

Wisconsin's Nutrient Management Standard 590

- Summary -

September 2005 Revision

Criteria for All Sites

1. General Cases

- A. Annual field-specific nutrient application plan consistent with UWEX soil fertility recs. (A2809).
- B. Plan shall be based on realistic yield goals – no higher than 15% above the previous 3-5 year average.
- C. Routine soil testing shall be conducted at least once every four years.
 - 1) Sample soils according to UWEX recs (A2100).
 - 2) Analysis by a WDATCP-certified lab.
- D. Annual phosphorus (P) and potassium (K) recommendations may be combined into a single application to meet the total nutrient needs over the crop rotation.
 - 1) Combined annual application not allowed on frozen or snow-covered ground.
 - 2) Commercial P fertilizer shall not be applied to fields with soil test P in the excessively high (non-responsive) range.
 - Exception of up to 20 lb/a of P₂O₅ starter for corn.
 - 3) Credit all P and K starter fertilizer against crop needs.
- E. Soil pH should be adjusted to optimum ranges.
- F. Nitrogen (N) applications shall not exceed annual crop need (or uptake).
 - 1) Exception: If legumes, manures, and/or organic byproducts are the only sources of N, N rate may exceed crop need by 20%.
 - 2) Credit any starter N fertilizer in excess of 20 lbs/a.
- G. First- and second-year legume-N credits shall be accounted and utilized.
- H. First-year available manure nutrient credits shall be accounted and utilized using either:
 - 1) Laboratory manure-nutrient analysis.
 - 2) UW estimates of first-year available nutrient content of manure.
- I. Other organic byproducts applied to fields need to be analyzed for nutrient content and applied according to existing regulations.
- J. Nutrients shall not run off fields during or immediately after application.
- K. Nutrient applications based on plant tissue analysis shall be done in accordance with UW sampling, testing, and interpretation guidelines.
- L. Where gleaming/pasturing occurs, do not allow the N and P manure additions to exceed the requirements of this standard.

2. Nutrient Application Prohibitions

- A. Nutrients shall not be spread on:
 - 1) Surface water, concentrated flow channels, vegetative buffers, non-farmed wetlands, sinkholes, gravel/sand pits, wells.
 - 2) Non-cropland and/or non-pastured land.
 - Exception: Establishment and maintenance nutrient requirements are allowed.
 - 3) Areas within 50 feet of a well - - applies to manure only.
 - 4) Areas contributing runoff 200 feet upslope of direct conduits to groundwater (wells, sinkholes, surface fractured bedrock, tile inlets, or gravel/sand mines) unless nutrients are incorporated within 3 days.
 - 5) Fields exceeding tolerable soil loss (T).
- B. Frozen or snow-covered soil nutrient application prohibitions:
 - 1) 1,000 feet of a lake, pond, flowage or within 300 feet of a river/perennial stream (SWQMAs),
 - 2) Areas identified as direct conduits to groundwater or surface water,
 - 3) P removal of the following growing season's crop is not to be exceeded when applying manure. Liquid manure applications limited to 7,000 gallons/acre,
 - 4) Slopes greater than 9%.
 - Exception: Up to 12% for manure applications on contoured or contour stripped fields.
 - 5) No commercial N or P fertilizer.
 - Exception: Grass pastures and winter grains not contained in above prohibition areas.

3. Nutrient Application Restrictions

- A. Application rates for unincorporated liquid manure on non-frozen soils within a SWQMA are not to exceed Table 1 values.
 - 1) No applications allowed on saturated soils.
 - 2) Subsequent manure applications possible (as standard allows) after 7 days or after soil evaluation (Table 1).
- B. All nutrient applications on non-frozen soil within a SWQMA shall be in conjunction with one or more of the following practices:
 - 1) Permanent vegetative buffers,
 - 2) Greater than 30% crop residue or vegetative cover after nutrient application,
 - 3) Incorporation within 3 days of application leaving adequate residue to meet "T",
 - 4) Cover crops established promptly following application.

Criteria for Groundwater Protection

Applies to high permeability soils (sands, etc.), soils with less than 20 inches to bedrock, or soils with less than 12 inches to apparent water table. Also fields within 1,000 feet of a municipal well

1. N Application Restrictions:

- A. No fall applications of commercial N.
 - **Exception:** Establishment of fall-seeded crops - 30 lb N/acre maximum.
- B. Apply one of the following practices on irrigated fields, includes irrigated manure:
 - 1) Apply majority of N after crop establishment (sidedress or split), *or*
 - 2) Utilize a nitrification inhibitor with ammonium forms of N.

2. Manure-N Application Restrictions:

- A. When manure is applied in late summer/fall when soil temperatures are greater than 50° F, meet one of the following:
 - 1) Use a nitrification inhibitor with liquid manure and limit rate to 120 lbs N/acre,
 - 2) Apply after Sept. 15 and limit rate to 90 lbs N/acre,
 - 3) Apply to perennial or fall-seeded crops and limit rate to 120 lbs N/acre *or* the crop's N requirement – whichever is less.
- B. When manure is applied in fall and soil temperatures are 50° F or lower, limit rate to 120 lbs N/acre *or* the crop's N requirement – whichever is less.

3. P Leaching Restrictions:

- A. Where P additions to groundwater are identified, implement practices to reduce P delivery.

Criteria for Surface Water Protection

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

- A. Avoid building soil test P values beyond the excessively high range for the most demanding crop in the rotation (30 to 50 ppm for most agronomic crops).
- B. Establish perennial vegetative cover in all areas of concentrated flow where gullies occur.

2. Develop a plan for managing P when manure or organic byproducts are applied using one of the following strategies. Selected strategy must be applied uniformly to all fields within a farm or tract.

- A. Phosphorus Index (PI) Strategy:
 - 1) The PI assesses P delivery to surface waters from fields. See <http://wpindex.soils.wisc.edu>,
 - 2) The planned PI value for up to an 8-year rotation of each field shall be 6 or lower.
 - 3) P applications on fields with a PI > 6 are allowed only if needed according to UWEX soil fertility recs.

B. Soil Test P Strategy:

- 1) P applications from all sources must be based on the following soil test P values:
 - a) < 50 ppm P - Nutrient applications allowed up to crop N need/removal,
 - b) 50 – 100 ppm P - Applications of P shall not exceed crop removal of P over a rotation (8 year max),
 - c) > 100 ppm P - Eliminate P applications, unless required by highest P-demanding crop in the rotation.
 - **Exception:** If P (i.e. manure-P) must be applied, applications shall be 25% less than the cumulative annual crop P removal over the rotation (8 year max).
 - **Exception:** For potatoes, P applications shall not exceed rotational crop removal (8 year max) if soil tests are optimum, high, or excessively high for potatoes.

Criteria for Air Quality Protection

Where air quality is identified as a concern, a management plan that minimizes N volatilization and particulate emissions while maintaining "T" shall be applied.

Criteria for Soil Quality Protection

1. Nutrients shall be applied in a manner that does not permanently degrade the soil's physical, chemical, or biological conditions.
2. To the extent practical, nutrients shall not be applied to flooded or saturated soils when the potential for soil compaction is high.

Table 1. Maximum unincorporated liquid manure application rate within a SWQMA.

Soil Texture Class ¹	Maximum Application Rate		Allowable Soil Moisture Description for Applications
	< 30% ²	> 30% ²	
	----- gal/acre -----		
Fine	3,000	5,000	Easily ribbons out between fingers, slick feel.
Medium	5,000	7,500	Forms a ball, very pliable, slicks readily with clay.
Coarse	7,000	10,000	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. The coarse category also includes peat and muck.

² Crop residue or vegetative cover on the soil surface after manure application.