Nutrient Application Planning for Pastures with SnapPlus

and

The Wisconsin P Index

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What's ahead:

- Wisconsin P Index
- P Index for pastures
- UW-Extension pasture recommendations
- Pasture nutrients in SnapPlus
- Examples and questions



County

Soil Type

Soil Test P and Organic Matter

Field Slope

Field Slope Length

Tillage

Rotation crops and yields

Manure Applications

P Fertilizer Applications

Downfield Slope to Surface Water

Distance to Surface Water

Stream

Wisconsin P Index

Calculated as P lb/acre/year delivered, average assuming long term weather

Field

Edge-of-Field Components Calculated P lb/acre/year delivered with average weather

Dissolved P soil Dissolved P manure/fertilizer Eroded sediment P

Field

Field-to-stream delivery ratio

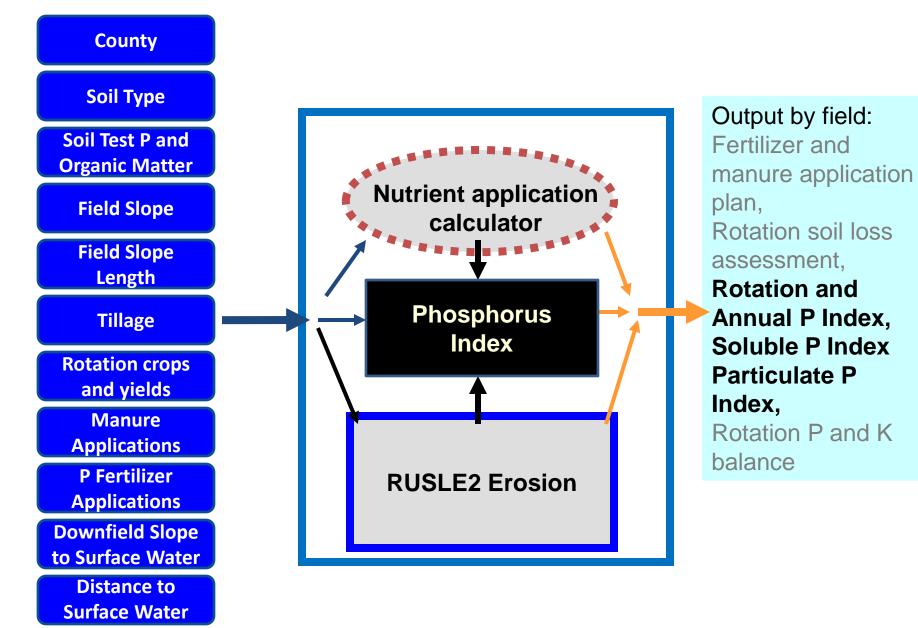
B. Filler aller an a point &

Stream

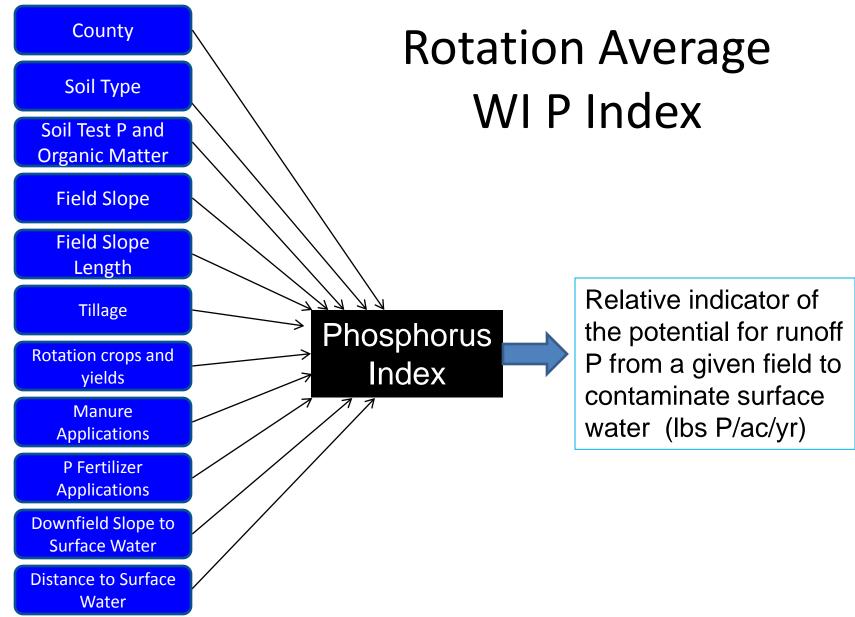


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WI P Index in NM Planning Software









Phosphorus Index Equations

Dissolved P from soil Dissolved P from manure and fertilizer Eroded sediment P

[P] x Transport = P delivered

Available P on Field Surface

Soil Type

County

Soil Test P and Organic Matter

Field Slope

Field Slope Length

Tillage

Rotation crops and yields

> Manure Applications

P Fertilizer Applications

Downfield Slope to Surface Water

Distance to Surface Water

Soil soluble P

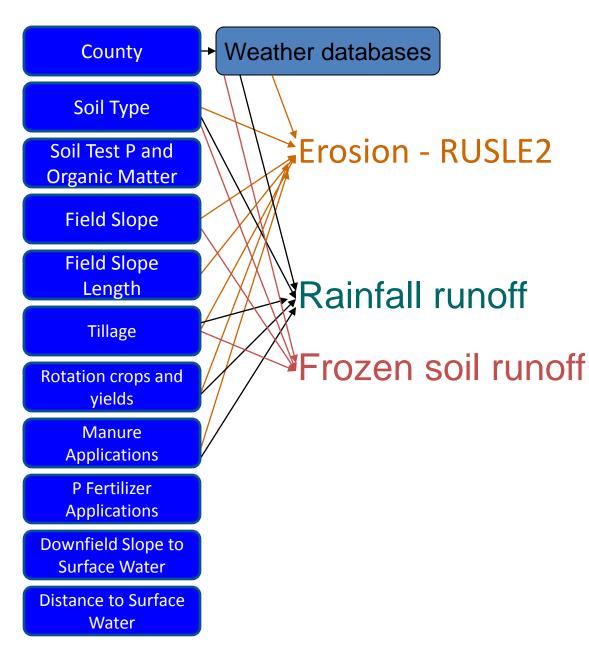
Soil total P

Manure & fertilizer soluble P





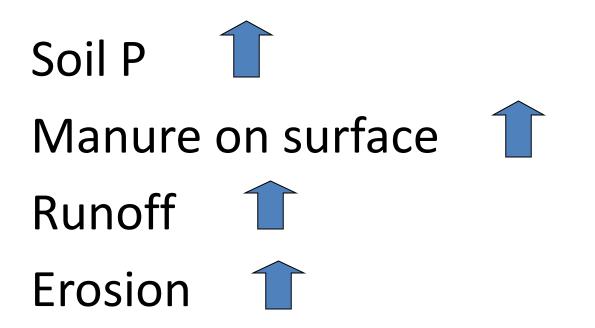
Field Transport Potential











P Index Varies with Management: Driftless Area Example

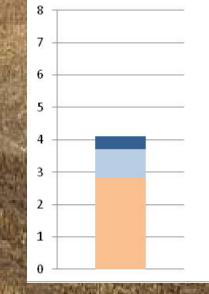
Cs-Cs-Cs-As-A-A

Soil test P = 70 ppm

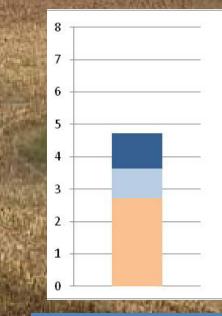


Particulate P

Fall chisel in 10,000 gal/acre dairy manure 5 T/a/yr erosion



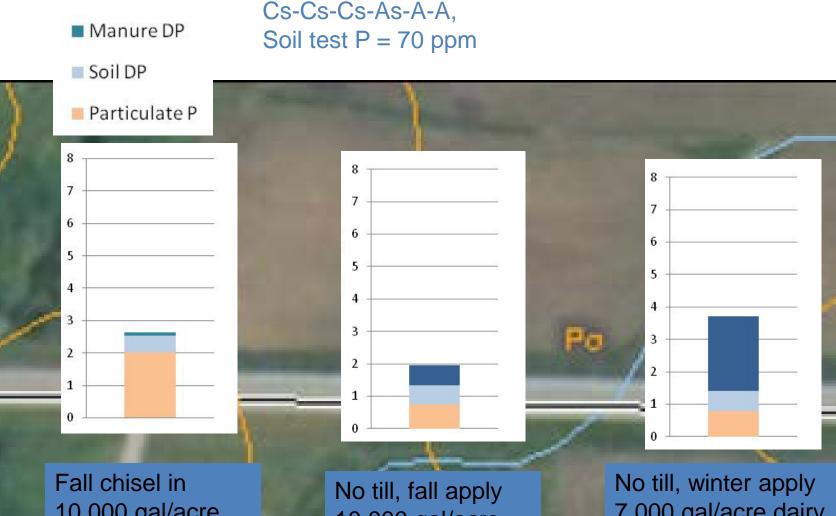
No till, fall apply 10,000 gal/acre dairy manure 2 T/a/yr erosion



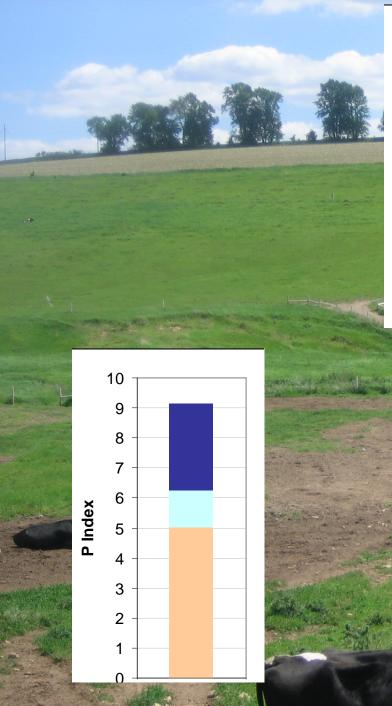
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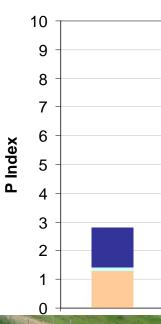
No till, winter apply 7,000 gal/acre dairy manure 2 T/a/yr erosion

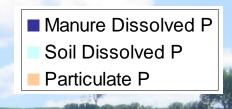
P Index Varies with Management: Eastern Wisconsin Example



Fall chisel in 10,000 gal/acre dairy manure 1.3 T/a/yr erosion No till, fall apply 10,000 gal/acre dairy manure 0.5 T/a/yr erosion No till, winter apply 7,000 gal/acre dairy manure 0.5 T/a/yr erosion

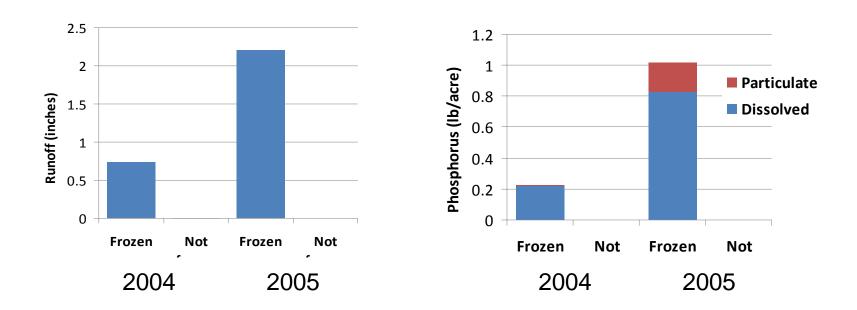






A Star Bar

Runoff Monitoring on Pasture at Pioneer Farm, Platteville



Majority of runoff P losses from pastures are dissolved P in snowmelt, rain on frozen soil

UW Extension Pasture Nutrient Recommendations

- Includes ALL nutrients recommended for yield of grass or grass + legumes
- Does not assume any nutrient return from urine or feces, so have to calculate return.

Pasture Fertility Recommendations

Soil test P is Optimum:18 ppm, Soil test K is Optimum: 110 ppm

Sandy, Silt, or Clay Loam Soil with > 2% OM, 2-3 ton removal per year

Seeding	ding N N seeding estblshd P2O5							
	lb/acre							
Grass	130	130	40	70				
Legumes < 30%	20	0	35	130				
Legumes > 30%	10	0	35	150				
Unimproved		100	40	140				

Pasture Manure Nutrients

Total N-P₂O₅-K₂O based on as-excreted "book values"

Total modified by percent available to account for losses, uneven distribution, variation from book values to get Plant Available N- N-P₂O₅-K₂O in lb/ton excreted



Application rates based on estimated amount excreted for time in field

 Dairy lactating 1200 lb cow per acre for 180 days = 11 T/a = (33-50-77)

Beef 1000 lb cow – 1 per acre for 180 days = 6
 T/a = (24-40-54)

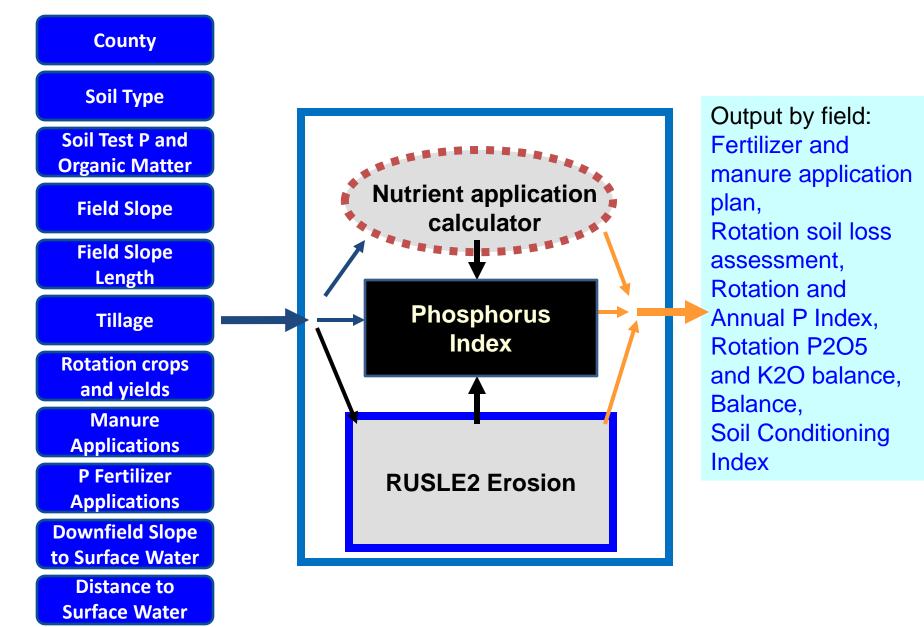
11 T/acre dairy (33-50-77) 6 T/a beef = (24-40-54)

Seeding	N seeding	N estblshd	P ₂ O ₅	K ₂ O						
		lb/acre								
Grass	130	130	40	70						
Legumes < 30%	20	0	35	65						
Legumes > 30%	10	0	35	75						
Unimproved		100	40	45						

Routine soil test program will ensure adequate P and K



SnapPlus NM Planning Software



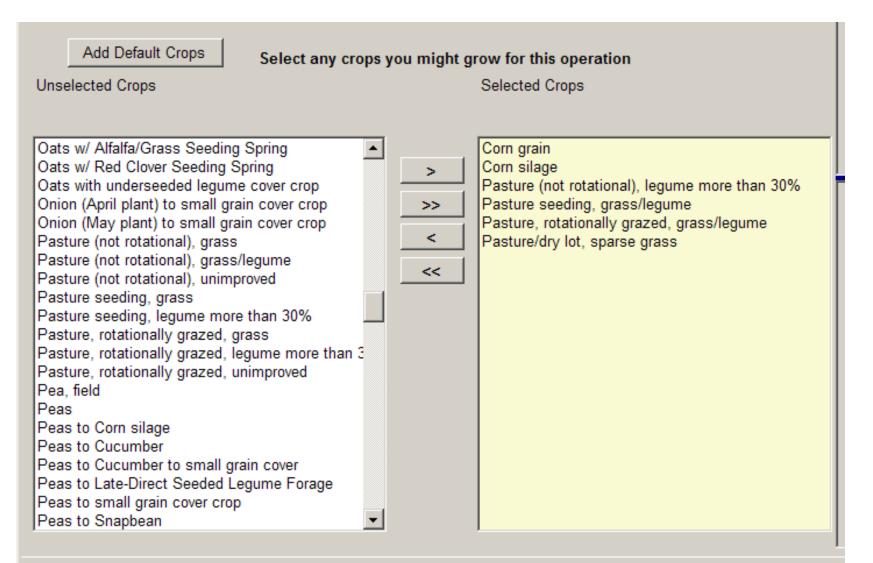


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File	Edit	View 1	Tools	Help									
Farm	Fields	Soil Tes	sts N	utrients	Cropping	Daily Log	Reports						

FARM SCREEN:

File Edit View Tools Help	
Location: C:\SnapPlus2MySnapPlusData\Adamski Farm.snapDb Farm Fields Soil Tests Nutrients Cropping Daily Log Reports Plan Completion / U Farm: Example Farm Fsa code: Farm Narrative: 2001-0	
Farm Fields Soil Tests Nutrients Cropping Daily Log Reports Plan Completion / U Farm: Example Farm Fsa code:	
Plan Completion / U Farm: Example Farm Fsa code: Farm Narrative: 2001-0:	
Farm: Example Farm Fsa code: Farm Narrative: 2001-0	
Contact name: Phone: Phone:	
	
Address: Cell:	
Fax:	
City: eMail:	
State: Zip: Contact county: Adams	~
Manure/Nutrient Credits Concentrated flow channel protection:	^
Do not use 2nd or 3rd year manure credits WPDES permited farm (CAFO)	
C Use 2nd year manure credits	
C Use 2nd and 3rd year manure credits	
Add Default Crops Select any crops you might grow for this operation	
Unselected Crops Selected Crops	
Oats w/ Alfalfa/Grass Seeding Spring Com grain	-
Oats with underseeded legume cover crop Pasture (not rotational), legume more than 30%	
Onion (April plant) to small grain cover crop Onion (May plant) to small grain cover crop Pasture, rotationally grazed, grass/legume Unselected Counties Unselected Counties	
Pasture/dry lot, sparse grass	
Pasture (not rotational), grass/legume Pasture (not rotational), unimproved	
Pasture seeding, grass	
Pasture seeding, legume more than 30% Pasture, rotationally grazed, grass Pasture seeding legume more than 30% >>	
Pasture, rotationally grazed, legume more than 3 Buffalo	
Pea, field	
Peas Chippewa Chippewa	
Peas to Cucumber	
Peas to Cucumber to small grain cover Crawford Dane	
Peas to small grain cover crop Dodge	
Peas to Snapbean	

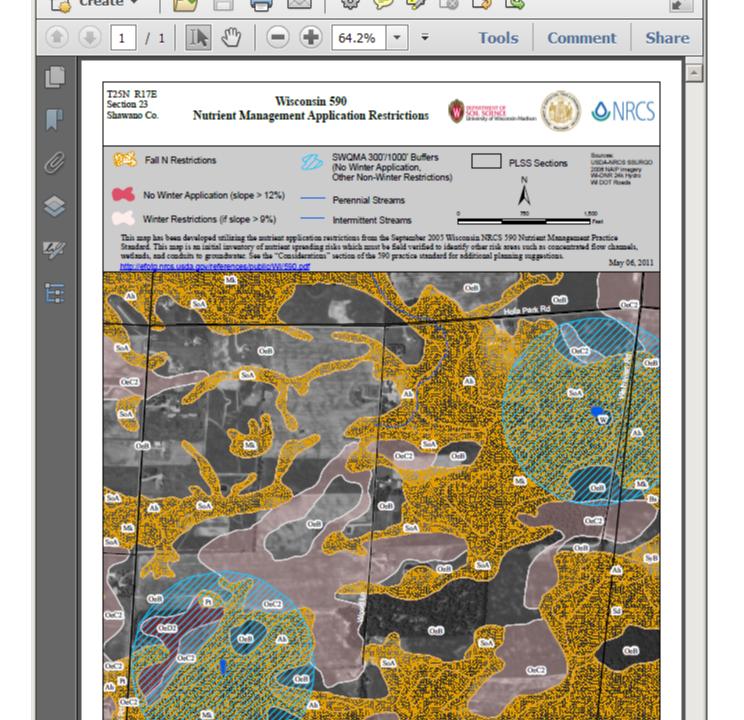
FARM SCREEN: SELECT CROPS



Success

FIELD SCREEN:

84 S	A SnapPlus 2.0.12292.1701													
File	a	Edit	V	iew To	ols Help									
Sub-Farm: Show all fields. 💌 Field: 1							Farm name: E Location: C:\Sna	xample Farm apPlus2\MySnapF	PlusData\Exam	ple Farm.snap	Db			
Farm		Field	s	Soil Tests	Nutrients C	ropping Daily I	og Reports							
Fiel	Fields Sub-Farms Groups													
	Add Field Delete Field													
	Ri	ight-	click	on the co	olumn header for	single or multi-o	ell editing of sel	ected cells.						
A L L	A		Symbol	Soil Soil Map Series Symbol Name (pre- (critical) dominant)		Soil Series Name (pre- dominant)	Re striction Features	Field Slope (%)	Field Slope Length (ft)	Below Field Slope to Water (%)				
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FIELD SCREEN: Select soil and distance to water

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SOIL TEST SCREEN

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Farm	Fields Soil Tests Nutrients Cropping Daily Log Reports					
So	oil test history for field: 1	Slope Soil Name Soil Symbol 4 Onaway OeB Onaway OeB				
	Add Soil Test Delete Current Test	Import Soil Test				
•	Avg pH	Avg OM (%)	Avg P (ppm)	Avg K (ppm)		
	7.6	4.8	15	60		
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9	SnapPlus 2.0.12292.1701												
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F	arm Fields Soil Tests Nutrients					Location: C:		wysnapPlusDa					
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l	pasture			Dairy, gra	azing	3	3	4		3	7	0.9	9
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	Fertilizer name	% N	% P2O5	% K2O	% S	% Mg	% Ca	Cost \$ per ton	r		Fertilizer name	% N	% P2O5
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🄲 SnapPlus 2.0.12292.1701

File Edit View Tools Help	
	Farm name: pastures3
	Location: C:\SnapPlus2\MySnapPlu
Farm Fields Soil Tests Nutrients Cropping Daily Log Reports	
	Grazing Estimator
Crop Year: 2012 🕂	
Nutrient sources Manure production estimator Animal units calculator Grazing herd s	Grazing application rate estimator
Add herd Delete this herd	Use herd information to fill daily manure production (optional)
Grazing/gleaning herd beef cows	Crop year: 2012 🗧
Add Animal Delete Selected Animal	Herd name: beef cows
Daily Total Daily Number of Manure Manure	Total daily herd manure production: 3.2 tons/day
Animal Type Animals Production (Ibs/animal) (Ibs/day)	Field/Pasture size: 100.0 ÷ acres
▶ Beef Cow 1000 lbs 100 63 6,300	Days on pasture: 240 ➡ days
	Percent of each day spent grazing: 80 😴 %
	Estimated application rate: 6 tons/acre
	Calculate Rate
	Close
Total daily production (all animals) 3.2	tons/day
Calculate	

			Loodion. o.ienapr
Fan	m Fields Soil Tests Nutrients Cropping Daily Log Reports		
	Crop Year: 2012 -		
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Γ	Grazing Estimator		Grazing Estimator
	Grazing application rate estimator		Grazing application rate estimator
	Use herd information to fill daily manure production (optional)		Use herd information to fill daily manure production (optional)
	Crop year: 2012 🛨	al [nur	Crop year: 2012 🛨
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	Days on pasture: 240 + days		Days on pasture: 125 🗧 days
	Percent of each day spent grazing: 80 ÷ %		Percent of each day spent grazing: 80 🕂 %
	Estimated application rate: 7.3 tons/acre		Estimated application rate: 19.1 tons/acre
	7 tons/acre Grazing Season	lcul	19 tons/acre Winter Season
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Setting up the rotation in Rotation Editor

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	3	Pasture, rotationally	💌	3.1-4.0	-	None		
	4	Pasture, rotationally	💌	3.1-4.0	•	None		
	5	Pasture, rotationally	💌	3.1-4.0	-	None		
	6	Corn grain	•	131-150	•	Spring MB Plow	-	
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Setting up the rotation in Rotation Editor

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	4	Pasture, rotationally	3.1-4.0	•	None	
	5	Pasture, rotationally	3.1-4.0	•	None	
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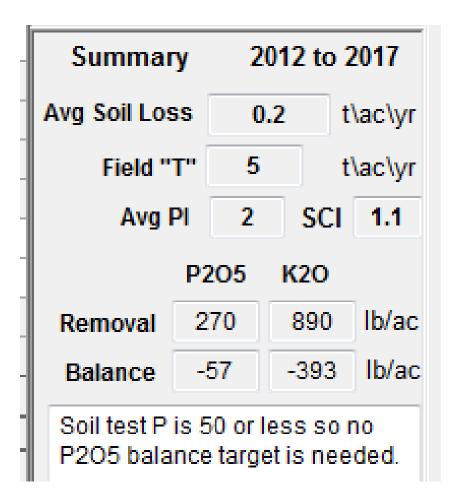
Cropping Screen

🄲 SnapPlus 2.0.12297.1514

File Edit View Tools Help

Sub-Farm: Show all fields.	Field: 1				Farm name: Example Farm Location: C:\SnapPlus2\MySnapPlusData\Example Farm.snapDb											
Farm Fields Soil Tests Nutrient	elds Soil Tests Nutrients Cropping Daily Log Reports															
NPM Fast Facts Year Soil Test	t pH	MO	P K	Cou	nty	Acres S	lope 3	Soil Name	Symb	ol Rest	P	Group	Texture			
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Yield Goal:	0.5-1.9		-	3.1-4.0		-	3.1-4.0)	-	3.1-4.0		•	3.1-4.0			
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Soil Test Date:	2012-10)-19	-	2012-10)-19	-	2012-1	10-19	-	2012-1	0-19	•	2012-1	0-19		
Lime Rec:		NA			NA			NA			NA			NA		
Irrigation / MRTN info:	r 🗆 Irrig	ated		🗌 Irrig	ated		Irri	gated		🗖 Irrig	ated		Irrig	ated		
Season notes:																
(Ibs/acre)	N	P205	K20	N	P205	K20	N	P205	K20	N	P205	K20	N	P20		
UW Recommendation:	20	35	160	0	45	210	0	45	210	0	45	210	0	45		
Prior years' extra:	-	0	0	-	7	0	-	0	0	-	0	0	-	0		
Adjusted UW recommendation:	20	35	160	0	38	210	0	45	210	0	45	210	0	45		
1st & 2nd year legume credit:	0	-	- 1	0	-	-	0	-	-	0	-	-	0	-		
2nd year manure credit:	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
This years' manure:	42	42	98	21	21	49	21	21	49	21	21	49	21	21		
This years' fertilizer:	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total credits & applications:	42	42	98	21	21	49	21	21	49	21	21	49	21	21		
Over(+)/Under(-) adj UW rec:	22	7	-62	21	-17	-161	21	-24	-161	21	-24	-161	21	-24		
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Sub-Farm: Show all fields. 🚽 🥃 Field:						Farm name: Example Farm											
Location: C:\SnapPlus2MySnapPlusData\Example Farm.snapDb																	
Farm Fields Soil Tests Nutrients Cropping Daily Log Reports																	
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SCI is Soil Conditioning Index: Greater than 0 means building organic matter

Highest annual P Index is 5 in corn year

Effect of changing soil test P or slope on rotation P Index

STP	Р
ppm	Index
15	2
150	3
300	4

Slope	Erosion T/a/yr	P Index
2%	0.2	1
4%	0.5	2
9%	1.1	2

Take home:

P Index are not likely to be high on managed pasture except for overwintering areas

