

Nutrient Management Planning Workbook



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USDA-NRSC 590 Nutrient Management Standard for Wisconsin



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Sample Farm

- ◉ Hilltop Acres Farm
 - Operator = Fred Johnson
- ◉ Dairy Farm with 65 milking cows
 - Daily haul
- ◉ Operates 170 acres of cropland
- ◉ Grows corn for grain and silage, oatlage with alfalfa seeding, alfalfa, and wheat
 - Typical tillage is fall chisel, no disk

Manure Crediting

full total - empty total ÷ 2000 = tons manure/load

overcrediting.

STEP 2. DETERMINE SPREADING RATE

Method 1: Using field records, enter the number of loads applied on a known acreage.

of loads # of acres loads / acre tons manure/load tons / acre
 ÷ = x =

Method 2: Estimation only. Using a measuring wheel, measure the area covered by a single load.

tons manure/load ft wide ft length tons / acre estimate
 x 43,560 ft²/acre ÷ [x] =

On the rented farm, Fred spread 65 loads on 21 acres.

STEP 3. DETERMINE MANURE NUTRIENT CREDITS

Enter the available nutrient content of manure

lb/ton tons / acre lb/acre

N x =

P₂O₅ x =

K₂O x =

Multiply the nutrient content by the spreading rate to get the pounds per acre of each nutrient.

Estimated Available Manure Nutrient Content

for crop use in the first year after spreading solid manure.

(Manure nutrient content can vary greatly; manure analysis is encouraged.)

Animal	N			P ₂ O ₅	K ₂ O
	more than 3 days*	1 hour to 3 days	less than 1 hour		
	lb/ton				
>20% dry matter Dairy	2	3	3	3	6
(11-20% dry matter) Dairy	2	2	3	3	5
Beef	3	4	5	6	10
Swine	7	9	12	10	8
Chicken	24	27	29	35	26

*Time to incorporation

Fred is spreading solid dairy manure with 11-20% dry matter, incorporated after 3 days.

Legume Credits

Fred's alfalfa stands are in fair condition (3 plants per square foot). When he kills off the alfalfa, there is less than 8" of regrowth. His fields have medium-textured soils.

1. What is the legume credit for the first year?



Nitrogen Credits for Alfalfa and Soybean in Wisconsin

First year credit:	MEDIUM & FINE TEXTURED SOILS		SANDS & LOAMY SANDS	
	> 8 inches of regrowth	< 8 inches of regrowth	> 8 inches of regrowth	< 8 inches of regrowth
Alfalfa (stand density)	Nitrogen Credit (lb N/acre)			
Good.....(70-100 % alfalfa, > 4 plants/ft ²)	190	150	140	100
Fair.....(30-70 % alfalfa, 1.5 - 4 plants/ft ²)	160	120	110	70
Poor.....(0-30 % alfalfa, < 1.5 plants/ft ²)	130	90	80	40

Second year credit: In the second cropping year following fair and good stands on medium and fine textured soil, you can take a 50 lb N/acre credit.

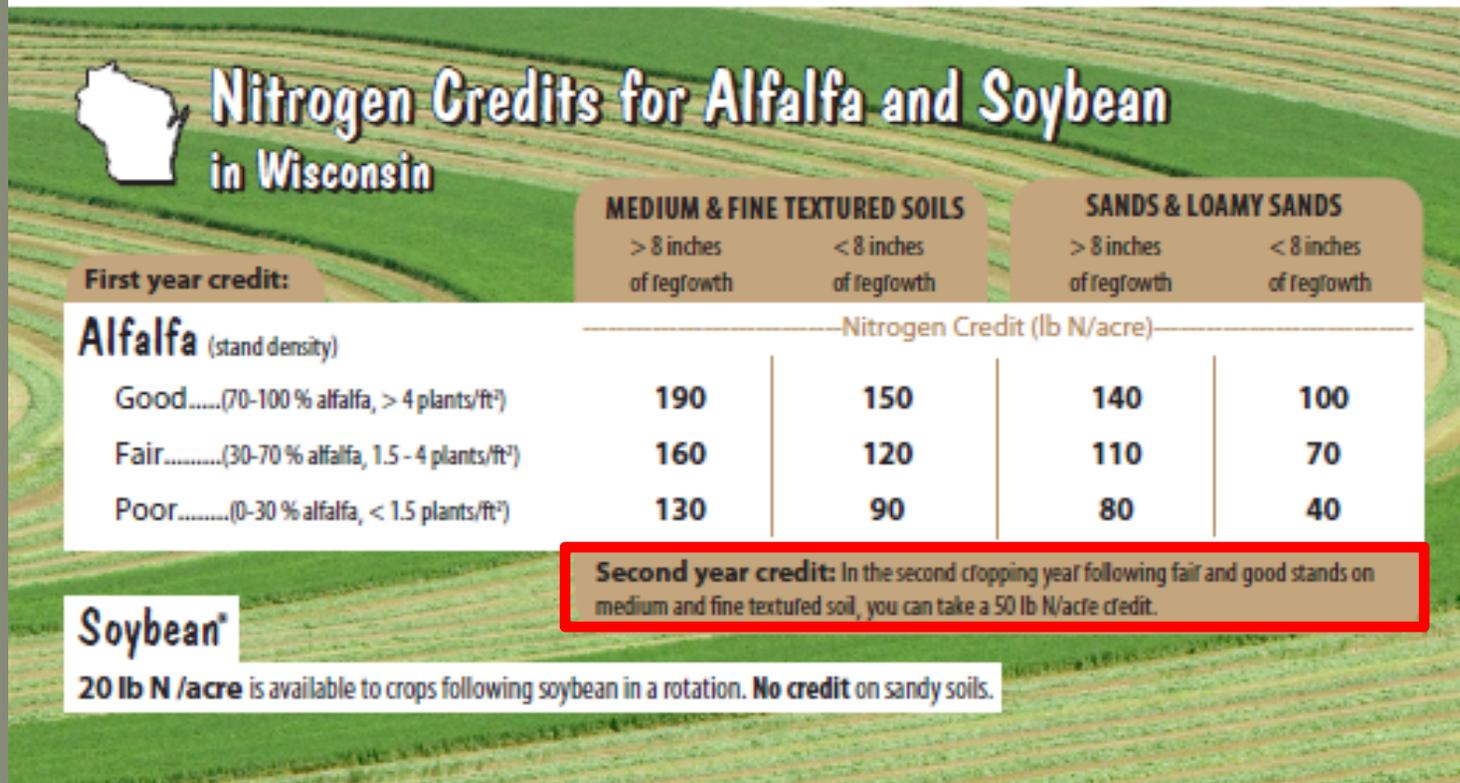
Soybean*

20 lb N /acre is available to crops following soybean in a rotation. **No credit** on sandy soils.

Legume Credits

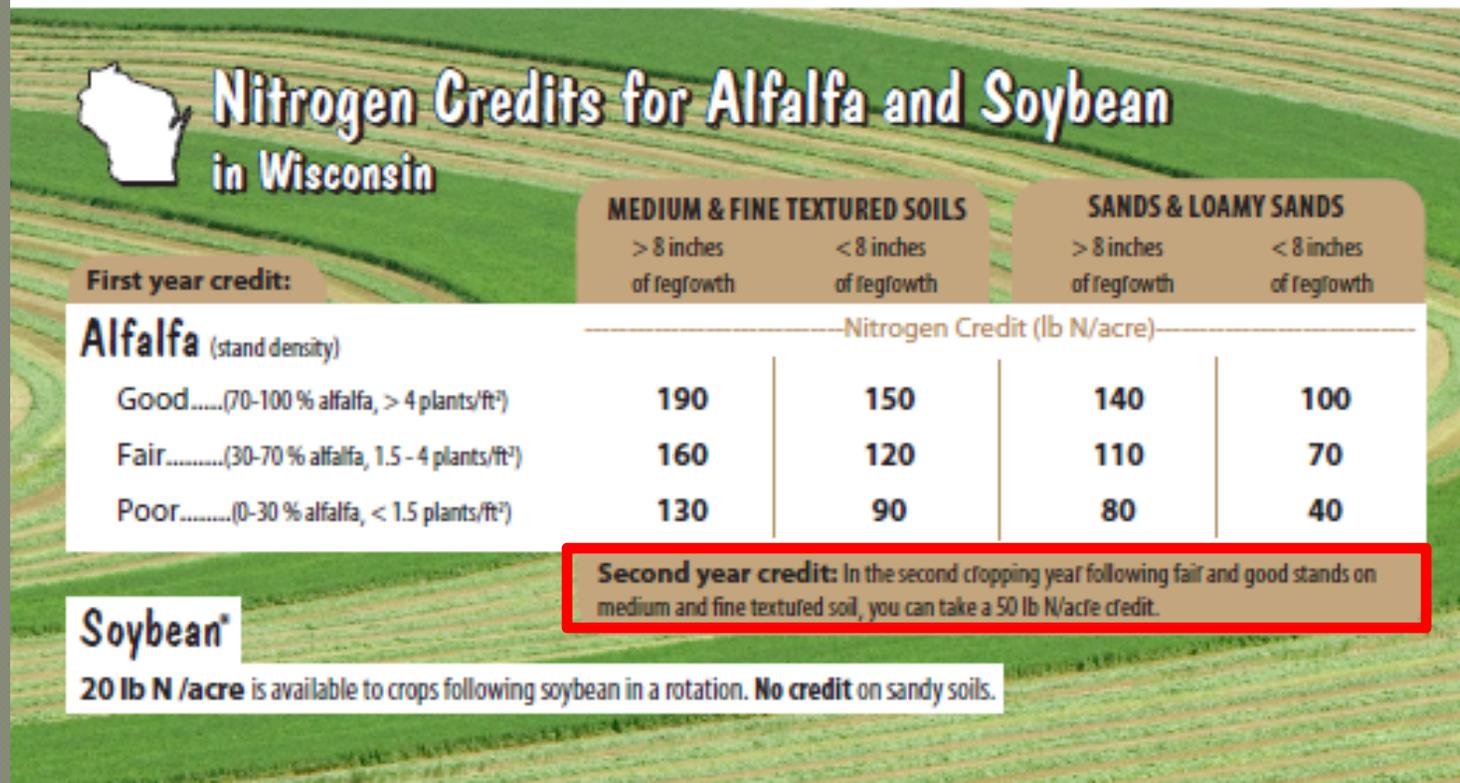
Fred's alfalfa stands are in fair condition (3 plants per square foot). When he kills off the alfalfa, there is less than 8" of regrowth. His fields have medium-textured soils.

2. Can a second year legume credit be taken?



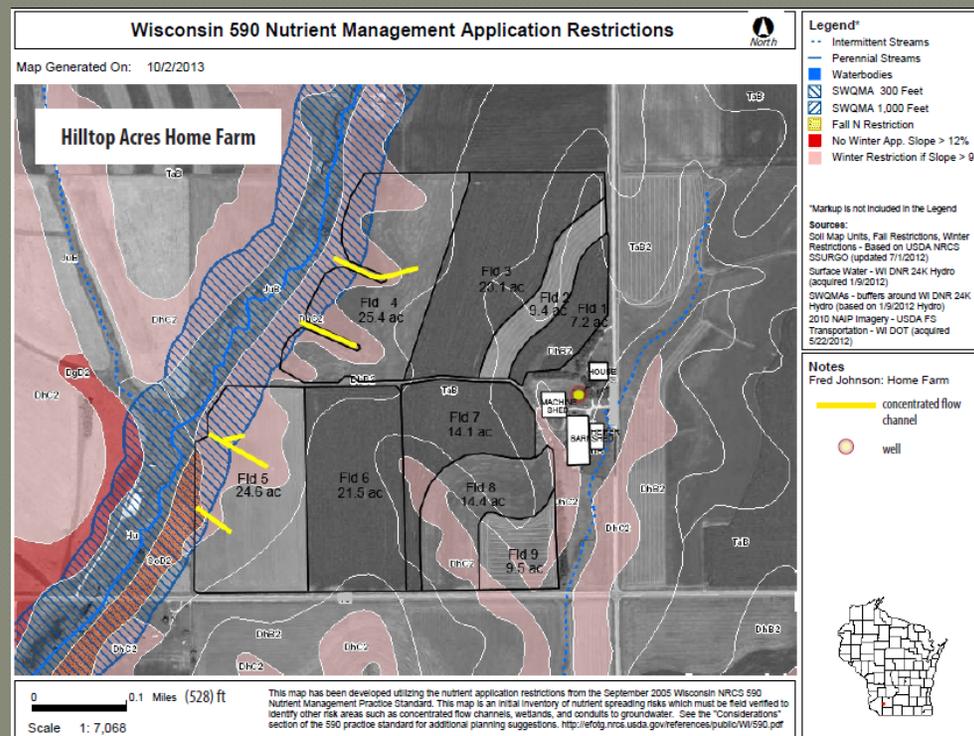
Legume Credits

3. Can you take a second year legume credit from alfalfa that is in poor condition at the time of kill?



Spreading Restrictions

- The next 8 questions pertain to the 590 restrictions which are symbolized on 590 maps:



Spreading Restrictions

1. If a field that is NOT contour plowed and has a **pink slope** area covering the majority of the field, can winter manure be spread on this field?

NO

● What if the field was contour plowed?

YES

Spreading Restrictions

2. How does a **red slope** effect winter spreading?

No spreading of
winter manure

Spreading Restrictions

3. A Surface Water Quality Management Area (SWQMA) is an area within:

1,000 feet from a lake or pond, and

300 feet from a stream or river

Spreading Restrictions

4. Can a field within a SWQMA be spread on during the spring or fall?

YES

◉ If so, are there any additional restrictions that must be followed?

YES

Spreading Restrictions

5. If a field has a speckled area, what does this mean?

It identifies a nitrogen restricted soil which has additional spreading restrictions, particularly in the fall

Spreading Restrictions

6. How many lbs of nitrogen from manure can be spread on a speckled area in the fall if soil temperatures are higher than 50°F (after Sept 15)?

90 lb N/ac

Spreading Restrictions

7. On N restricted soils, can you apply commercial nitrogen fertilizer in the fall on fall-seeded crops?

YES

◉ If so, what is the restriction?

May apply up to 30 lb N/ac

Spreading Restrictions

8. Can you spread manure on fields within 50 feet of a residential well?

NO

Spreading Restrictions

Fred's Manure Spreading and Cropping Plan					
Field	Acres	Prior year		Plan year (* not yet implemented)	
		Crop (rotation year)	Manure application rate/season	Crop (rotation year)	Manure application rate/season
Field 1	7.2	Corn silage (1)	4.5 loads/acre winter	Corn grain (2)	4.5 loads/acre winter*
Field 2	9.4	Alfalfa (4)	--	Alfalfa (5)	--
Field 3	23.1	Corn silage (1)	4.5 loads/acre spring	Corn grain (2)	4.5 loads/acre winter
Field 4	25.4	Alfalfa (4)	--	Alfalfa (5)	--
Field 5	24.6	Alfalfa (6)	--	Corn silage (1)	4.5 loads/acre spring*
Field 6	21.5	Corn grain (2)	4.5 loads/acre fall	Oatlage/alfalfa seeding (3)	--
Field 7	14.1	Oatlage/alfalfa seeding (3)	4.5 loads/acre winter	Alfalfa (4)	--
Field 8	14.4	Alfalfa (5)	--	Alfalfa (6)	--
Field 9	9.5	Corn grain (2)	4.5 loads/acre winter	Oatlage/alfalfa seeding (3)	4.5 loads/acre fall
Rented	21	Wheat (4)	--	Corn grain (1)	3 loads/acre fall

5. Are there any applications that you may need to adjust for the plan year according to the season because of spreading restrictions?

NO

Fertility Recommendations

Fertility Recommendations Worksheet:

Use the soil test information on the following page to complete the worksheet for the rented farm's field.

Prior Year's Crop:

Wheat

Soil Yield Potential (hint: see yellow box on soil test results)

Plan Year's Crop:

Corn grain

Plan Year's Crop Yield Goal:

Fred's Manure Spreading and Cropping Plan

Chart from page 9

Field	Acres	Prior year		Plan year (* not yet implemented)	
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Fertility Recommendations

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Prior Year's Crop: Soil Yield Potential (hint: see yellow box on soil test results)

Plan Year's Crop: Plan Year's Crop Yield Goal:

Soil Test P (ppm): Soil pH:

Soil Test K (ppm):

Using the information from the previous worksheets, fill in the

Was any manure applied to the rented field for the plan year?

If yes, include the manure credits in the brown boxes below (fr

Was there a legume crop on the rented field in the prior year that

If so, include the legume nitrogen credit below in the green b

Are there any spreading restrictions (see 590 explanations)?

Does the pH need adjusting?

Results from page 11					
Sample Identification	Soil pH	O.M. %	Phosphorus ppm	Potassium ppm	60-69 Lime Req (T/a)
33	6.2	3.6	22	125	
34	6.1	4.2	35	112	
35	6.0	3.9	19	140	
36	6.3	3.6	22	125	
37	6.2	4.1	29	128	
Avg	6.2	3.9	21	126	

Yes No

Fertility Recommendations

Fertility Recommendations Worksheet:

Recommendations
from page 11, corn
after wheat

	Recommendation (lb/a)		Manure Credits (lb/a)		Legume Credits (lb/a)		Adjusted Rec. (lb/a)
Nitrogen (N)	<input type="text" value="140"/>	subtract	<input type="text" value="24"/>	subtract	<input type="text" value="0"/>	equals	<input type="text" value="116"/>
Phosphorus (P)	<input type="text" value="75"/>	subtract	<input type="text" value="36"/>			equals	<input type="text" value="39"/>
Potassium (K)	<input type="text" value="60"/>	subtract	<input type="text" value="60"/>			equals	<input type="text" value="0"/>

Using the information from the previous worksheets, fill in the information for the rented field.

Was any manure applied to the rented field for the plan year?

Yes No

If yes, include the manure credits in the brown boxes below (from Manure Credit Worksheet):

Was there a legume crop on the rented field in the prior year that would provide a credit in the plan year?

Yes No

If so, include the legume nitrogen credit below in the green boxes below (from Alfalfa Credit Worksheet):

Are there any spreading restrictions (see 590 explanations)?

Yes No

Does the pH need adjusting?

Yes No

Fertility Recommendations

- What you know:

- Adjusted recommendation for determining fertilizer needs is 116-39-0
- Products Fred uses:
 - Starter 9-23-30 (typically 150 lb/ac)
 - 28% UAN (28-0-0)
 - DAP (18-46-0)
 - Potash (0-0-60)

What would you recommend for fertilizer?

Fertility Recommendations

Current Recommendation = 116-39-0

- 150 lbs/ac of 9-23-30 = 13-34-45

	N	P	K
Recommendation	116	39	0
Less Starter Fertilizer	13	34	45
Remaining Need	103	5	0

- 40 gal/ac of 28% UAN = 112-0-0

Fertility Recommendations

- Page 12 & 13:
- Fields are sorted by crop
 - Determine application rates by crop type based on the reports provided
 - *Hint: negative numbers identify where N, P, or K is needed*
 - Use the following fertilizers=
 - Starter 9-23-30
 - 28% UAN (28-0-0)
 - DAP (18-46-0)
 - Potash (0-0-61)

Fertility Recommendations

- Complete the fertilizer recommendation on pages 12-13
 - All manure and legumes have been credited, use adjusted recommendations shown
- Remember to keep your application method in mind when you determine how many application rates you want to use of each product needed

Fertilizer Quiz

- How many lbs of nitrogen are in 100 lbs of urea (46-0-0)?
- How many lbs of phosphorus are in 100 lbs of DAP (18-46-0)?
- How many lbs of nitrogen are in 10 gal of 28% UAN (28-0-0)?