

Evening One Agenda

Make the most of what you have



Improve or change what you have



Evening One Agenda

☐ What do I have?

- ☐ Species

- ☐ Soil type

- ☐ Soil fertility

☐ What do I do with it?

- ☐ Improve fertility

- ☐ Improve cutting management

Would You keep it?

Why or why not?









Make the most of what you have

- Know what species you have
 - Look for the good stuff
 - Can you manage it to be more productive
 - Tailor your management to what you have
- Planting new takes resources and incurs a risk
 - If you aren't managing what you have now what you plant new may become what you have
 - Can you establish and manage a new seeding?

Grass

- Includes grasses and grass-like plants, sedges, rushes and lilies
- 1 Cotyledon or seed leaf - monocot
- Growing point internal - whorl
- Parallel leaf veins
- No secondary growth – no branching



Orchardgrass

A close-up photograph of a dense field of Orchardgrass. The grass consists of numerous long, narrow, flat leaves that are a vibrant green color. The leaves are arranged in a somewhat chaotic but dense pattern, with many blades pointing upwards and others leaning over. The lighting is bright, suggesting a sunny day, and the overall texture of the grass appears soft but firm.

Orchardgrass

- Leaf sheaths and stems flattened
- Leaf crosssection is V shaped



Orchardgrass

- Bunch grass

- Scattered winterkill in NYS



Orchardgrass
- Early maturing grass

Reed canarygrass

- Can be difficult to establish?
- Very persistent
- Relatively high protein





Reed canarygrass:

- Can be difficult to establish?
- Very persistent
- Relatively high protein



- Large ligule



Reed
Canarygrass



Timothy



Timothy



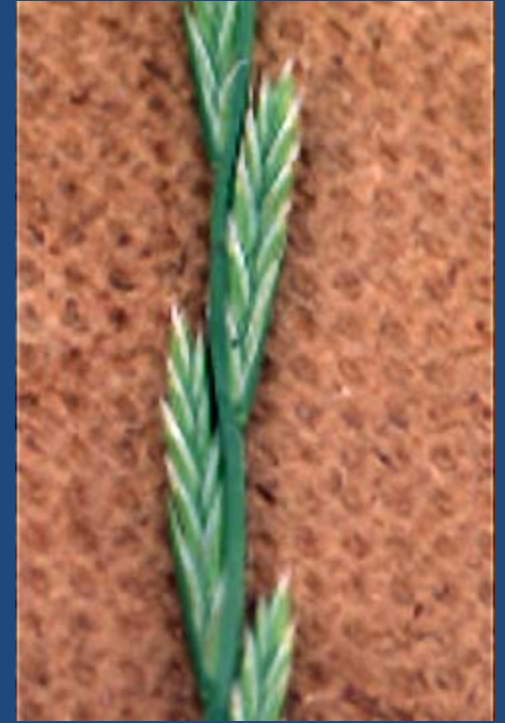


Tall Fescue

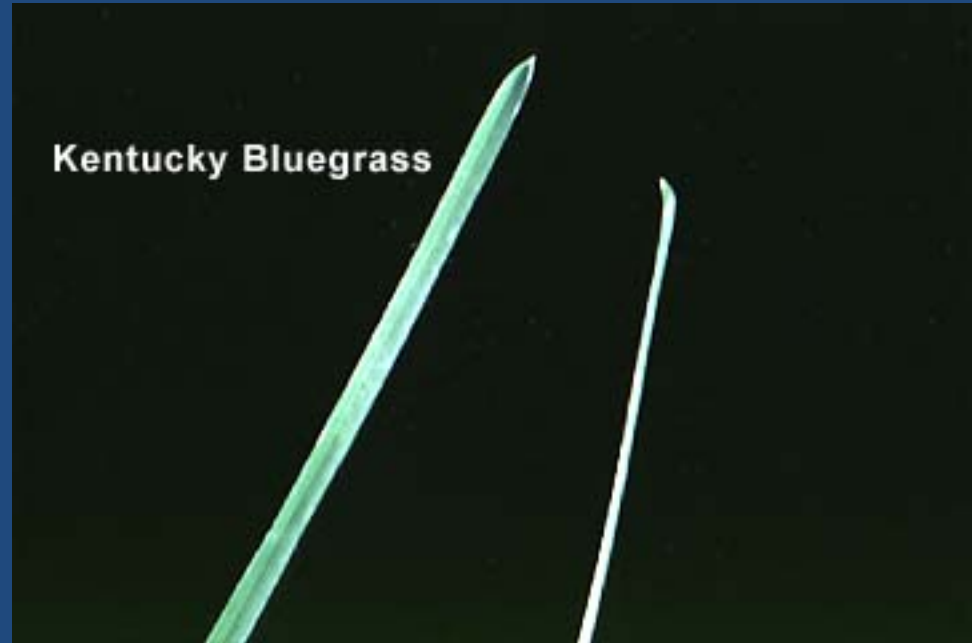
Tall Fescue



Perennial Ryegrass

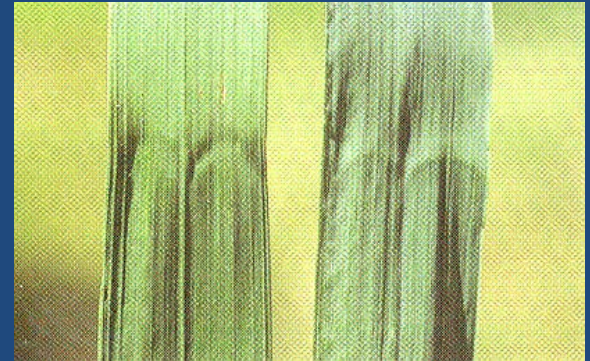


Kentucky Bluegrass



Smooth Bromegrass

- “M” constriction in middle of leaf
- Smooth seedhead that tends to flop to one side





Smooth brome grass

- Has distinctive *M* or *W* constriction in leaf
- Rhizomes, forms a sod

Quackgrass



Quackgrass





Tall grasses

- Orchardgrass, timothy, tall fescue, smooth brome grass. reed canarygrass
- Do not graze, mow or clip closer than 3 inches, reserves and new growth are in the stubble
- With the exception of orchardgrass will not tolerate frequent grazing below typical hay cutting height

Short grasses

- Bluegrass, perennial ryegrass
- Will tend to take shorter and more continuous grazing and mowing
- Bluegrass has basal tillers than seem to survive the closest clipping and grazing

Growth habit

- Bunch Type
 - orchardgrass, timothy, tall fescue, perennial ryegrass
- Sod Forming-Rizhomes
 - reed canarygrass,
smooth brome grass. bluegrass

Grass Regrowth

- Type of regrowth: culms = stems
 - Regrowth culmless: tall fescue, orchardgrass, bluegrass
 - Regrowth culmed: reed canarygrass, smooth brome grass
 - Regrowth culmed reproductive: timothy, perennial ryegrass

Apical Dominance

Growth is dominated by growing point at the tip of stem or root.

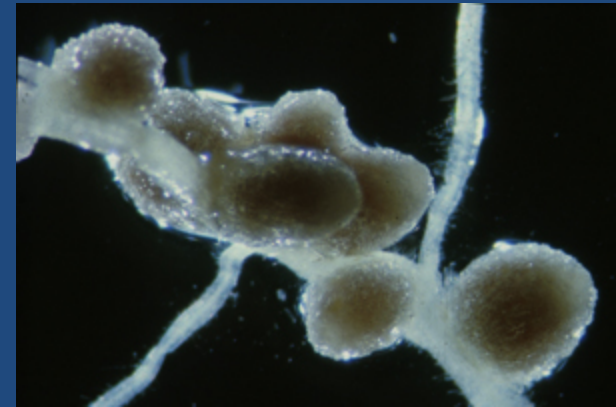
Removal allows new buds to form and grow.

- Strong
 - Timothy
 - Smooth Bromegrass
- Intermediate
 - Orchardgrass
 - Reed Canarygrass
 - Tall Fescue
- Weak
 - Perennial Ryegrass
 - Kentucky Bluegrass

Legume



- Dicot
 - Two leaf seedling
 - Leaf veins net like
 - New growth can come from new buds in above ground portion of plant
- Seed in pod
- Roots have nodules
 - Use an inoculant





Alfalfa





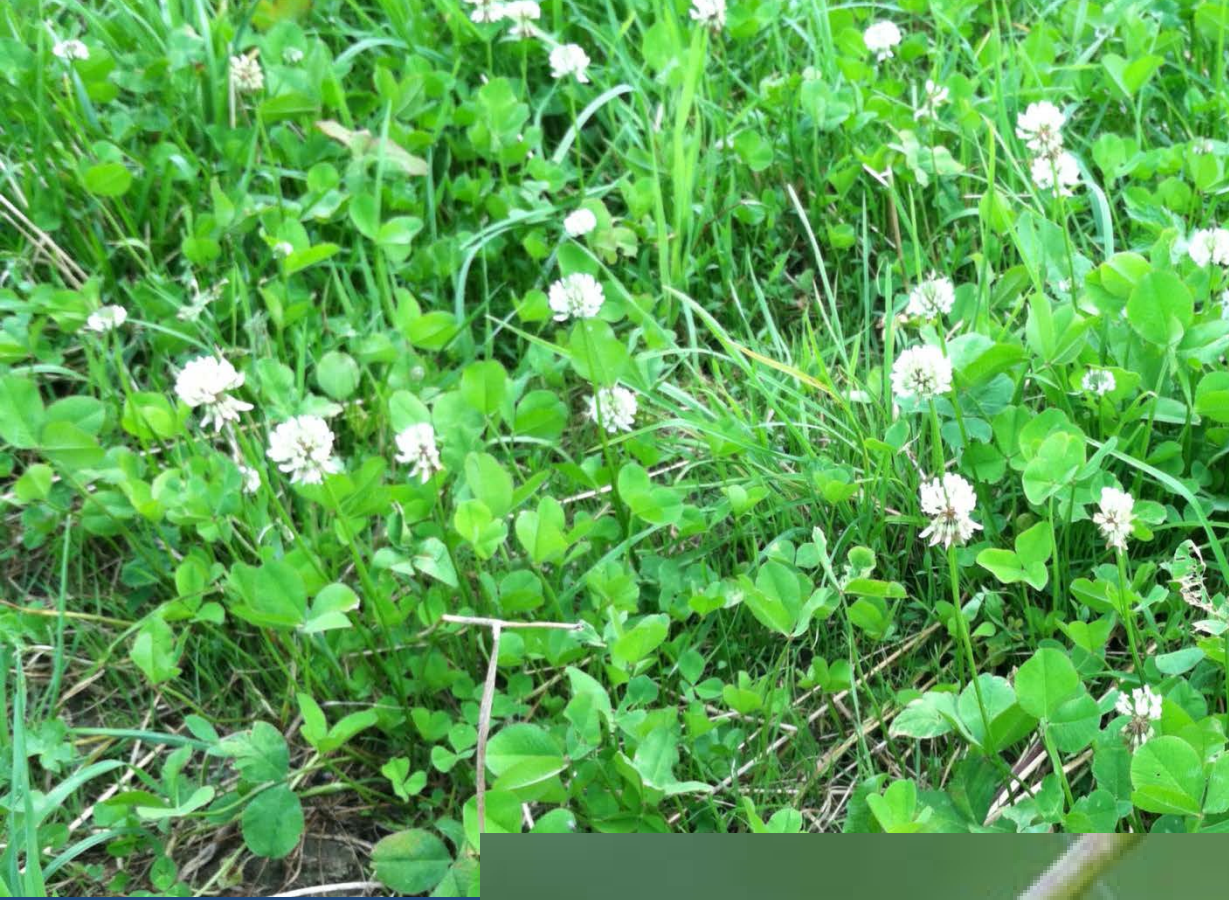
Red Clover



“V”
watermark

Red Flower

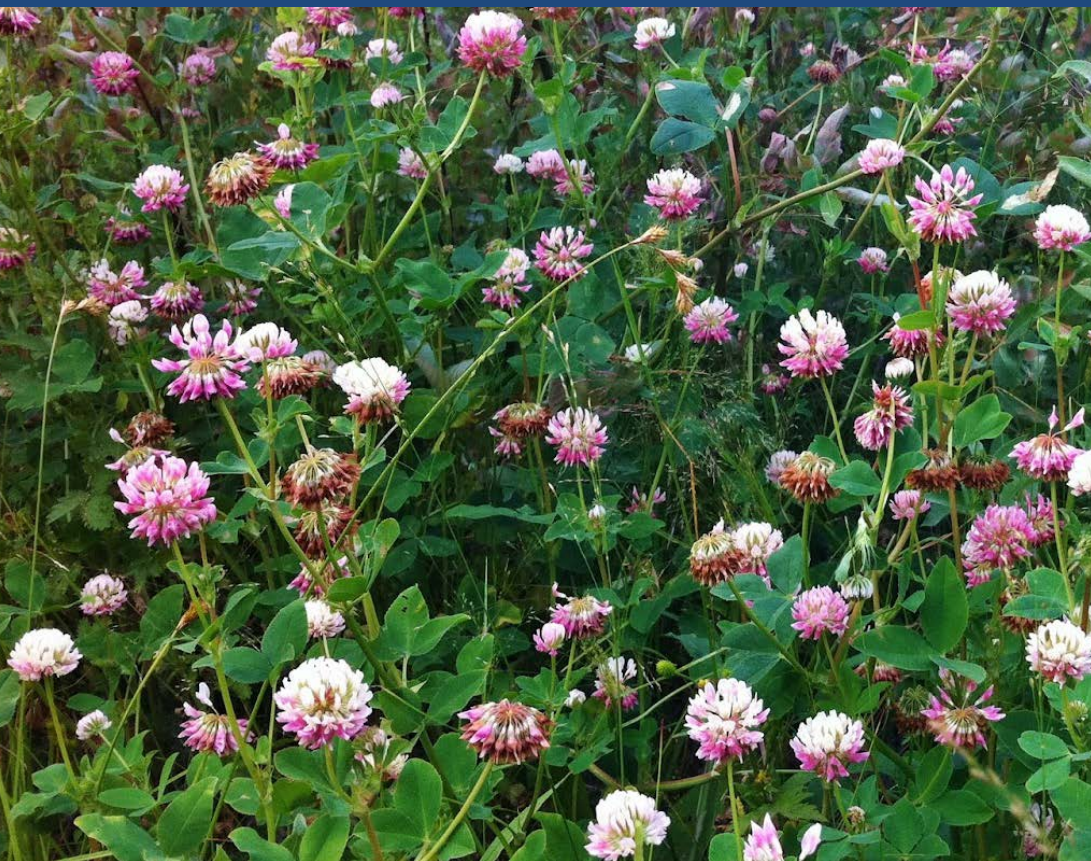




White
Clover



Alsike Clover



Birdsfoot Trefoil













Evening One Agenda

- ✓ What do I have?

- ✓ Species

- ☐ Soil type

- ☐ Soil testing

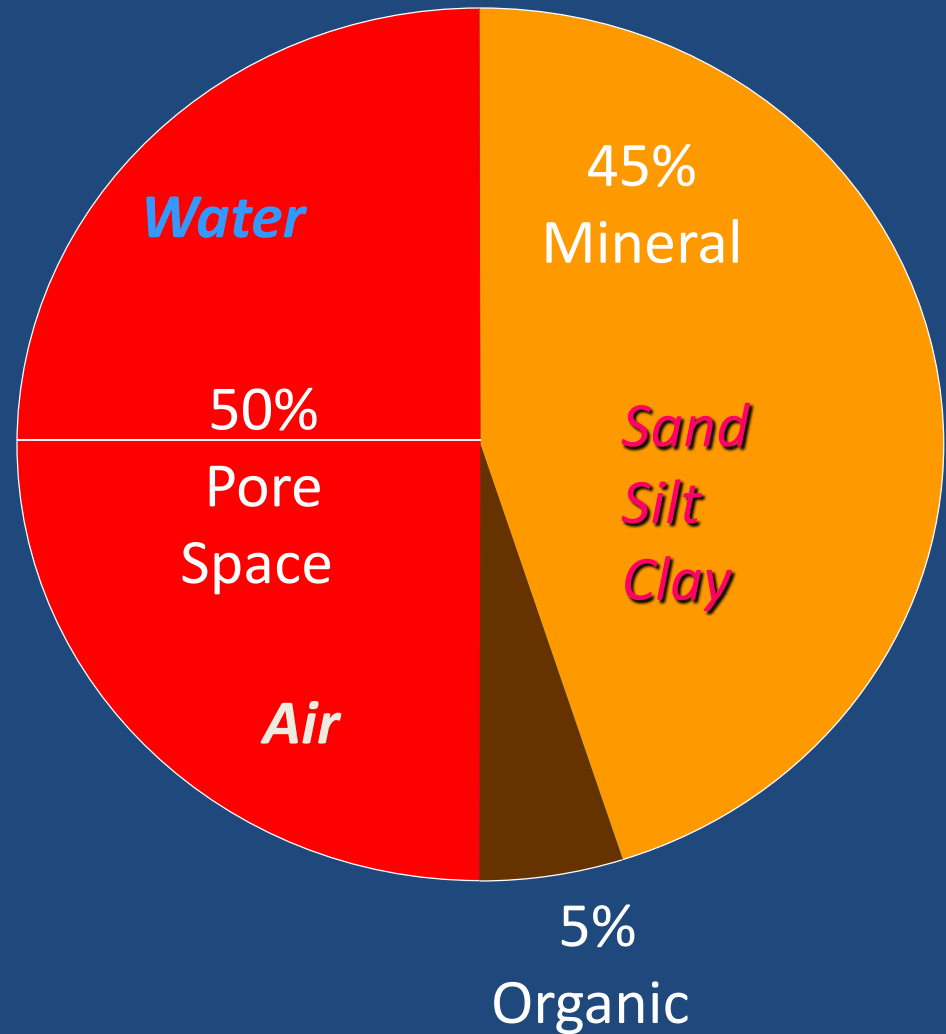
- ☐ What do I do with it?

- ☐ Improve fertility

- ☐ Improve cutting management

Soil

- Typically half solid and half space
- Pores about equally contain air and water
- Nutrients held on solids
- Plant available nutrients are in soil solution(water)



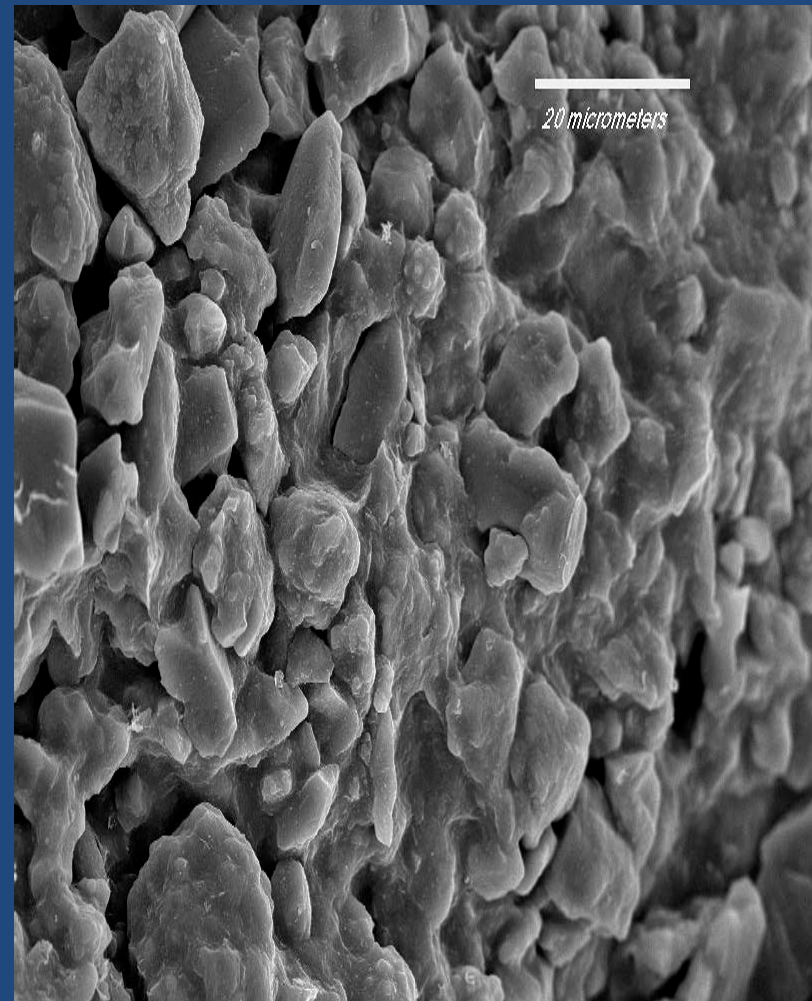
Sand



- Coarse larger particle
- Little surface area

Silt

- Smaller smooth particle
- Silt “flows”



Clay

- Smaller plate like particle
- Lots of surface area.

Lincoln 60 Fireclay • 25000x magnification

Courtesy of the SDSU Electron Microscope Facility



Sands

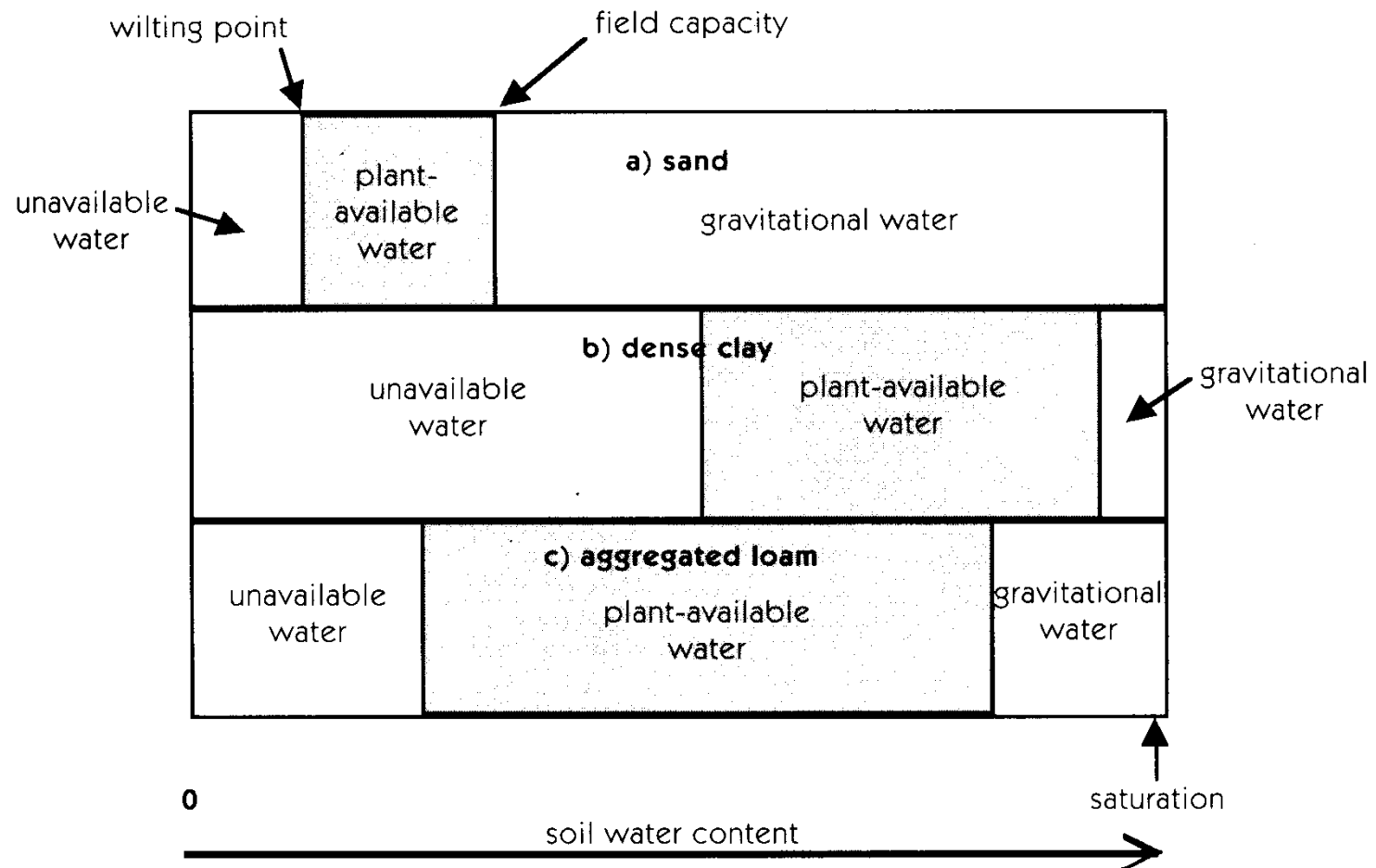
Loams

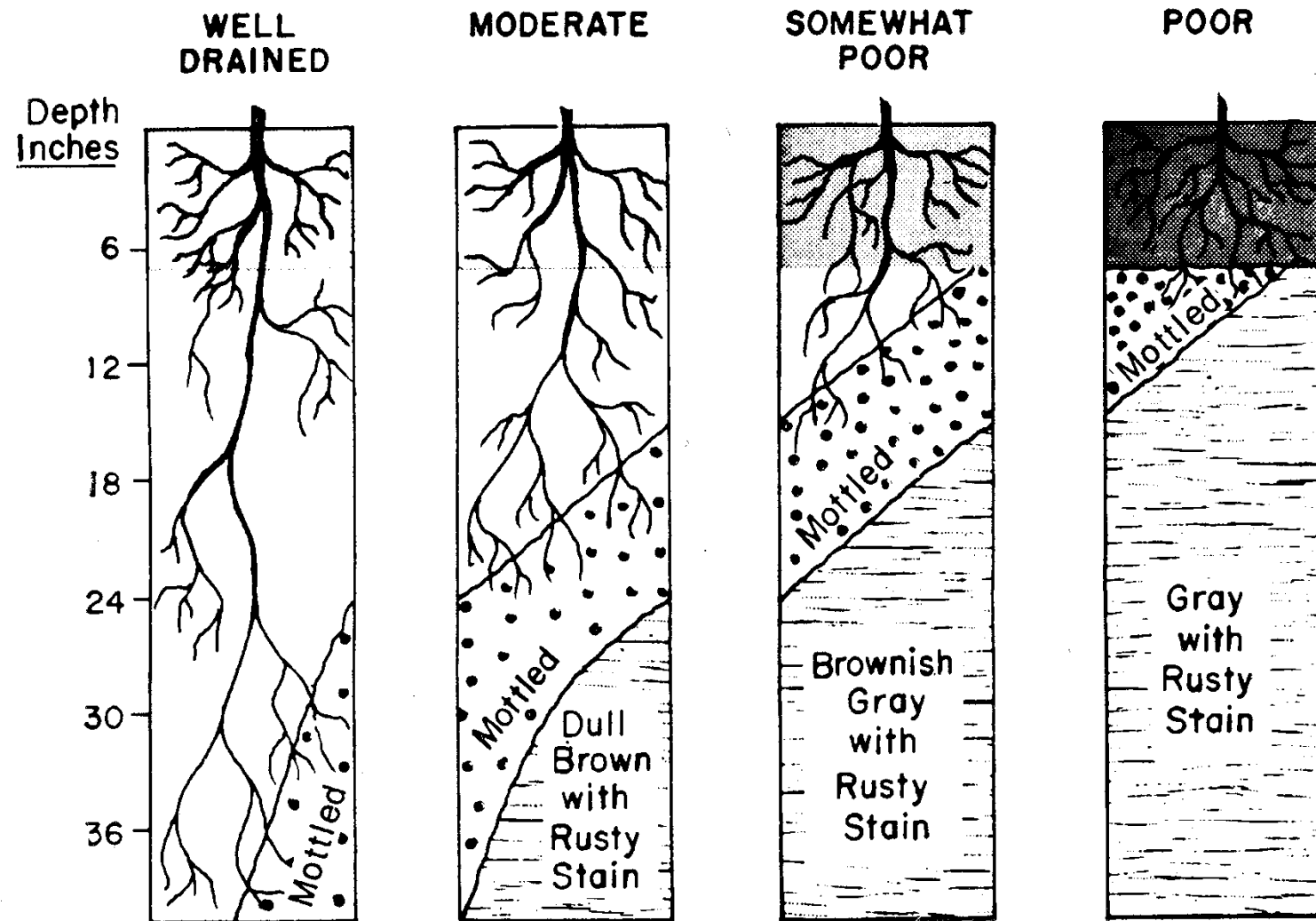
Clay



- Good
 - water drains away
 - roots need air
 - warm up early in the spring
- Bad
 - water drains away
 - less organic matter
 - don't hold nutrients

- Good
 - hold moisture
 - holds nutrients
 - higher organic matter
- Bad
 - hold moisture
 - slow to warm up in the spring









Know your soil types

- Soils have a specific soil name(soil series)
- Named based on the local it was found in

Know your soil types

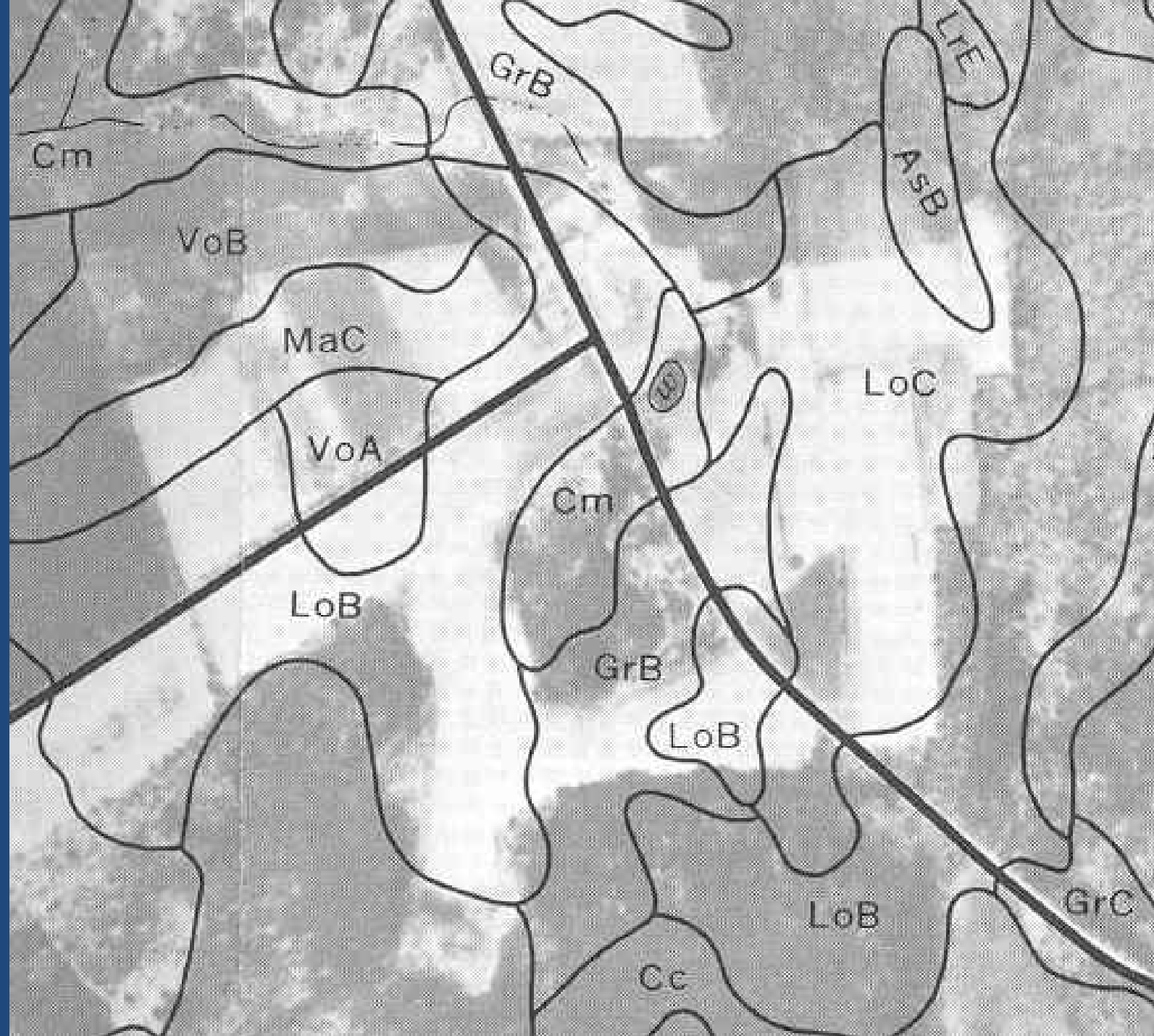
- Will tell you drainage class
- Need for Cornell specific nutrient recommendations

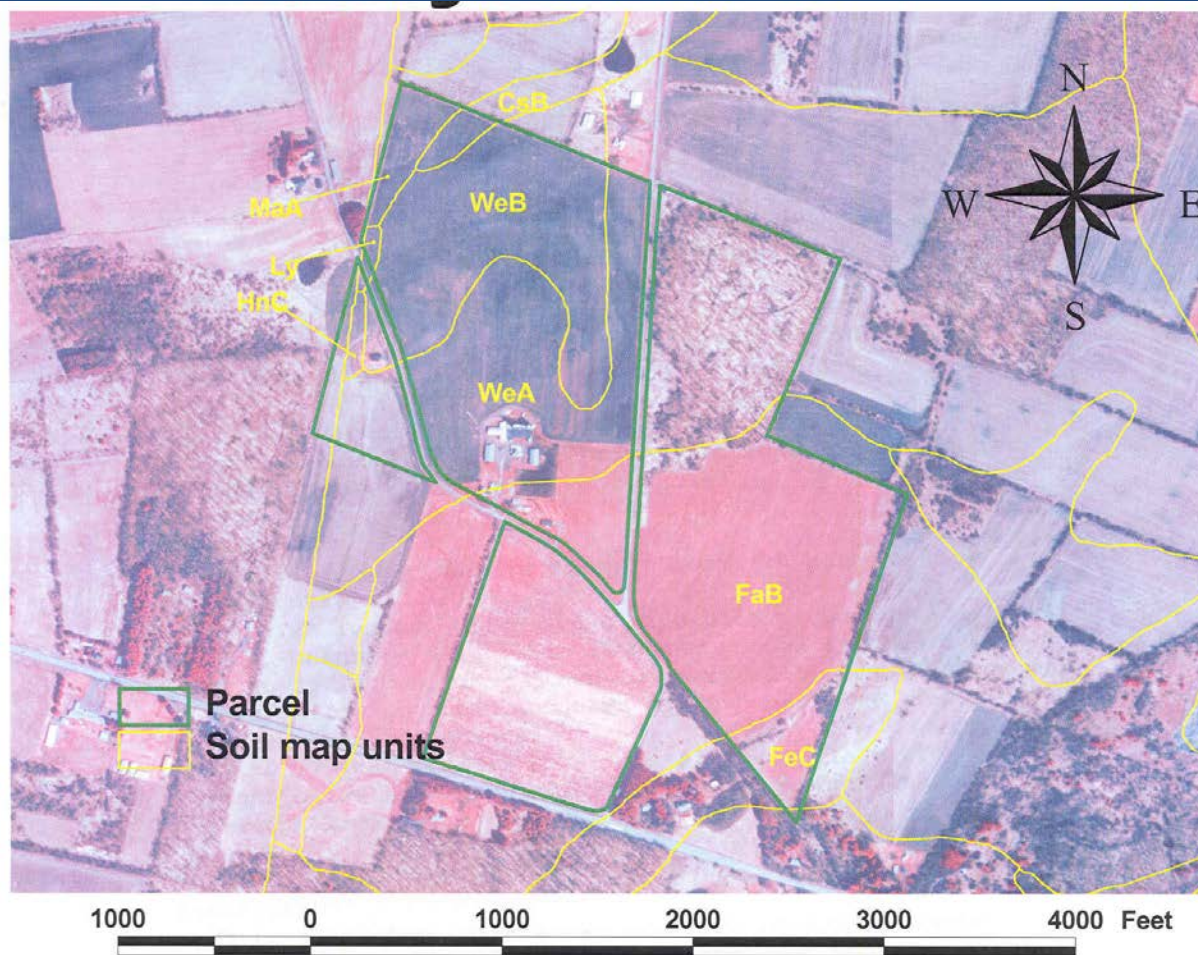
RHINEBECK SERIES

- The Rhinebeck series consists of very deep, somewhat poorly drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments. Slope ranges from 0 to 15 percent. Mean annual temperature is 48 degrees F, and mean annual precipitation is 39 inches.

Where you can obtain

- Local Soil and Water Conservation District office
- and
- Natural Resources Conservation Service office
- Soil Survey books
- <http://websoilsurvey.nrcs.usda.gov/app/>





Musym	Count	Sum Acres
CsB	2	52.9590
FaB	3	1293.0600
FeC	1	24.7010
HnC	1	0.7940
Ly	2	1.2320
MaA	1	10.3350
WeA	3	501.5310
WeB	2	55.6400



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- ▶ Official Soil Series Descriptions (OSD)
- ▶ Soil Series Extent Mapping Tool
- ▶ Geospatial Data Gateway
- ▶ eFOTG
- ▶ National Soil Characterization Data
- ▶ Soil Geochemistry

The simple yet powerful way to access and use soil data.


 A green circular button with a silver border and the text 'START WSS' in white.

Welcome to Web Soil Survey (WSS)



Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Soil surveys can be used for general farm, local, and wider area planning. Onsite investigation is needed in some cases, such as soil quality assessments and certain conservation and engineering applications. For more detailed information, contact your local

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Announcements/Events

- [Web Soil Survey 3.0 has been released! View description of new features.](#)
- [Web Soil Survey Release History](#)
- [Sign up for e-mail](#)

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BoC	Bombay very fine sandy loam, 8 to 15 percent slopes	0.4	0.5%
CsB	Conesus silt loam, 2 to 8 percent slopes	2.9	3.8%
FaC	Farmington silt loam, 0 to 8 percent slopes	16.2	21.4%
HtA	Hornell silt loam, 0 to 3 percent slopes	2.3	3.0%
HyC	Hudson silt loam, loamy substratum, 8 to 15 percent slopes	3.2	4.2%
RbA	Rhinebeck silt loam, loamy substratum, 0 to 3 percent slopes	1.0	1.3%
WaA	Wassaic silt loam, 0 to 3 percent slopes	6.4	8.4%
WaB	Wassaic silt loam, 3 to 8 percent slopes	30.3	40.0%
WaC	Wassaic silt loam, 8 to 15 percent slopes	9.6	12.7%
WaD	Wassaic silt loam, 15 to 25 percent slopes	3.5	4.7%
Totals for Area of Interest		75.8	100.0%



 Warning: Soil Map may not be valid at this scale.



WaB

CsB

RbA

BoC

WaC

WaA

HyC

WaC

WaB

WaD

FaC

WaC

HtA

FaC

Map Unit Legend**Herkimer County, New York, Southern Part
(NY615)**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
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RbA	Rhinebeck silt loam, loamy substratum, 0 to 3 percent slopes	1.0	1.3%
WaA	Wassaic silt loam, 0 to 3 percent slopes	6.4	8.4%
WaB	Wassaic silt loam, 3 to 8 percent slopes	30.3	40.0%
WaC	Wassaic silt loam, 8 to 15 percent slopes	9.6	12.7%
WaD	Wassaic silt loam, 15 to 25 percent slopes	3.5	4.7%
Totals for Area of Interest		75.8	100.0%

Report — Map Unit Description

**Herkimer County, New York, Southern Part****WaB—Wassaic silt loam, 3 to 8 percent slopes****Map Unit Setting**

Elevation: 800 to 1,750 feet

Mean annual precipitation: 41 to 50 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 125 to 165 days

Map Unit Composition

Wassaic and similar soils: 80 percent

Minor components: 20 percent

Description of Wassaic**Setting**

Landform: Ridges, till plains, benches

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till derived mainly from limestone, with varying amounts of sandstone, shale, and crystalline rock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent

Available water capacity: Low (about 4.0 inches)

Interpretive groups

Farmland classification: All areas are prime farmland

Land capability (nonirrigated): 2e

Hydrologic Soil Group: C

Typical profile

0 to 2 inches: Silt loam

2 to 7 inches: Loam

7 to 28 inches: Gravelly silt loam

28 to 32 inches: Unweathered bedrock

Minor Components**Honeoye**

Percent of map unit: 5 percent

Farmington

Percent of map unit: 5 percent

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Suitabilities and Limitations Ratings

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- Building Site Development
- Construction Materials
- Disaster Recovery Planning
- Land Classifications
- Land Management
- Military Operations
- Recreational Development
- Sanitary Facilities

Vegetative Productivity

- Crop Productivity Index
- Forest Productivity (Cubic Feet per Acre per Year)
- Forest Productivity (Tree Site Index)
- Iowa Corn Suitability Rating
- Range Production (Favorable Year)
- Range Production (Normal Year)
- Range Production (Unfavorable Year)
- Yields of Irrigated Crops (Component)
- Yields of Irrigated Crops (Map Unit)

Yields of Non-Irrigated Crops (Component)

[View Description](#)
[View Rating](#)

View Options

Map ☒

Table ☒

Description of Rating ☒

Rating Options ☒

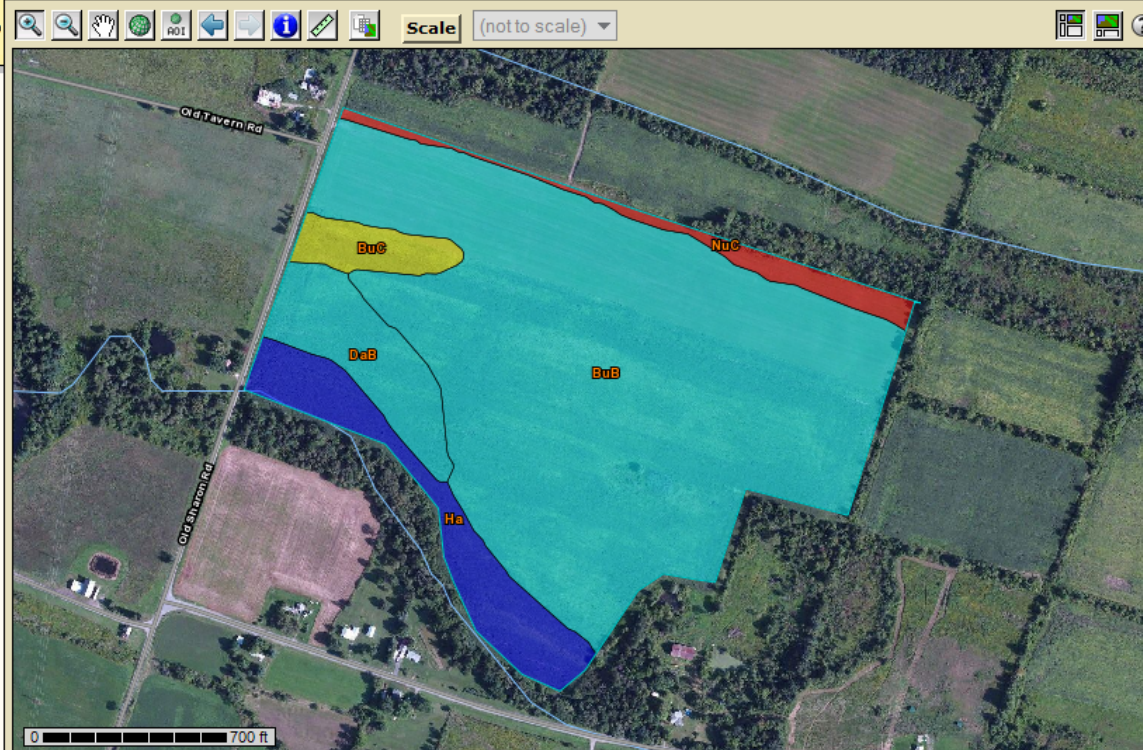
☐ Detailed Description

Basic Options

Crop Grass-legume hay ▾ Tons

Advanced Options

Map — Yields of Non-Irrigated Crops (Component): Grass-legume hay (Tons)



Warning: Soil Ratings Map may not be valid at this scale.

Tables — Yields of Non-Irrigated Crops (Component): Grass-legume hay (Tons) — Summary By Map Unit

Summary by Map Unit — Montgomery County, New York (NY057)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BuB	Burdett channery silt loam, 3 to 8 percent slopes	2.63	53.5	75.6%
BuC	Burdett channery silt loam, 8 to 15 percent slopes	2.25	2.4	3.3%
DaB	Darien silt loam, 3 to 8 percent slopes	2.63	5.5	7.7%
Ha	Hamlin silt loam	3.75	6.8	9.7%
NuC	Nunda channery silt loam, 8 to 15 percent slopes	1.88	2.6	3.7%
Totals for Area of Interest			70.7	100.0%

Description — Yields of Non-Irrigated Crops (Component)

These are the estimated average yields per acre that can be expected of selected nonirrigated crops under a high level of

Search

**Suitabilities and Limitations Ratings**

Open All

Close All



Building Site Development



Construction Materials



Disaster Recovery Planning



Land Classifications



Land Management



Military Operations



Recreational Development



Sanitary Facilities

**Vegetative Productivity**

Crop Productivity Index

Forest Productivity (Cubic Feet per Acre per Year)

Forest Productivity (Tree Site Index)

Iowa Corn Suitability Rating

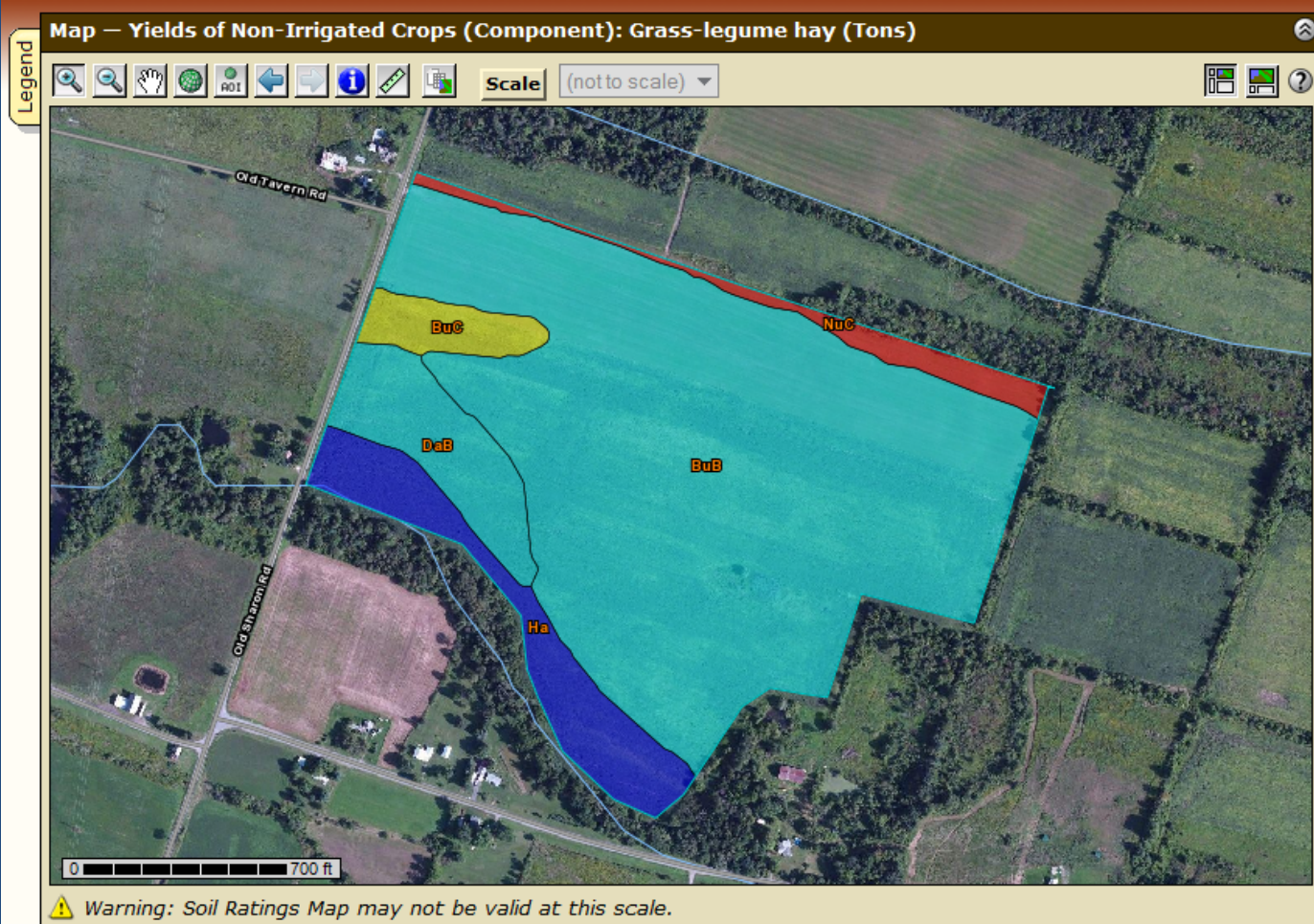
Range Production (Favorable Year)

Range Production (Normal Year)

Range Production (Unfavorable Year)

Yields of Irrigated Crops (Component)

Yields of Irrigated Crops (Map Unit)



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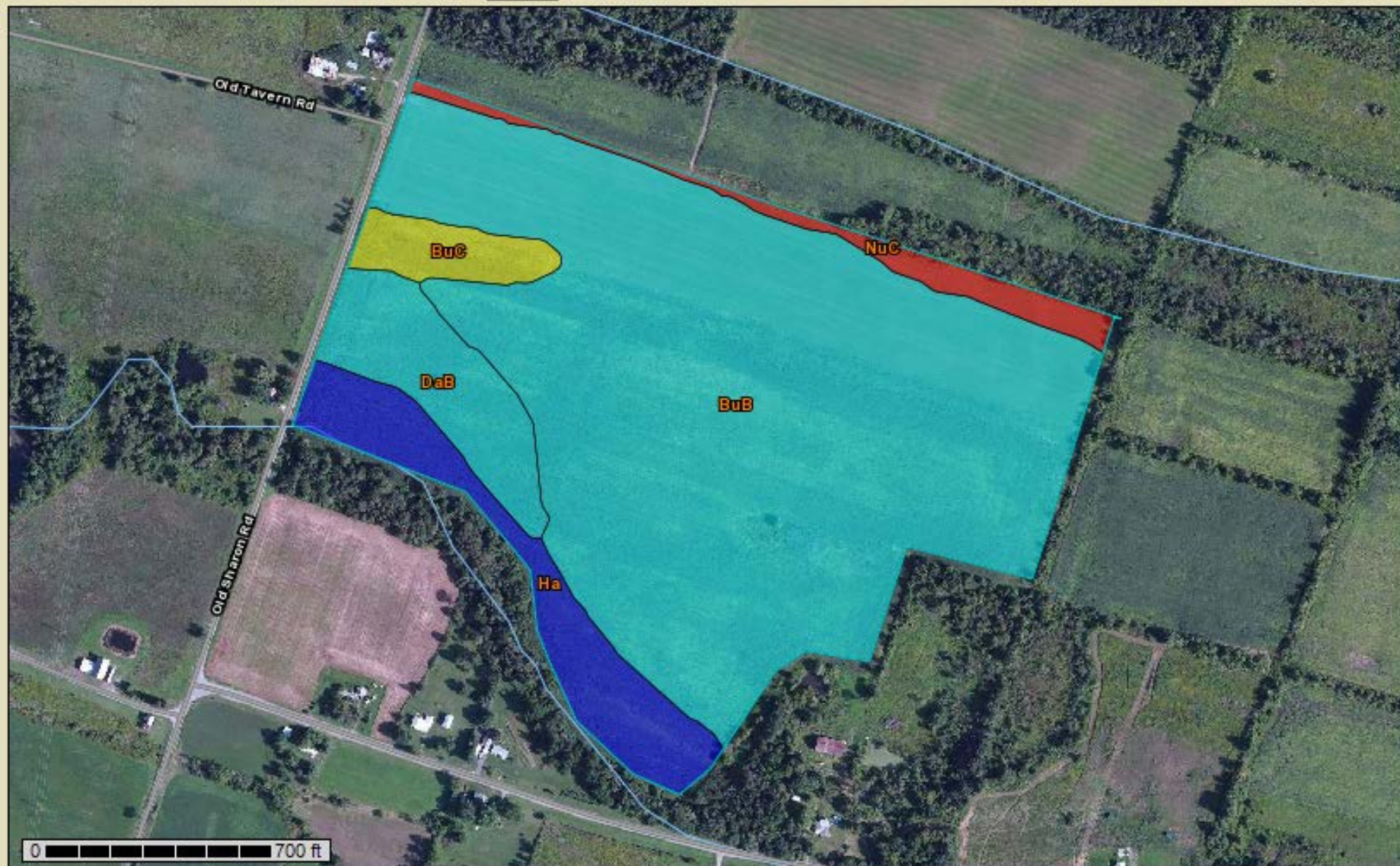
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Map — Yields of Non-Irrigated Crops (Component): Grass-legume hay (Tons)



Scale

(not to scale) ▼



⚠ Warning: Soil Ratings Map may not be valid at this scale.

 Warning: Soil Ratings Map may not be valid at this location.

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These are the estimated average yields per acre that can be expected of selected nonirrigated crops under

Evening One Agenda

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- ✓ Species

- ✓ Soil type

- ☐ Soil testing

☐ What do I do with it?

- ☐ Improve fertility

- ☐ Improve cutting management

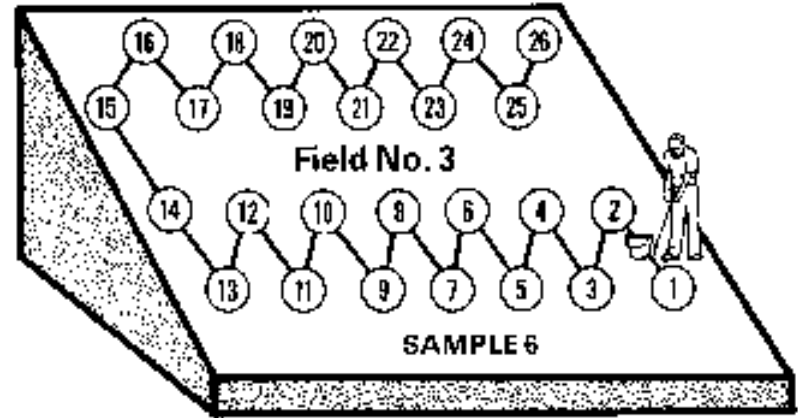
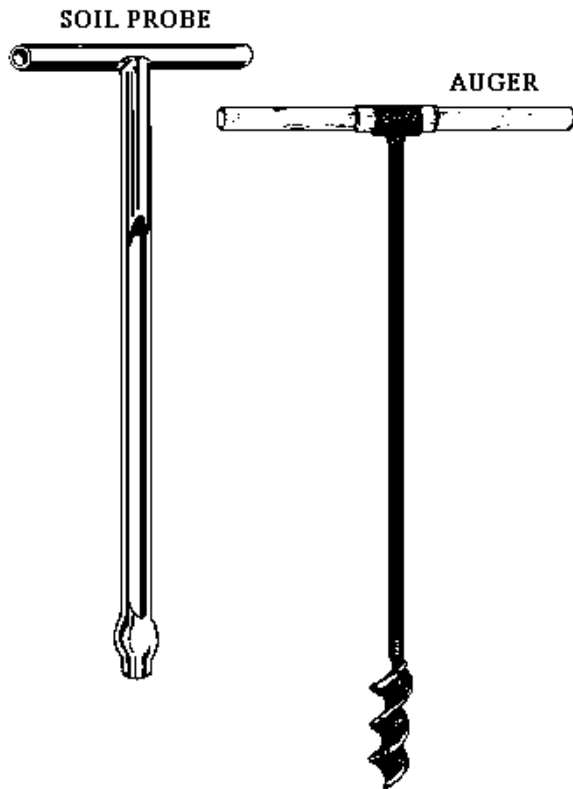
If you use no fertilizer or
manure this year will your
crops still grow

?

How much from the soil?

- Don't care!
- Experience
- Soil Testing
 - has its limitations
 - as good as info you provide

Take samples to
plow depth or 5-6
inches



Take representative
samples throughout the
field

Take one composite
sample for analysis

Example 1

Lab Sample ID: **Example 1**

Field/Location:

Date Sampled:

Date Tested:

Statement ID:

Description:

A

Element	lbs/acre*	Very Low	Low	Medium	High	Very High
Phosphorus (P)	2	<div></div>				
Potassium (K)	138	<div></div>				
Calcium (Ca)	3,209	<div></div>				
Magnesium (Mg)	268	<div></div>				

Element	Value	Element	Value	Element	Value
Soil pH	5.7	Manganese (Mn), lbs/acre	28.2	% OM	6.1
Buffer pH	5.6	Zinc (Zn), lbs/acre	1.2		
Iron (Fe), lbs/acre	10.4	Aluminum (Al), lbs/acre	97.5		

Crop History (1 = last year, etc.)

Year	Crop
3	Grasses Maintenance
2	Grasses Maintenance
1	Grasses Maintenance

Sample Information Summary

Soil Name: Valois
Tillage Depth: 1 - 7 Inches
Drainage: Not Specified
% Legume: Not Specified
Crop Code: GRT
Type: Pre-Plant

Soil Fertilizer Recommendations (1=current yr, 2=next yr, etc.)

Year	Crop	tons / acre		lbs / acre	
		Lime	N Range	P2O5 Range	K2O
1	Grasses Maintenance	3.00	50 - 75	40	30.00
2	Grasses Maintenance	0.00	50 - 75	40	30.00
3	Grasses Maintenance	0.00	50 - 75	40	30.00

Comments - Improve yield and plant quality as well as protect the environment with proper fertilization.

* Morgan analysis results reported in pounds per acre.

Nutrient recommendations provided by Cornell University. For assistance interpreting your report, contact your local Cooperative Extension office at 607-334-5841 or <http://coe.cornell.edu/Pages/Default.aspx> for a complete list of Cornell Cooperative Extension offices.

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These are general comments. Always consult with your crop adviser for recommendations specific to your farm.

Yr1 Lime rate is for 100% ENV. To calculate actual rate: rate to use = recommended rate/ENV (of lime source) x 100.

Element	lbs/acre*	Very Low	Low	Medium	High	Very High
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Potassium (K)	138	██				
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Lab Results

Crop History (1 = last year, etc.)

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Year Crop

1 Grasses Maintenance
2 Grasses Maintenance
3 Grasses Maintenance

tons / acre

Lime

3.00

0.00

0.00

lbs / acre

N Range

50 - 75

50 - 75

50 - 75

P2O5 Range

40

40

40

K2O

30.00

30.00

30.00

Management
Recommendations

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Yr1 Lime rate is for 100% ENV. To calculate actual rate: rate to use = recommended rate/ENV (of lime source) x 100.

Example 2

Lab Sample ID: **Example 2**

Field/Location:

Date Sampled:

Date Tested:

Statement ID:

Description:

A

Element	lbs/acre*	Very Low	Low	Medium	High	Very High
Phosphorus (P)	2	<div></div>				
Potassium (K)	183	<div></div>				
Calcium (Ca)	3,216	<div></div>				
Magnesium (Mg)	290	<div></div>				

Element	Value	Element	Value	Element	Value
Soil pH	5.9	Manganese (Mn), lbs/acre	28.7	% OM	5.5
Buffer pH	5.7	Zinc (Zn), lbs/acre	1.1		
Iron (Fe), lbs/acre	24.6	Aluminum (Al), lbs/acre	91.3		

Crop History (1 = last year, etc.)

Year	Crop
3	Corn-Silage
2	Corn-Silage
1	Clover-Grass Seeding

Sample Information Summary

Soil Name: Red Hook Crop Code: CGT
Tillage Depth: 1 - 7 Inches Type: Maintenance
Drainage: Not Specified
% Legume: 50% - 100% Legume

Soil Fertilizer Recommendations (1=current yr, 2=next yr, etc.)

Year	Crop	tons / acre		lbs / acre	
		Lime	N Range	P2O5 Range	K2O
1	Clover-Grass Maintenance	2.00	0	40	0.00
2	Clover-Grass Maintenance	0.00	0	40	0.00
3	Clover-Grass Maintenance	0.00	0	40	0.00

Comments - Improve yield and plant quality as well as protect the environment with proper fertilization.

* Morgan analysis results reported in pounds per acre.

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Evening One Agenda

- ✓ What do I have?

 - ✓ Species

 - ✓ Soil type

 - ✓ Soil testing

- What do I do with it?

 - Improve fertility

 - Improve cutting management

Improving pH - Lime

- Apply lime and nutrients to soil test recommendations
- Lime recommendations is based on lime with 100% ENV (Effective Neutralizing Power)
- Example:
 - If lime ENV is 75% and you need 3 ton of lime how many tons do you apply:
 - $3 \text{ ton} \div .75 = 4 \text{ tons to be applied}$

Improving Fertility – Adding Plant Nutrients

- Use fertilizer and/or manure
 - Example: If you need 75 lbs N, 40 lbs P_2O_5 and 30 lbs K_2O per acre, what fertilizer do you buy?
 - Go to fertilizer dealer and tell them to mix you the fertilizer you need
- Or
- Use a known analysis like 19-19-19 and apply the pounds that get you close

Improving Fertility – Adding Plant Nutrients (continued)

- Example

- If you need 75 lbs N, 40 lbs P_2O_5 and lbs 30 K_2O per acre, what fertilizer do you buy?
- Go to fertilizer dealer and tell them to mix you the fertilizer you need

Or

- If you need 75 lbs N, 40 lbs P_2O_5 and lbs 30 K_2O per acre, what fertilizer do you buy?

Fertility

- **Soil Test**
- **For alfalfa apply any needed lime**
- **Phosphorous and Potassium**
 - On dairy farms most P and K should come on the farm in feed truck and go to the field in a manure spreader
 - Should not need P or K on fields regularly receiving manure
 - Fields not receiving manure and selling hay crop will likely need manure.

Nitrogen

- For grasses you need 200 -225 of actual N in applications spread out over the summer
- Unlikely you would apply enough manure to supply nitrogen
- Typically need 50 lbs actual N for every ton of anticipated dry matter yield
- Example (lbs actual N):
100 lbs at green up in the spring, 50 lbs after 1st cutting and 50 lbs after 2nd.
- Can be combo with manure to achieve desired N.

Thoughts on fertility...

- Lack of nitrogen fertilization is one reason why grasses still tend to be under appreciated
 - Reason for “I don’t get any second cutting”
 - Nitrogen can raise protein and lower fiber levels
- Is field grass or legume
 - Decide which it is, don’t view as a mix
 - Fertilize accordingly

