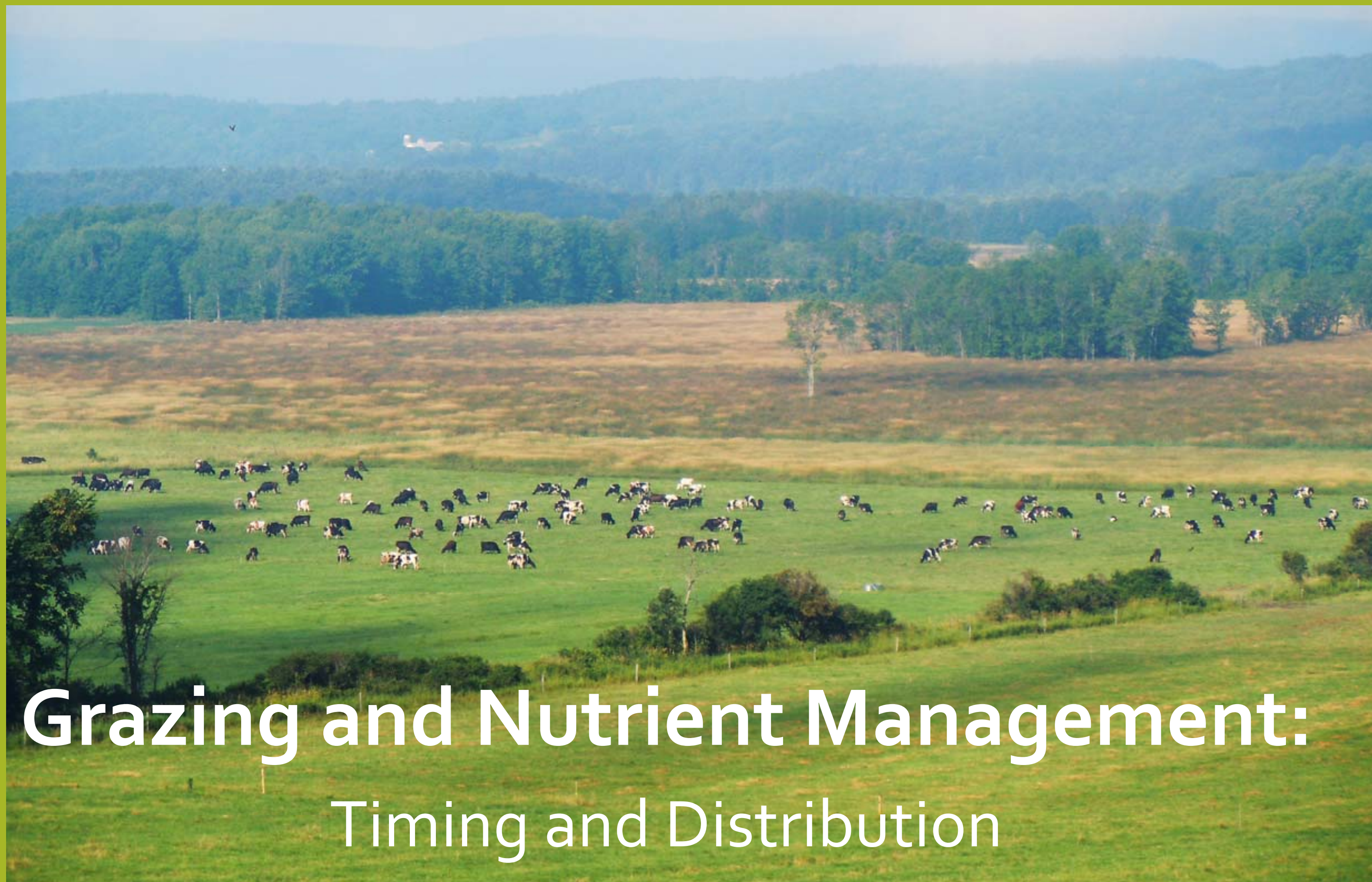


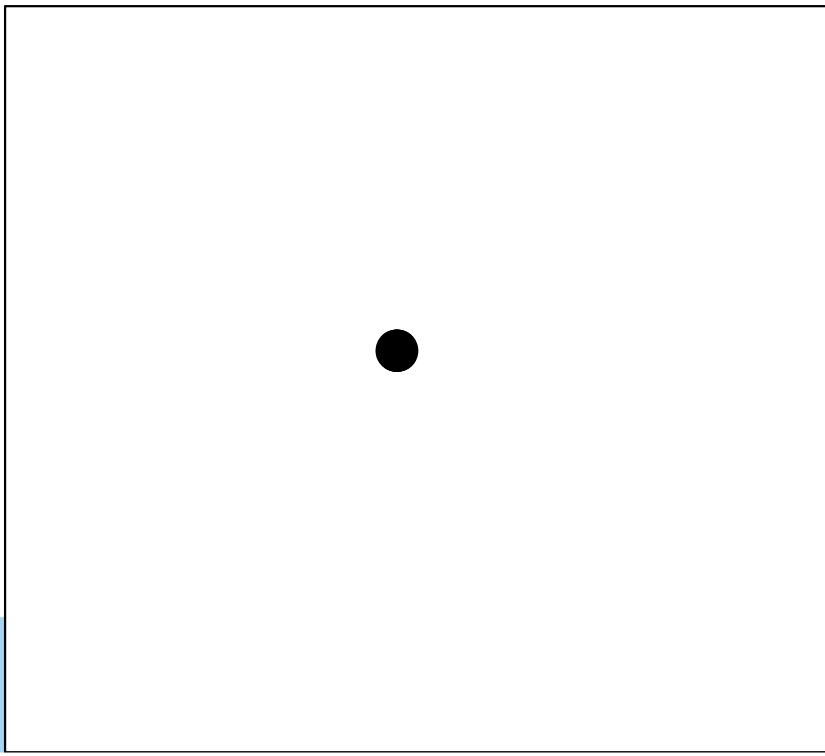
Grazing and Nutrient Management:

Timing and Distribution

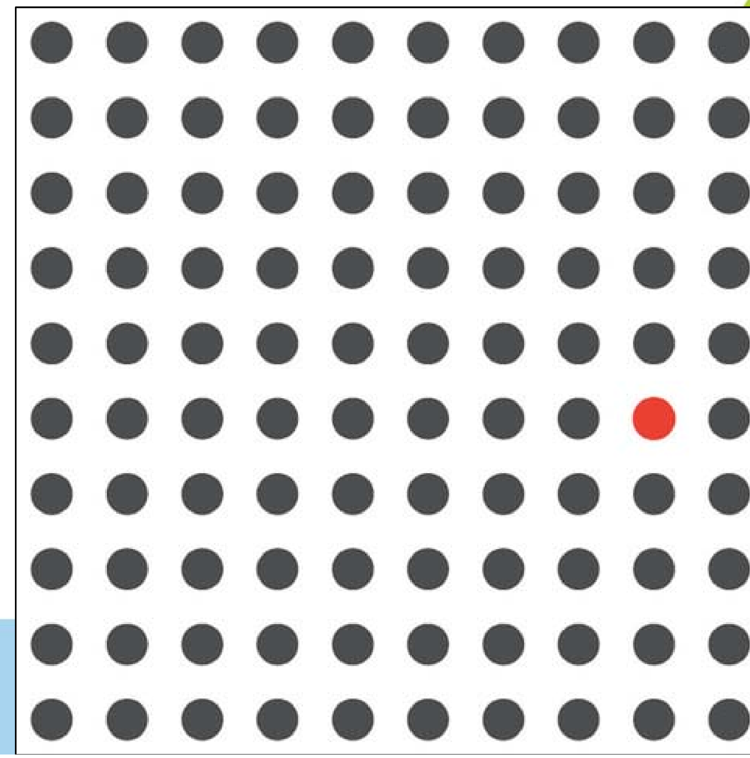

MINNESOTA
Lucky's
800-877-5654
FERRISBURGH
The University of Vermont

QUIZ: Which causes more over-grazing damage?

One cow on an acre for 100 days



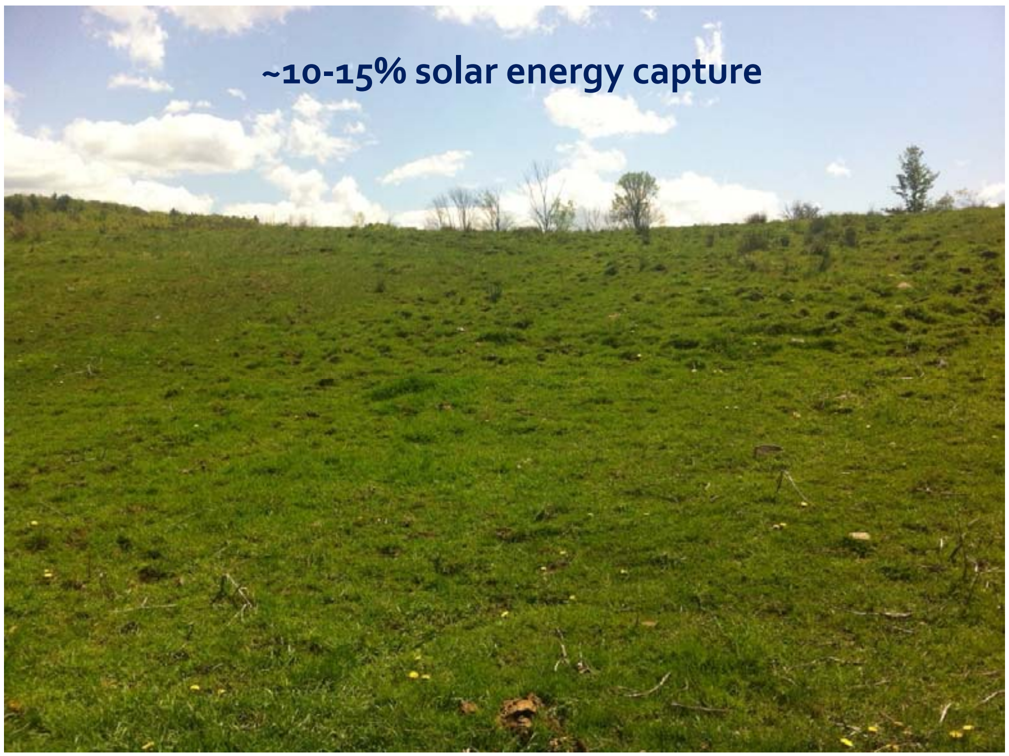
One hundred cows on an acre for 1 day

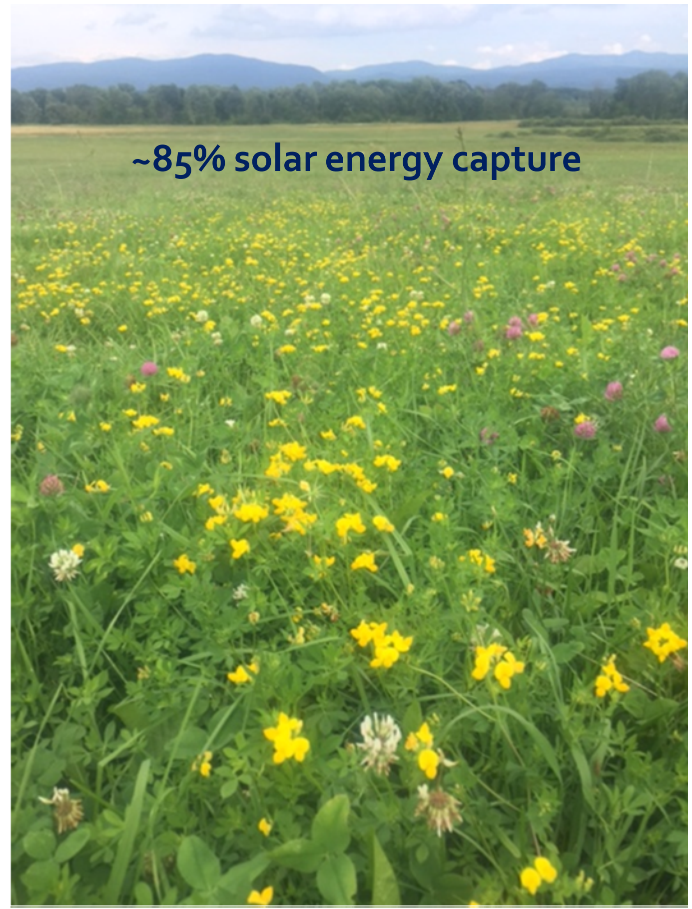


Over-grazing is <u>not</u> a product of animal numbers

Over-grazing is a product of time

Efficiency - maximize solar energy capture





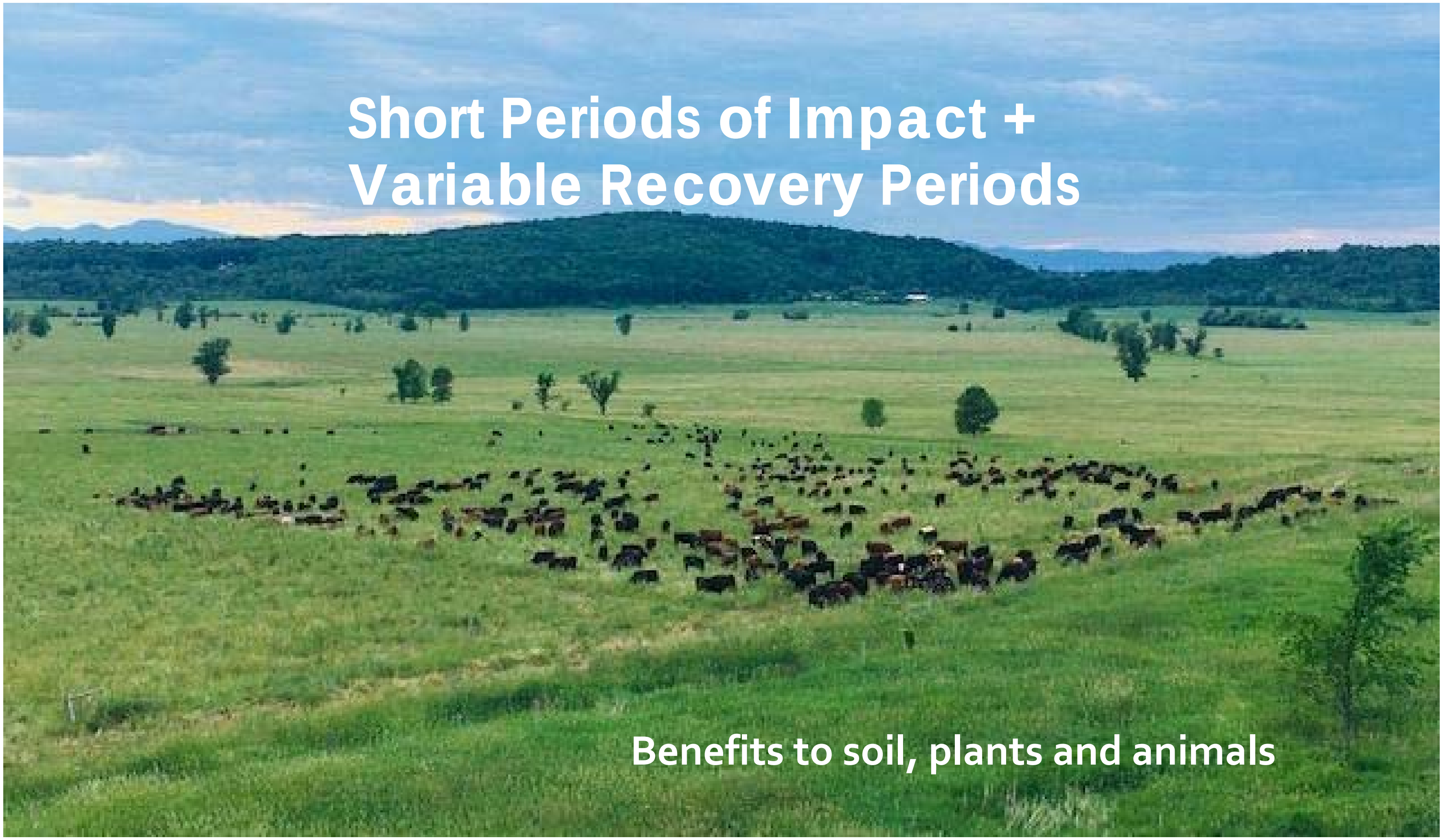
Increase density, increase yield

- Our goal is to maximize coverage. No bare soil.

Physiology of the cow

Bites/day, ease of rumen fill (efficiency)

Effective nutrient distribution


Short Periods of Impact +
Variable Recovery Periods
Benefits to soil, plants and animals

Efficiency - maximize utilization

Adequate residual, taking top ½ or 1/3

Leaving more may shorten recovery

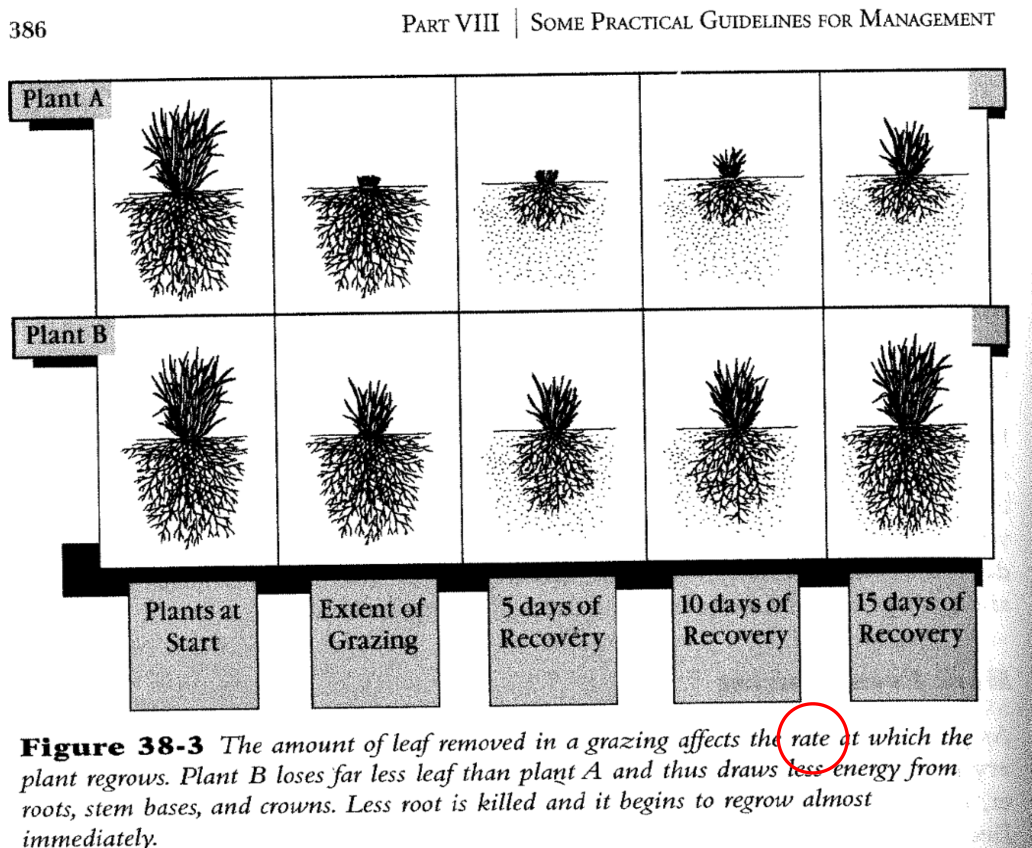

386 PART VIII | SOME PRACTICAL GUIDELINES FOR MANAGEMENT

Figure 38-3 *The amount of leaf removed in a grazing affects the rate at which the plant regrows. Plant B loses far less leaf than plant A and thus draws less energy from roots, stem bases, and crowns. Less root is killed and it begins to regrow almost immediately.*

What are adequate regrowth periods?

Actual varies by season and site:

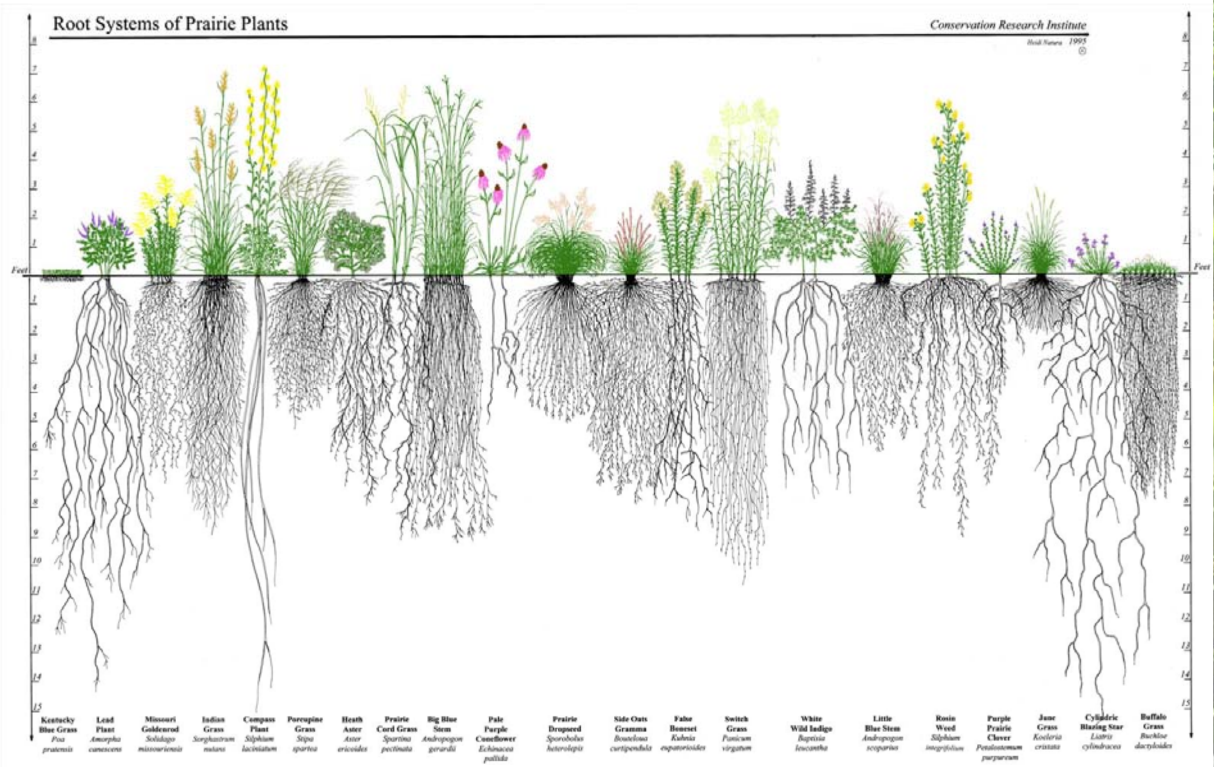
May: 18-21 days
June: 24-30+ days
July: 30-35+ days
August: 35-40+ days
September: 40-45+ days
October: 60 days

Dry conditions: 60-90 days
Drought? 120 days +

Actual 2022 recovery periods from one Vermont dairy farmer's records:

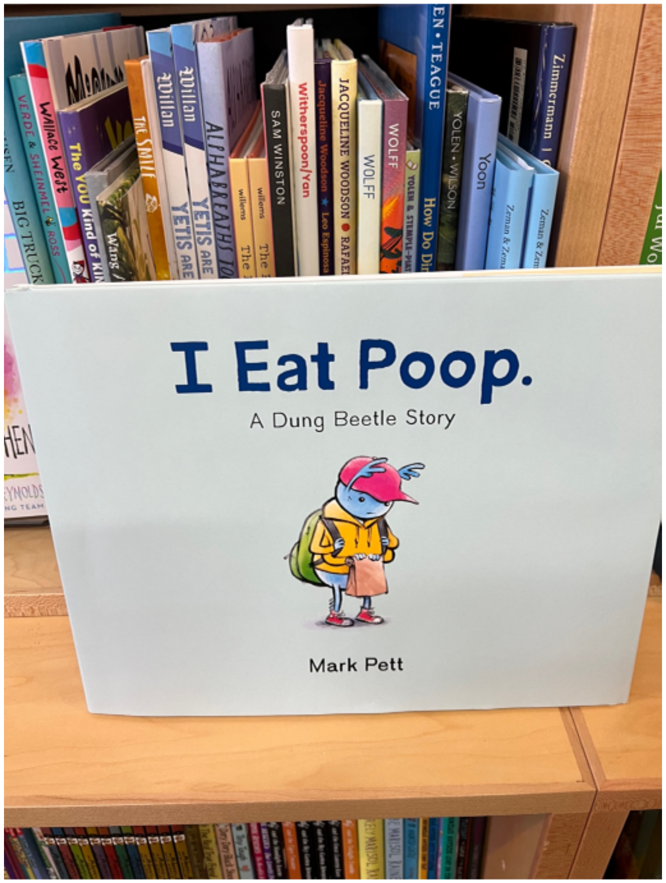
June – August 2022: 68 – 82 days

A diversity of roots,
⬆ nutrient cycling



Benefits of introducing more forbs

Active soil biology



Organic N source – how relates to K and pH

Review of soil test lab results showed >90% of the samples from organically managed farms were deficient in nitrogen

Without synthetic nitrogen, what is the source?

Legumes – an effective N source

BUT… need optimal K and pH

Nutrient	Low	Medium	Optimum	High or Excessive
Phosphorus (P):				
Potassium (K):				
Magnesium (Mg):				

Analysis	*Value Found*	*Optimum Range ** (or Average *)*	*Analysis*	*Value Found*	*Optimum Range * (or Average *)*
Soil pH (2:1, water)	5.5		Boron (B)	0.1	0.3*
Modified Morgan extractable, ppm			Copper (Cu)	0.1	0.3*
Macronutrients			Zinc (Zn)	0.3	2.0*
Phosphorus (P)	0.8	4-7	Sodium (Na)	10.0	20*
Potassium (K)	37	100-130	Aluminum (Al)	193	35*
Calcium (Ca)	547	**	**Soil Organic Matter %**	4.8	**
Magnesium (Mg)	38	50-100	**Effective CEC, meq/100g**	3.1	**
Sulfur (S)	8.0	11*	**Base Saturation, %**		
Micronutrients			Calcium Saturation	36.5	40-80
Iron (Fe)	9.4	7.0*	Potassium Saturation	1.3	2.0-7.0
Manganese (Mn)	4.3	8.0*	Magnesium Saturation	4.2	10-30

** Micronutrient and S deficiencies are rare in Vermont and optimum ranges are not defined; thus average values in Vermont soils are shown inste*

*** Ranges shown are for Field Crops; Vegetable ranges are higher. Ranges for Calcium, Organic Matter, and Effective CEC vary with soil type and c*

Recommendations for Grass Pasture - Establishment (2AE)

Limestone (Target pH of 6.2)	Nitrogen, N	Phosphate, P_2O_5	Potash, K_2O
tons / Acre	**lbs / Acre**	**lbs / Acre**	**lbs / Acre**
2.5	**50**	**120**	**140**

What about our stocking rates?

Is supply and demand in balance?

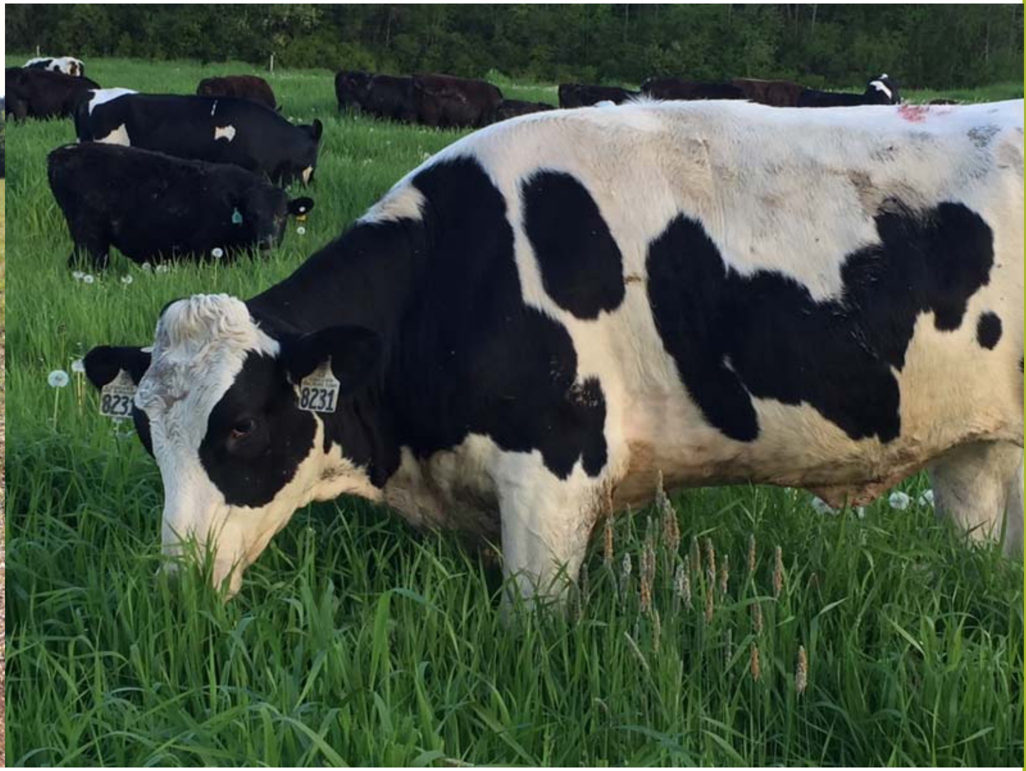
Is pasture managed like a crop?

Are we giving ourselves enough of a buffer? What is our longest recovery period? Do recovery periods increase over the season? And have we built in extended recovery periods of dry weather conditions?

If not –we are likely overstocked. How do we either add more acres to graze (increase supply) or decrease animal numbers (demand)?

Do your livestock work for you or do you work for your livestock?

Which employees would you rather be paying?



Strategies to improve nutrient distribution

1. Use higher stock density – shorter occupation periods and smaller paddocks
2. Move the mineral feeder, reduce heavy use area
3. Portable water, move the location, sized appropriately
4. Shade? Only when critical for heat stress
5. Supplemental feeding – high, dry ground. Vary the location, minimize impact
6. Stockpiled feed or bale grazing (we can look at this more in the next session)

Nutrient distribution

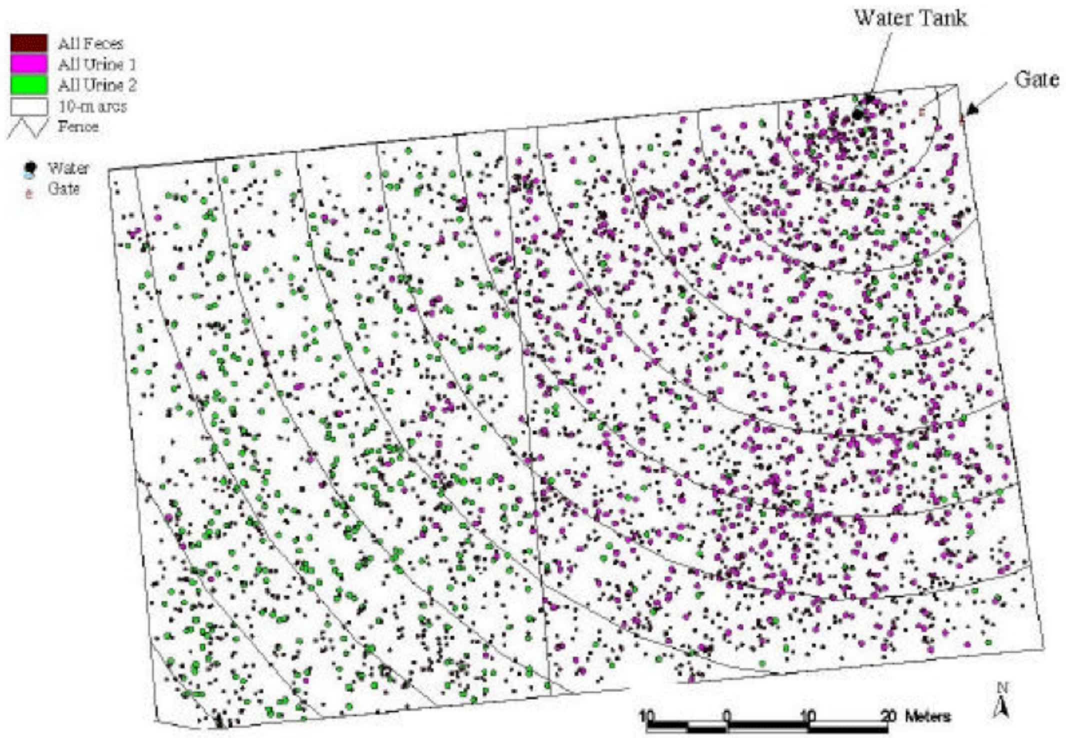


Figure 1 – Distribution of feces and urine from 36 lactating dairy cattle grazing a .74 ha pasture. Data were collected from six grazing days from July to april1998. Concentric arc lines are at 10-increments from the water tank.

Nutrient distribution

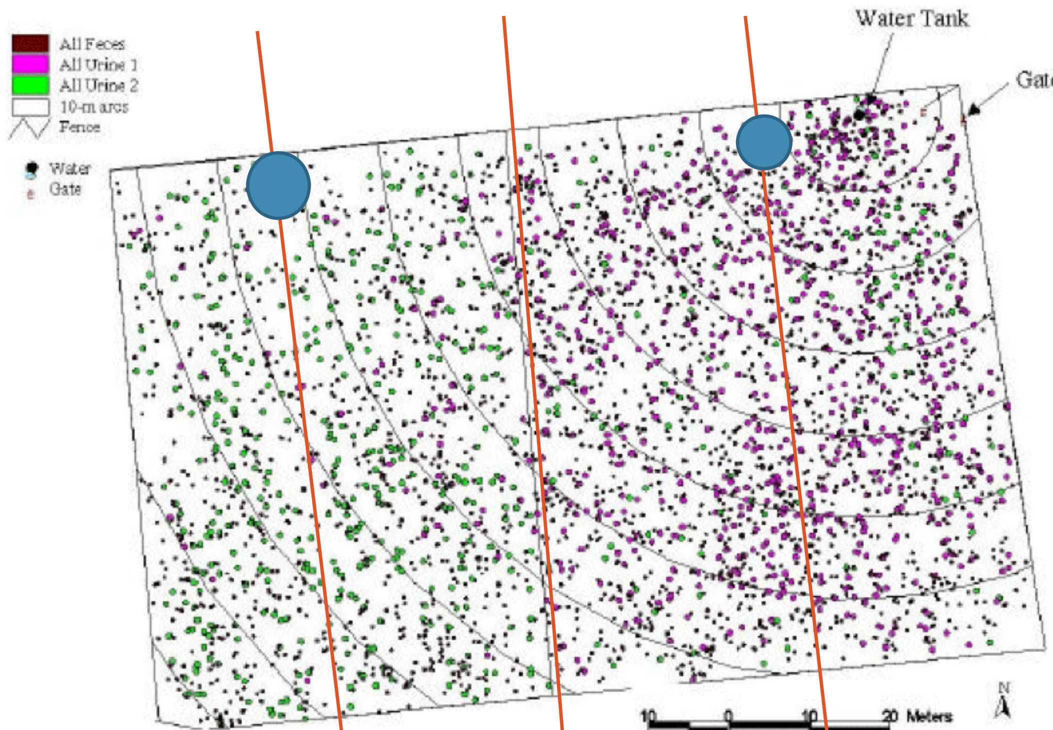


Figure 1 – Distribution of feces and urine from 36 lactating dairy cattle grazing a .74 ha pasture. Data were collected from six grazing days from July to april1998. Concentric arc lines are at 10-increments from the water tank.

Stock Density Example

36 cows x 1200 lbs = 43,200 lbs

43, 200 lbs/1.85 acres = **23,351 lbs livewt/ac**

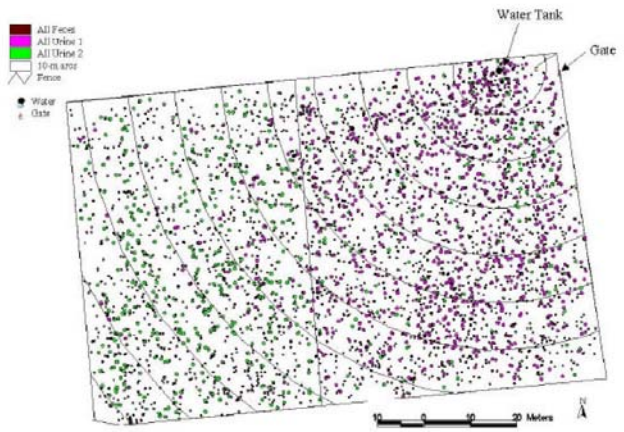


Figure 1 – Distribution of feces and urine from 36 lactating dairy cattle grazing a .74 ha pasture. Data were collected from six grazing days from July to april1998. Concentric arc lines are at 10-increments from the water tank.

36 cows x 1200 lbs = 43, 200 lbs

43,200 lbs / .46 acres = **93,913 lbs livewt/ac**

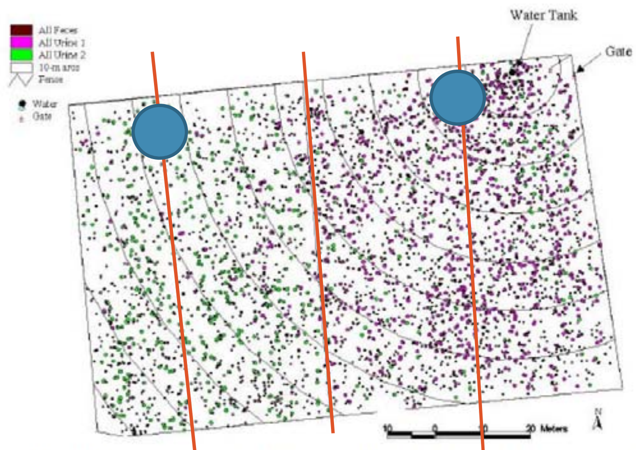


Figure 1 – Distribution of feces and urine from 36 lactating dairy cattle grazing a .74 ha pasture. Data were collected from six grazing days from July to april1998. Concentric arc lines are at 10-increments from the water tank.

⬆ Efficiency – well functioning infrastructure

Both of these scenarios cost the farmer money

*** Animal Health, Milk Quality, and Labor Costs

Distance Cattle Travel to Water Affects Pasture Utilization Rate

Utilization rate shown to drop to less than 20% where water greater than 1,100 ft away

"The recommendation of 800 feet is probably best used in a system designed for maximum forage use."

"The distance that livestock travel to water has a profound influence on grazing distribution and subsequent pasture utilization rates. We recommend that pasture systems be designed to provide water sources within 600 to 800 feet of all areas of the pasture for optimum uniformity of grazing." – J. Gerrish, P. Peterson, R. Morrow

Free unrestricted access to surface water causes erosion and nutrient loading

Signs of heat stress

Factors impacting heat stress:

Temperature
Relative humidity
Wind
Solar radiation
Ground cover
Height of forage
Access to water
Diet ie. digestible forage
Night time temperatures
Hide color
Breed
Hair coat

Livestock Weather Hazard Guide

Relative Humidity (%)

Dry Bulb Temp. (F)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
75									70	70	71	71	72	72	73	73	74	74	75	75
76							70	70	70	71	72	72	72	73	74	74	74	75	76	76
77						70	70	71	71	72	72	73	73	74	74	75	75	76	76	77
78					70	70	71	71	72	72	73	74	74	75	75	76	76	77	78	78
79				70	70	71	72	72	73	73	74	74	75	75	76	77	77	78	78	79
80			70	70	71	72	72	73	73	74	74	75	76	76	77	78	78	79	79	80
81		70	70	71	71	72	73	73	74	75	75	76	77	77	78	78	79	80	80	81
82		70	71	71	72	73	73	74	75	75	76	77	77	78	79	79	80	81	81	82
83	70	71	71	72	73	73	74	75	75	76	77	78	78	79	80	80	81	82	82	83
84	70	71	72	72	73	74	75	75	76	77	78	78	79	80	80	81	82	83	83	84
85	71	72	72	73	74	75	75	76	77	78	78	79	80	81	81	82	83	84	84	85
86	71	72	73	74	74	75	76	77	78	78	79	80	81	81	82	83	84	84	85	86
87	72	73	73	74	75	76	77	77	78	79	80	81	81	82	83	84	85	85	86	87
88	72	73	74	75	76	76	77	78	79	80	81	81	82	83	84	85	85	86	87	88
89	73	74	74	75	76	77	78	79	80	80	81	82	83	84	85	86	86	87	88	89
90	73	74	75	76	77	78	79	79	80	81	82	83	84	85	86	87	87	88	89	90
91	74	75	76	76	77	78	79	80	81	82	83	84	85	86	86	87	88	89	90	91
92	74	75	76	77	78	79	80	81	82	83	84	84	85	86	87	88	89	90		
93	75	76	77	78	79	80	80	81	82	83	84	85	87	87	88	89	90			
94	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90				
95	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90					
96	76	77	78	79	80	81	82	84	84	86	87	88	89	90	91					
97	77	78	79	80	81	82	83	84	85	86	87	88	90	91						
98	77	78	79	80	82	83	84	85	86	87	88	89	90							
99	78	79	80	81	82	83	84	86	87	88	88	90								
100	78	79	80	82	83	84	85	86	87	88	90	91								
105	80	82	83	84	86	87	89	90	91											

Alert
Danger
Emergency

The downside of shade

Hedgerows for emergency use

Hedgerows – more than just shade

Can be a feed source

Slow down drying summer winds which increase soil evaporation

Attract dew, pollinators and beneficial insects

Shelterbelts in winter as well

WHAT IS THE BEST WAY TO MAKE CHANGE?

"The light bulb did not get invented by incrementally increasing the brightness of the candle."

Most breakthroughs <u>do not</u> come from aiming for incremental improvements.

We need <u>big steps</u> that come from complete mindset changes. <u>A PARADIGM SHIFT</u>

It is possible to be 100% efficient and 0% effective.
Let's make sure we are hitting the right target

Winter feeding

How much is every day worth?

Bale Grazing

Dramatic improvements to overgrazed land with carbon and nutrient applications

May - Year 1

May - Year 2

Greg Brann photo

Winter water can be a challenge

Need to consider access and impact on nutrient loading

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS

Windchill Chart in °F

Actual Temp	MPH ↓	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Equiv. Temp	Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	5	48	37	27	16	6	5	-15	-26	-35	-47	-57	-68
	10	40	28	16	3	-9	-22	-34	-46	-58	-71	-83	-95
	15	36	22	9	-5	-18	-31	-45	-58	-72	-85	-99	112
	20	32	18	4	-10	-24	-39	-53	-67	-81	-95	110	129
	25	30	16	1	-15	-29	-44	-59	-74	-88	-103	118	133
	30	28	13	-2	-18	-33	-49	-64	-79	-93	-109	125	140
	35	27	11	-4	-20	-35	-52	-67	-82	-97	-113	129	145
	40	26	10	-5	-21	-37	-53	-69	-84	-100	-115	132	148
	45	25	9	-6	-22	-38	-54	-70	-85	-102	-117	135	150


64
R 285
B DIA

Mud

Increases stress
Increases energy requirements
Decreases intake
Increases risk of disease

Cheryl Cesario
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