

Step 2: Four-row harvester: 16 rows, each 30 inch (2.5 ft) row is 1210 feet long
(1210 ft x 2.5 ft x 16 rows) ÷ 43,560 ft²/acre = 1.10 acres

Step 3: 209 bu of corn ÷ 1.10 acres = 190 bu/acre

FERTILIZER ANALYSIS

	N	P_2O_5	K_2O	other
	% content			
Nitrogen				
Ammonium nitrate	34	0	0	
Ammonium sulfate (AMS)	21	0	0	24(S)
Ammonium thiosulfate (ATS)	12	0	0	26(S)
Anhydrous ammonia	82	0	0	
Aqueous ammonia	20	0	0	
Calcium nitrate (CN)	15	0	0	17(Ca)
Urea	46	0	0	
28% Urea ammonium nitrate (UAN)	28	0	0	
32% UAN	32	0	0	
Phosphorus				
Ammonium polyphosphate (dry)	15	62	0	
Ammonium polyphosphate (liquid)	10	34	0	
Diammonium phosphate (DAP)	18	46	0	
Monoammonium phosphate (MAP)	11	52	0	
Triple superphosphate (TSP)	0	46	0	
Potassium				
Potassium chloride (muriate of potash)	0	0	60-62	
Potassium-magnesium sulfate	0	0	22	22(S),11(Mg)
Potassium nitrate	13	0	44	
Potassium sulfate	0	0	50	18(S)

Liquid weights:
1 gallon water weighs 8.3 lbs
1 gallon UAN (28%) weighs 10.6 lbs
1 gallon 10-34-0 weighs 11.6 lbs
1 gallon 9-18-9 weighs 11.1 lbs

CONVERSIONS

Take column 1	multiply by column 2	to get column 3
acre (a)	43,560	square feet (ft²)
acre (a)	0.405	hectare (ha)
square mile (mi²)	640	acres (a)
cubic yard (yd³)	27	cubic feet (ft³)
cubic feet (ft³)	7.48	gallons (gal)
bushel (bu)	1.244	cubic feet (ft³)
bushel (bu)	8	gallons - dry
bushel (bu)	9.31	gallons - liquid
ounces (oz)	29.6	milliliters (ml)
gallon (gal)	3.78	liters (l)
gallon (gal)	128	fluid ounces (fl oz)
gallon (gal)	4	quart (qt)
acre-foot	43,560	cubic feet (ft³)
acre-foot	325,851	gallons (gal)
chain (ch)	66	feet (ft)
chain (ch)	4	rods (r)
rods (r)	16.5	feet (ft)
mile (mi)	5280	feet (ft)
ton (short)	2,000	pounds (lb)
ton (long)	2,230	pounds (lb)
gallons/acre (gal/a)	9.354	liters/hectare (l/ha)
miles/hour (mph)	88	feet/minute (ft/min)
pounds/acre (lb/a)	1.12	kilograms/hectare (kg/ha)
P_2O_5 (lb)	0.44	P (lb)
K_2O (lb)	0.83	K (lb)
ppm-plow layer (6 in)	2	lb/acre (lb/a)
ppm-top soil (12 in)	4	lb/acre (lb/a)

To get column 1, divide column 3 by column 2

Appendix C
NUTRIENT MANAGEMENT PLAN CHECKLIST

V 11/9/05

For Wisconsin's NRCS 590 (September 2005) Nutrient Management Standard Requirements

County name:_____ Date Plan Submitted:_____ Growing season year NM plan is written for _____
Township (T.__N., S.) – (R.__E., W.) Initial Plan or Updated Plan (circle one) (from harvest to harvest)

Name of qualified nutrient management planner		Planner's business name, address, phone:
Circle the planner's qualification: 1. NAICC-CPCC 2. ASA-CCA 3. ASA-Professional Agronomist 4. SSSA-Soil Scientist 5. DATCP approved training course 6. Other credentials approved by DATCP	Cropland Acres (owned & rented)	Name of farmer receiving nutrient management plan: Circle relevant program requirement or regulation the plan was developed for: Ordinance, USDA, DATCP, DNR, NR 243 – NOD or WPDES

		Yes	No	NA
1.	**Are the following field features identified on maps or aerial photos in the plan?**			
a.	Field location, soil survey map unit(s), field boundary, and field identification number			
b.	Areas prohibited from receiving nutrient applications: Surface water, established concentrated flow channels with perennial cover, permanent non-harvested vegetative buffer, non-farmed wetlands, sinkholes, lands where established vegetation is not removed, nonmetallic mines, and fields eroding at a rate exceeding tolerable soil loss (T)			
c.	Areas within 50 feet of a potable drinking water well where mechanically-applied manure is prohibited			
d.	Areas prohibited from receiving winter nutrient applications: Slopes > 9% (12% if contour-cropped); Surface Water Quality Management Area (SWQMA) defined as land within 1,000 ft of lakes and ponds or within 300 ft of perennial streams draining to these waters, unless manure is deposited through winter gleaning/pasturing of plant residue and not exceeding the N and P requirements of this standard; Additional areas identified within a conservation plan as contributing runoff to surface or groundwater			
e.	Areas where winter applications are restricted unless effectively incorporated within 72 hours: Land contributing runoff within 200 feet upslope of direct conduits to groundwater such as a well, sinkhole, fractured bedrock at the surface, tile inlet, or nonmetallic mine			
f.	Sites vulnerable to N leaching: Areas within 1,000 feet of a municipal well, and soils listed in Appendix 1 of the Conservation Planning Technical Note WI-1			
2.	**Are erosion controls implemented so the crop rotation will not exceed T on fields that receive nutrients according to the conservation plan or WI P Index model?**			
3.	**Were soil samples collected and analyzed within the last 4 years according to UW Publication A2100 recommendations?**			
4.	**Using the field's predominant soil series and realistic yield goals, are planned nutrient application rates, timing, and methods of all forms of N, P, and K listed in the plan and consistent with UW Publication A 2809,** *Soil Test Recommendations for Field, Vegetable and Fruit Crops,* **and the 590 standard?**			
5.	**Do manure production and collection estimates correspond to the acreage needed in the plan? Are manure application rates realistic for the calibrated equipment used?**			
6.	**Is a single phosphorus (P) assessment of either the P Index or soil test P management strategy uniformly applied to all fields within a tract?**			
7.	**Are areas of concentrated flow, resulting in reoccurring gullies, planned to be protected with perennial vegetative cover?**			
8.	**Will nutrient applications on non-frozen soil within the SWQMA comply with the following?**			
a.	Unincorporated liquid manure on unsaturated soils will be applied according to Table 1 of the 590 standard to minimize runoff			
b.	One or more of the following practices will be used: 1) Install/maintain permanent vegetative buffers, or 2) Maintain greater than 30% crop residue or vegetative coverage on the surface after nutrient application, or 3) Incorporate nutrients leaving adequate residue to meet tolerable soil loss, or 4) Establish fall cover crops promptly following application			

I certify that the nutrient management plan represented by this checklist complies with Wisconsin's NRCS 590 nutrient management standard.
Signature of qualified nutrient management planner

Appendix D

NUTRIENT MANAGEMENT

(Acre)
Code 590

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

Managing the amount, source, placement, form, and timing of the application of nutrients and soil amendments.

II. Purposes

This standard establishes the acceptable criteria and documentation requirements for a plan that addresses the application and *budgeting*[1] of nutrients for plant production. All nutrient sources, including soil reserves, commercial fertilizer, manure, organic byproducts, legume crops, and crop residues shall be accounted for and properly utilized. These criteria are intended to minimize nutrient entry into surface water, groundwater, and atmospheric resources while maintaining and improving the physical, chemical, and biological condition of the soil.

III. Conditions Where Practice Applies

This standard applies to all *fields* where plant nutrient sources and soil amendments are applied during the course of a *rotation*.

IV. Federal, State, and Local Laws

Users of this standard are responsible for compliance with applicable federal, state, and local laws, rules, or regulations governing nutrient management systems. This standard does not contain the text of federal, state, or local laws. Implementation of this standard may not eliminate nutrient losses that could result in a violation of law.

V. Criteria

This section establishes requirements for planning, design parameters, acceptable management processes, and performance requirements for nutrient management plan development and implementation. Nutrient management plans shall be prepared according to all of Criteria A., B., C., D., and E.

All of the information contained in this section is required. Wisconsin Conservation Planning Technical Note WI-1 is the companion document to this standard and includes criteria that are required where referenced within this section.

A. Criteria for Surface and Groundwater Resources

1. Nutrient Criteria for All Sites

   a. Develop and implement an annual field-specific nutrient application plan. Account for the source, rate, timing, form, and method of application for all *major nutrients* consistent with this standard and soil fertility recommendations found in University of Wisconsin-Extension (UWEX) Publication A2809, "Soil Test Recommendations for Field, Vegetable and Fruit Crops," unless use of one the following options are appropriate:

      - For crops not listed in A2809, use other appropriate Land Grant University recommendations.
      - For nutrient application decisions based on plant tissue analysis, the sampling and testing of plants and the resulting nutrient recommendations shall be done in accordance with University of Wisconsin recommendations. See V.A.1.l.

      Annual plan updates shall document the crops, tillage, nutrient application rates, and methods actually implemented.

   b. The plan shall be based on yield goals that are attainable under average growing conditions and established

[1] Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

using soil productivity, local climate information, multi-year *documented yields*, and/or local research on yields for similar soils and crop management systems. Yield goals should not be higher than 15% above the previous 3-5 year average.

c. Soils shall be tested a minimum of once every four years by a DATCP-certified laboratory for pH, phosphorus (P), potassium (K), and organic matter. A laboratory list is provided in Appendix 2 of the Wisconsin Conservation Planning Technical Note WI-1. Soil sampling shall be consistent with UWEX Publication A2100, "Sampling Soils for Testing." For perennial fruit crops, use of soil test recommendations from UWEX Publication A-2809 is only required as the basis for fertilizer applications prior to establishment of new plantings. Subsequent nutrient recommendations should be based on plant tissue analysis results. See V.A.1.l.

d. Annual P and K nutrient recommendations may be combined into a single application that does not exceed the total nutrient recommendation for the rotation. This combined annual application is not allowed on frozen or snow covered soil. Commercial P fertilizers shall not be applied to soils with P tests in the non-responsive range for the crop being grown with the exception of not more than 20 pounds per acre P_2O_5 as starter for corn or recommended rates of starter P_2O_5 for potatoes and other vegetable crops as identified in UWEX Publication A3422, "Commercial Vegetable Production in Wisconsin." All the P and K starter fertilizer shall be credited against crop needs. When grouping fields for nutrient application purposes, N, P, and K application rates shall match individual field recommendations as closely as possible.

e. Where practical, adjust soil pH to the specific range of the crop(s) grown to optimize nutrient utilization.

f. Available nitrogen from all sources shall not exceed the annual N requirement of non-legume crops consistent with UWEX Publication A2809, or the annual N uptake by legume crops. Because of variability in N mineralization and manure applications, it is acceptable for available N to be up to 20% more than the recommended N rate when legumes, manures, and organic byproducts are used to meet the entire N requirement of the crop to be grown.

Starter N fertilizers are to be credited against crop needs as follows: all N beyond 20 pounds per acres for corn and 40 pounds per acre for potatoes.

g. First year available N in manure applied to fields prior to legume crop establishment shall not exceed the first year's annual N removal by legumes and companion crop. See Wisconsin Conservation Planning Technical Note WI-1, Part II B.4.

h. First and second-year legume credits shall be applied as identified in UWEX Publication A2809, Table 25, or through soil nitrate testing as identified in UWEX Publication A3624, "Soil Nitrate Tests for Wisconsin Cropping Systems."

i. Estimates of first-year available nutrient credits for manure shall be established in accordance with one of the following methods:

(1) A manure analysis from a laboratory participating in the Manure Analysis Proficiency (MAP) testing program and interpreted according to Part III, Table 3 of the Wisconsin Conservation Planning Technical Note WI-1, or

(2) Estimates of first-year available nutrients from manure. See Part III, Table 4 of the Wisconsin Conservation Planning Technical Note WI-1.

Note: It is strongly recommended that second-year nutrient credits, especially for areas receiving consecutive manure applications, be

included in the nutrient management plan using values in Part III, Table 4 of Wisconsin Conservation Planning Technical Note WI-1 or soil nitrate testing.

j. Organic byproducts other than manure (i.e., industrial wastes, municipal sludge, and septage) applied to fields shall be analyzed for nutrient content and applied in accordance with applicable regulations including restrictions on heavy metal content and land application rates.

k. Manures, organic byproducts, and fertilizers shall not run off the field site during or immediately after application. If ponding, runoff, or drainage to subsurface tiles of the applied materials occurs, implement the following activities as appropriate:

(1) Stop application.

(2) Take corrective action to prevent offsite movement.

(3) Modify the application (rate, method, depth of injection, timing) to eliminate runoff or drainage to subsurface tiles.

(4) Notify the Wisconsin Department of Natural Resources (WDNR) in the event that a spill or accidental release of any material or substance when required by the Agricultural Spill Law (s.289.11, Wis. Stats.) or the terms of a WPDES permit. Refer to the Wisconsin Conservation Planning Technical Note WI-1, Part IV, for contact information and "Agricultural Spills and How to Handle Them," Pub-RR-687-2002, August 2002.

l. Where nutrient application decisions are based on plant tissue analysis, the sampling and testing of plants and the resulting nutrient recommendations shall be done in accordance with University of Wisconsin recommendations in the references section of this standard. Nutrient recommendations for cranberries may be based on plant analysis as defined by appropriate publications in the references section of this standard.

m. Where *gleaning/pasturing* occurs, verify through computations that the nutrients deposited as manure within a field, do not exceed the N and P requirements of this standard.

2. Nutrient Application Prohibitions

a. Nutrients shall not be spread on the following features:

(1) Surface water, established *concentrated flow channels,* or non-harvested *permanent vegetative buffers.*

(2) A non-farmed wetland, sinkhole, nonmetallic mine, or well.

(3) The area within 50 feet of a potable drinking water well shall not receive mechanical applications of manure.

(4) Areas contributing runoff within 200 feet upslope of *direct conduits to groundwater* such as a well, sinkhole, fractured bedrock at the surface, *tile inlet,* or nonmetallic mine unless the nutrients are *effectively incorporated* within 72 hours.

(5) Land where vegetation is not removed mechanically or by grazing, except to provide nutrients for establishment and maintenance, unless necessary in an emergency situation.

(6) Fields exceeding *tolerable soil loss (T).* Erosion controls shall be implemented so that tolerable soil loss (T) over the crop rotation will not be exceeded on fields that receive nutrients.

b. When frozen or snow-covered soils prevent effective incorporation at the time of application and the nutrient application is allowed, implement the following:

(1) Do not apply nutrients within the *Surface Water Quality Management Area (SWQMA)*

except for manure deposited through winter gleaning/pasturing of plant residue.

(2) Do not apply nutrients to locally identified areas delineated in a *conservation plan* as contributing nutrients to direct conduits to groundwater or surface water as a result of runoff.

(3) Do not exceed the P removal of the following growing season's crop when applying manure. Liquid manure applications are limited to 7,000 gallons per acre. The balance of the crop nutrient requirement may be applied the following spring or summer. Winter applications shall be conducted according to Section VII.B.

(3) Do not apply nutrients on slopes greater than 9%, except for manure on slopes up to 12% where cropland is contoured or contour strip cropped.

(5) Do not apply N and P in the form of commercial fertilizer. An exception is allowed for grass pastures and on winter grains that do not fall within a prohibition area defined by V.A.2.

3. Nutrient Application Restrictions

a. When unincorporated liquid manure applications (less than 12% solids) occur on non-frozen soils within a SWQMA, use Table 1 to determine maximum acceptable rates. No applications are allowed on *saturated soils*.

Sequential applications may be made to meet the desired nutrient additions consistent with this standard. Prior to subsequent applications soils shall be evaluated using Table 1 or wait a minimum of 7 days.

Table 1.

Surface Texture Class[1]	**Max Application Rate** *gal/acre*		**Allowable Soil Moisture Description for Applications**
	*< 30%**	*≥ 30%**	
Fine	3000	5000	Easily ribbons out between fingers, has a slick feel.
Medium	5000	7500	Forms a ball, is very pliable, slicks readily with clay.
Coarse	7000	10000	Forms a weak ball, breaks easily.

[1] Fine – clay, silty clay, silty clay loam, clay loam
Medium – sandy clay, sandy clay loam, loam, silt loam, silt
Coarse – loamy sand, sandy loam, sand. This category also includes peat and muck based on their infiltration capacity.

* Crop residue or vegetative cover on the soil surface after manure application.

b. For all nutrient applications on non-frozen soil within a SWQMA use one or more of the following practices as appropriate to address water quality concerns for the site:

(1) Install/maintain permanent vegetative buffers (harvesting is allowed unless restricted by other laws or programs). Refer to NRCS Field Office Technical Guide (FOTG), Section IV, Standard 393, Filter Strip, or ATCP 48 for land in drainage districts.

(2) Maintain greater than 30% crop residue or vegetative cover on the soil surface after nutrient application.

(3) Incorporate nutrients within 72 hours leaving adequate residue to meet tolerable soil losses.

(4) Establish cover crops promptly following application.

B. Criteria to Minimize Entry of Nutrients to Groundwater

To minimize N leaching to groundwater on *high permeability soils*, or soils with less than 20 inches to bedrock, or soils with less than 12 inches to *apparent water table,* or within 1000 feet of a municipal well, apply the following applicable management practices:

Note: A list of soils with a high potential for N leaching to groundwater is provided in Appendix 1 of the Wisconsin Conservation Planning Technical Note WI-1.

1. Where sources of N are applied:

a. No fall commercial N applications except for establishment of fall-seeded crops. Commercial N application rates, where allowed, shall not exceed 30 pounds of available N per acre.

b. On irrigated fields, including irrigated manure, apply one of the following management strategies:

(1) A split or delayed N application to apply a majority of crop N requirement after crop establishment.

(2) Utilize a nitrification inhibitor with ammonium forms of N.

2. When manure is applied in late summer or fall to meet the fertility needs of next year's crop and soil temperatures are greater than 50°F, apply one of the following options:

a. Use a nitrification inhibitor with liquid manure and limit N rate to 120 pounds available N per acre.

b. Delay applications until after September 15 and limit available N rate to 90 pounds per acre.

c. Apply to fields with perennial crops or fall-seeded crops. N application shall not exceed 120 pounds available N per acre or the crop N requirement, whichever is less.

3. When manure is applied in the fall and soil temperatures are 50°F or less, limit available N from manure application to 120 pounds per acre or the crop N requirement, whichever is less.

Note: The restrictions in B. 2. and 3. do not apply to spring manure applications prior to planting. The balance of the crop N requirements may be applied the following spring or summer.

4. Where P enrichment of groundwater is identified as a conservation planning concern, implement practices to reduce delivery of P to groundwater.

C. Additional Criteria to Minimize Entry of Nutrients to Surface Water

1. Where manure, organic byproducts, or fertilizers are applied:

a. Avoid building soil test P values when possible beyond the non-responsive soil test range for the most demanding crop in the rotation. For most agronomic crops in Wisconsin, the non-responsive soil test range is 30 to 50 parts per million (ppm) Bray P-1 soil test.

b. Establish perennial vegetative cover in all areas of concentrated flow resulting in reoccurring gullies.

2. Develop a P management strategy when manure or organic by-products are applied during the crop rotation to minimize surface

water quality impacts. Use either the *Phosphorus Index (PI)* in section a., or Soil Test Phosphorus Management Strategy found in section b. The single strategy chosen, either a. or b., shall be applied uniformly to all fields within a farm or tract.

Note: First year available N in manure applied to fields prior to legume crop establishment shall not exceed the first year's annual N removal by legumes and companion crop. See Wisconsin Conservation Planning Technical Note WI-1, Part II B.4. Available N applied cannot exceed the N need or legume crop N removal of the next crop to be grown.

a. PI Strategy – The planned average PI values for up to an 8-year rotation in each field shall be 6 or lower. P applications on fields with an average PI greater than 6 may be made only if additional P is needed according to UWEX soil fertility recommendations. Strategies for reducing the PI, algorithms, and software for calculating the Wisconsin PI can be found at http://wpindex.soils.wisc.edu/.

b. Soil Test Phosphorus Strategy - Management strategies based on soil test phosphorus may be used. Operations using this strategy shall have a conservation plan addressing all soil erosion consistent with the current crops and management or use the erosion assessment tools included with the Phosphorus Index model. In crop fields where ephemeral erosion is an identified problem, a minimum of one of the following runoff-reducing practices shall be implemented:

   - Install/maintain contour strips and/or contour buffer strips. Refer to NRCS FOTG, Section IV, Standard 585, Strip Cropping, and/or Standard 332, Contour Buffer Strip.
   - Install/maintain filter strips (NRCS FOTG, Section IV, Standard 393, Filter Strip) along surface waters and concentrated flow channels that empty into surface waters that are within or adjoin areas where manure will be applied.
   - Maintain greater than 30% crop residue or vegetative cover on the soil surface after planting.
   - Establish fall cover crops.

   Available phosphorus applications from all sources shall be based on the following soil test P values (Bray P-1).

   (1) Less than 50 ppm soil test P: nutrient application rates allowed up to the N needs of the following crop or the N removal for the following legume crop.

   (2) 50-100 ppm soil test P: P application shall not exceed the total crop P removal for crops to be grown over a maximum rotation length of 8 years.

   (3) Greater than 100 ppm soil test P: eliminate P applications, if possible, unless required by the highest P demanding crop in the rotation. If applications are necessary, applications shall be 25% less than the cumulative annual crop removal over a maximum rotation length of 8 years.

   (4) For land with potatoes in the rotation, total P applications shall not exceed crop removal over a maximum rotation length of 8 years if soil tests are in the optimum, high, or excessively high range for potatoes.

D. Additional Criteria to Minimize N and Particulate Air Emissions

Where air quality is identified in a conservation plan as a resource concern, apply a management strategy that minimizes nutrient volatilization and particulate losses while maintaining tolerable soil erosion levels for wind and water.

E. Additional Criteria to Protect the Physical, Chemical, and Biological Condition of the Soil

1. Nutrients shall be applied in such a manner as not to permanently degrade the soil's

structure, chemical properties, or biological condition.

2. To the extent practical, nutrients shall not be applied to flooded or saturated soil when the potential for soil compaction and/or the creation of ruts is high.

VI. Considerations

The following are optional management considerations and are not required practices.

A. Promote seeding and stabilization of concentrated flow channels, installation and maintenance of vegetative filter strips, riparian buffers and other buffer strips adjacent to surface water and wetlands in conjunction with other conservation practices in order to reduce the amounts of sediment and nutrients that reach surface water and/or groundwater.

B. Corn nitrogen recommendations in A2809 can be adjusted for the effects of current corn and nitrogen fertilizer prices using the N rate calculator available at http://www.uwex.edu/ces/crops/NComparison.htm. Additional management practices that can be utilized to improve N use efficiency can be found in the Wisconsin Conservation Planning Technical Note WI-1, Part II.

C. Apply nutrients not specifically addressed by this standard (i.e., secondary and micro nutrients) based on recommendations found in UWEX Publication A2809.

Since specific environmental concerns have not been identified for potassium (K), K additions in manure or bio-solids will be determined by rate limits for the N or P in those materials. Commercial fertilizer K applications equal to crop removal will avoid building soil test K levels. K may be applied equal to crop removal at any soil test K level. Dairy producers should monitor K levels in forages and take additional steps to reduce soil K levels if consumption of forage with high K levels becomes an animal health problem.

D. To minimize N leaching on medium and fine-textured soils, avoid fall commercial N applications for crops to be seeded the following spring. When commercial N is applied in the fall, use ammonium forms of N and delay N application until soil temperatures drop below 50°F. Use of a nitrification inhibitor with fall-applied N is recommended.

E. Irrigated fields should use irrigation scheduling strategies with the intent of minimizing leaching losses and improving water use efficiency and not exceeding intake/infiltration capacity of the soil.

F. Consider the use of animal feeding strategies based on published nutrition research findings (National Research Council, etc.) to reduce excess P in rations when manure applications are made to cropland.

G. Consider delaying surface applications of manure or other organic byproducts if precipitation capable of producing runoff is forecast within 24 hours of the time of planned application.

H. Consider modifications to the crop rotation to provide crop fields for the application of manure during the summer crop growing season.

I. Manure top-dressed on existing forages should not exceed the nutrient equivalent of 35 pounds N – 25 pounds P_2O_5 – 80 pounds K_2O (first year availability per acre) or no more than 10 tons of solid manure per acre per harvest. Additional management considerations can be found in "Applying Manure to Alfalfa," North Central Regional Research Report 346.

J. For fields directly adjacent to, or with areas of concentrated or channelized flow that drain directly to, Outstanding, Exceptional or nutrient impaired surface waters, avoid raising soil test P levels to the maximum extent practicable. In addition, implement conservation practices that reduce delivery of nutrients to these waters. For operations using the P-Index in high environmental risk areas, the P-Index values should be reduced to the maximum extent practicable by applying additional ~~using~~ conservation practices.

K. Where residual nitrate carryover is probable, the preplant soil nitrate test is recommended to adjust N application rates.

VII. Plans and Specifications

A. The minimum requirements for a nutrient management plan are specified in the previous sections of this standard and expanded in Part I of the Wisconsin Conservation Planning Technical Note WI-1. Include in a nutrient management plan:

- a soil map and aerial photograph of the site;

- current and planned crops and crop yields; realistic yield goals;
- results of soil, plant, manure, or organic byproduct sample analysis;
- recommended nutrient application rates;
- documentation of actual nutrient applications including the rate, form, timing, and method. Revise the plan to reflect any changes in crops, yields, tillage, management, and soil or manure analyses;
- the location of sensitive areas and the resulting nutrient application restrictions;
- guidance for implementation, maintaining records;
- each field's tolerable and actual soil losses;
- soil test P-ppm; P balance, or P Index level where applicable;
- other management activities required by regulation, program requirements, or producer goals;
- a narrative to explain other implementation clarifications.

B. Winter Spreading Plan – The plan shall identify those areas of fields that meet the restrictions for frozen or snow-covered ground identified in this standard. If necessary, land application of manure on frozen and snow-covered ground shall occur on those fields accessible at the time of application that represent the lowest risk of runoff and deliverability to areas of concentrated and channelized flow and surface waters. Low-risk fields shall be identified using either the P-Index or an approved conservation plan. In general, fields most suitable for land application during frozen and snow-covered ground conditions include those fields:

- with low slope,
- with low erosion,
- with high levels of surface roughness,
- with the greatest distance to surface waters and areas of concentrated flow,
- with no drainage to Outstanding/ Exceptional/nutrient impaired water bodies,
- with low delivery potential during active snowmelt.

Refer to section VIII.E for storage/infield stacking of manure during periods of active snowmelt.

C. Persons who review or approve plans for nutrient management shall be certified through any certification program acceptable to the NRCS (NRCS General Manual, Title 180, Part 409.9, NRCS TechReg) or other appropriate agencies within the state.

D. Industrial wastes and byproducts and municipal sludge are regulated by the Wisconsin Department of Natural Resources (WDNR). They must be spread in accordance with a Wisconsin Pollution Discharge Elimination System (WPDES) permit as obtained from the WDNR.

E. Plans for nutrient management shall be developed in accordance with policy requirements of the NRCS General Manual Title 450 Part 401.03 and Title 190, Part 402, the contents of this standard, the procedures contained in the National Planning Procedures Handbook, and NRCS National Agronomy Manual, Section 503.

F. Plans for Nutrient Management that are elements of a more comprehensive conservation plan shall recognize other requirements of the conservation plan and be compatible with the other requirements. A Comprehensive Nutrient Management Plan (CNMP) is a conservation system unique to animal feeding operations (AFO). The CNMP will be developed to address the environmental risks identified during the resource inventory of an AFO. A CNMP will require use of all the applicable criteria in this technical standard along with the additional criteria located in NRCS National Planning Procedures Handbook, Subpart B, Part 600.54.

VIII. Operation and Maintenance

A. Document the actual nutrient application including the rate, form, timing, and method of the application. Revise the plan to reflect any changes in crops, tillage or management, soils, and manure tests.

B. Evaluate the need to modify field operations to reduce the risk of large nutrient losses during a single runoff event based on current field conditions or forecasted weather events.

C. Minimize operator exposure to potentially toxic gases associated with manure, organic wastes, and chemical fertilizers, particularly in enclosed areas. Wear protective clothing appropriate to the material being handled.

D. Protect commercial fertilizer from the weather, and agricultural waste storage facilities from accidental leakage or spillage. See Wisconsin administrative rules and county or local ordinances concerning regulations on siting, design, operation, and maintenance of these facilities.

E. During periods when land application is not suitable, manure shall be stored in a manure storage facility designed in accordance with the criteria contained in NRCS FOTG Standard 313, Waste Storage Facility. Temporary management of manure shall be in accordance with the criteria for temporary unconfined stacks of manure contained in Table 7 of Standard 313.

F. When cleaning equipment after nutrient application, remove and save fertilizers or wastes in an appropriate manner. If the application equipment system is flushed, use the rinse water in the following batch of nutrient mixture where possible or dispose of according to state and local regulations. Always avoid cleaning equipment near high runoff areas, ponds, lakes, streams, and other water bodies. Extreme care must be exercised to avoid contaminating potable drinking water wells.

G. The application equipment shall be calibrated to achieve the desired application rate.

IX. References

Cranberry Tissue Testing for Producing Beds in North America (1995) Davenport et al., Oregon State Univ. Ext. Serv. Pub. CM8610.

Mineral Nutrition for Fruit Crops, Roper, Univ. of Wisconsin Dept. of Horticulture Pub.

National Research Council (NRC) Nutrient Requirements of Dairy Cattle, National Academy Press, 7th Revised Edition, 2001.

Nitrogen for Bearing Cranberries in North America (2000) Davenport et al., Oregon State Univ. Ext. Pub.

North Central Regional Research Report 346, Applying Manure to Alfalfa, December 2003.

Phosphorus for Bearing Cranberries in North America (2004) Roper et al., Univ. of Wisconsin Ext. Pub.

TechReg Website: http://techreg.usda.gov

USDA, NRCS, General Manual, Title 180, Part 409 Conservation Planning Policy, Wisconsin Supplement 409.9, Minimum Criteria to Achieve an NRCS Certified Conservation Planner Designation.

USDA, NRCS, General Manual, Title 190, Part 402, Nutrient Management.

USDA, NRCS, National Agronomy Manual, October 2002.

USDA, NRCS, National Planning Procedures Handbook, Amendment 4, March 2003.

USDA, NRCS, National Handbook of Conservation Practices, Subpart B, Part 600.54, Element Criteria for CNMP Development.

USDA, NRCS, Wisconsin Conservation Planning Technical Note WI-1, Companion Document to NRCS FOTG Standard 590, Nutrient Management.

USDA, NRCS, Wisconsin Field Office Technical Guide (FOTG), Section I, Erosion Prediction, Maps.

USDA, NRCS, Wisconsin Field Office Technical Guide (FOTG), Section II, Soil Interpretations (T-Value).

USDA, NRCS, Wisconsin Field Office Technical Guide (FOTG), Section IV, Practice Standards and Specifications.

University of Wisconsin-Extension (UWEX) Publication A2100, Sampling Soils for Testing, May 2, 2001.

University of Wisconsin-Extension (UWEX) Publication A2809, Soil Test Recommendations for Field, Vegetable, and Fruit Crops, revised 1998.

University of Wisconsin-Extension (UWEX) Publication A3340, Corn Fertilization.

University of Wisconsin-Extension (UWEX) Publication A3392, Guidelines for Applying Manure to Cropland and Pasture in Wisconsin, August, 1995.

University of Wisconsin-Extension (UWEX) Publication A3422, Commercial Vegetable Production in Wisconsin, 2005.

University of Wisconsin-Extension (UWEX) Publication A3512, Wisconsin's Preplant Soil Profile Nitrate Test, 1990.

University of Wisconsin-Extension (UWEX) Publication A3517, Using Legumes as a Nitrogen Source, September 1997.

University of Wisconsin Extension (UWEX) Publication A3557, Nutrient Management: Practices for Wisconsin Corn Production, September 1994.

University of Wisconsin-Extension (UWEX) Publication A3568, A Step-by-Step Guide to Nutrient Management, May 1992.

University of Wisconsin-Extension (UWEX) Publication A3624, Soil Nitrate Tests for Wisconsin Cropping Systems, 1994.

University of Wisconsin-Extension (UWEX) Publication A3634, Nitrogen Management on Sandy Soils, 1995.

University of Wisconsin-Extension (UWEX), Nitrogen Source and $ Rate of Return Calculator, Rankin, http://www.uwex.edu/ces/crops/NComparison.htm

University of Wisconsin-Extension (UWEX), NPM Program, Know How Much You Haul!, ipcm.wisc.edu.

University of Wisconsin-Extension (UWEX) Publication A3769, Recommended Methods of Manure Analysis, 2003.

University of Wisconsin Soil and Forage Analysis Lab Sampling for plant analysis: http://uwlab.dyndns.org/marshfield/ (Click on Lab procedures and then plant analysis).

Wisconsin Administrative Code, Department of Agriculture, Trade and Consumer Protection, Chapter 48, Drainage Districts.

Wisconsin Phosphorus Index: http://wpindex.soils.wisc.edu/.

X. Definitions

Apparent Water Table (V.B) - Continuous saturated zone in the soil to a depth of at least 6 feet without an unsaturated zone below it.

Budgeting (II) - Document present and prior year's crop, estimated nutrient removal by these crops and known nutrient credits. When nutrients are applied for future crop needs in the rotation, implement a tracking process to allow adjustment of subsequent nutrient applications so that the total amount of nutrients applied to the farm or tract complies with this standard and is documented in the plan. Required as a component for all nutrient management plans (VII.A.; Wisconsin Conservation Planning Technical Note WI-1 Part 1 B.d. (1), (2); C.6.).

Concentrated Flow Channel (V.A.2.a.(1)) - A natural channel or constructed channel that has been shaped or graded to required dimensions and established in perennial vegetation for the stable conveyance of runoff. This definition may include non-vegetated channels caused by ephemeral erosion. These channels include perennial and intermittent streams, drainage ditches, and drainage ends identified on the NRCS soil survey and not already classified as SWQMAs. Concentrated flow channels are also identifiable as contiguous up-gradient deflections of contour lines on the USGS 1:24,000 scale topographic map. The path of flow to surface water or direct conduits to groundwater must be documented. For construction, refer to NRCS FOTG Standard 412, Grassed Waterway, for more information.

Conservation Plan (V.A.2.b.(2)) - A plan developed and field verified by a conservation planner to document crop management and the conservation practices used to control sheet and rill erosion to tolerable levels (T) and to provide treatment of ephemeral soil erosion. A conservation plan must be signed by the land operator and approved by the county land conservation committee or their representative. A conservation plan will be needed for designating winter spreading restrictions other than those specifically listed in this standard, and when implementing the soil test P management strategy where the soil erosion assessment is not calculated with the Wisconsin Phosphorus Index model. A conservation planner must develop conservation plans using the minimum criteria found in the USDA, NRCS National Planning Procedures Handbook and the Wisconsin Field Office Technical Guide and be qualified by one of the following:

1. Meeting the minimum criteria in the NRCS General Manual, Title 180, Part 409.9(c), NRCS Certified Conservation Planner Designation.

2. Meeting criteria established by the county land conservation committee.

3. Meeting the NRCS TechReg Certified Conservation Planner Option 1, 2, 3.

Direct Conduits to Groundwater (V.A.2.a.(4)) - Wells, sinkholes, swallets (a sinkhole or rock hole that intercepts a stream, diverting all or a portion of it to the groundwater), fractured bedrock at the surface, mine shafts, non-metallic mines, tile inlets discharging to groundwater quarries, or depressional groundwater recharge areas over shallow fractured bedrock. For the purpose of nutrient management planning, these features will be identified on the NRCS soil survey and/or USGS 1:24,000 scale topographic map, or otherwise determined through

on-site evaluation and documented in a conservation plan.

Documented yields (V.A.1.b.) - Crop production yield-records documented by field for at least two consecutive years that are used to determine phosphorus and potassium fertility recommendations. Yield record documentation may include measurements of harvested crop weight, volume, or the use of calibrated yield-monitors.

Effectively Incorporated (V.A.2.a.(4)) - Means the mixing with the topsoil or residue or subsurface placement of nutrients with topsoil by such means as injector, disc, sweep, mold-board plow, chisel plow, or other tillage/infiltration methods. Nutrients will not run off the field or drain to subsurface tiles during application.

Fields (III) - A group or single nutrient management unit with the following conditions: similar soil type, similar cropping history, same place in rotation (i.e., second year corn fields, established alfalfa), similar nutrient requirements, and close proximity. Examples include: alternate strips in a contour strip system, pasture, variable rate nutrient application management units, and other management units where grouping facilitates implementation of the nutrient management plan.

Gleaning / Pasturing (V.A.1.m.) - An area of land where animals graze or otherwise seek feed in a manner that maintains the vegetative cover over all the area and where the vegetative cover is the primary food source for the animals. Livestock shall be managed to avoid the routine concentration of animals within the same area of the field. Manure deposited near a well by grazing of livestock does not require incorporation.

High Permeability Soils (V.B) - Equivalent to drained hydrologic group A that meet both of the following criteria:

1. Permeability = 6 inches/hour or more in all parts of the upper 20 inches and

2. Permeability = 0.6 inches/hour or more in all parts of the upper 40 inches.

Use the lowest permeability listed for each layer when evaluating a soil. For a multi-component map unit (complex), evaluate each component separately. If the high permeability components meet the criteria and cannot be separated, the entire map unit should be considered as high permeability.

Major Nutrients (V.A.1.a) - Nitrogen (N), phosphorus (P), and potassium (K).

Note (V.A.1.i.) - Any section labeled as a 'note' is to be considered a recommendation rather than a requirement. The note is included in the criteria section to ensure subject continuity.

Permanent Vegetative Buffer (V.A.2.a.(1)) - A strip or area of perennial herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forest land) and environmentally sensitive areas (as defined in NRCS Technical Standard 393, Filter Strip).

Phosphorus Index (PI) (V.C.2) - The Wisconsin Phosphorus Index (PI) is an assessment of the potential for a given field to deliver P to surface water. The PI assessment takes into account factors that contribute to P losses in runoff from a field and subsequent transport to a water body, including:

- Soil erosion as calculated using the current approved NRCS soil erosion prediction technology located in Section I of the NRCS FOTG.
- Estimated annual field rainfall and snowmelt runoff volume.
- Soil P concentrations as measured by routine soil test P (Bray P-1).
- Rate and management of P applications in the form of fertilizer, manure, or other organic material.
- Characteristics of the runoff flow pathway from the field to surface water.

The algorithms and software for calculating the Wisconsin PI can be found at http://wpindex.soils.wisc.edu/.

Rotation (III) - The sequence of crops to be grown for up to an 8-year period as specified by the conservation plan or as part of the soil erosion assessment calculated with the Wisconsin Phosphorus Index model.

Saturated Soils (V.A.3.a) - Soils where all pore spaces are occupied by water and where any additional inputs of water or liquid wastes cannot infiltrate into the soil.

Surface Water Quality Management Areas (SWQMA) (V.A.2.b.(1)) - For the purposes of nutrient management planning, Surface Water Quality Management Areas are defined as follows:

1. The area within 1,000 feet from the ordinary high-water mark of navigable waters that consist of a lake, pond or flowage, except that, for a navigable water that is a glacial

pothole lake, "surface water quality management area" means the area within 1,000 feet from the high-water mark of the lake.

2. The area within 300 feet from the ordinary high-water mark of navigable waters that consists of a river or stream that is defined as:

   - Perennial streams (continuous flow) identified on the NRCS soil survey and/or USGS 1:24,000 scale topographic map as solid lines,
   - Otherwise determined through an onsite evaluation and documented in an approved conservation plan.

   Areas within the SWQMA that do not drain to the water body are excluded from this definition.

Tile Inlet (V.A.2.a.(4)) - The interception of surface runoff within a concentrated flow channel or field depression, by a constructed device designed to direct runoff into an underground tile for conveyance to surface or groundwater.

Tolerable Soil Loss (T) - For sheet and rill erosion (V.A.2.a.(6)) - T-value means the maximum rate of soil erosion established for each soil type that will permit crop productivity to be sustained economically and indefinitely. Erosion calculations shall be based on current approved erosion prediction technology found in NRCS FOTG Section I or the soil loss assessment calculated using the Phosphorous Index Model. Tolerable soil erosion rates shall be determined using the RUSLE2 Related Attributes Report located in Section 2, e-FOTG, Soil Report.