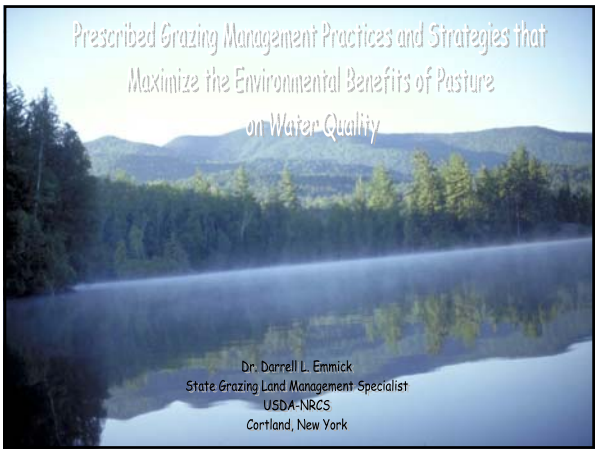
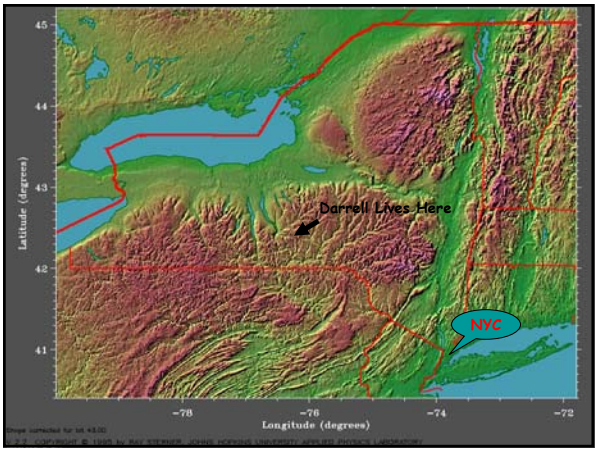
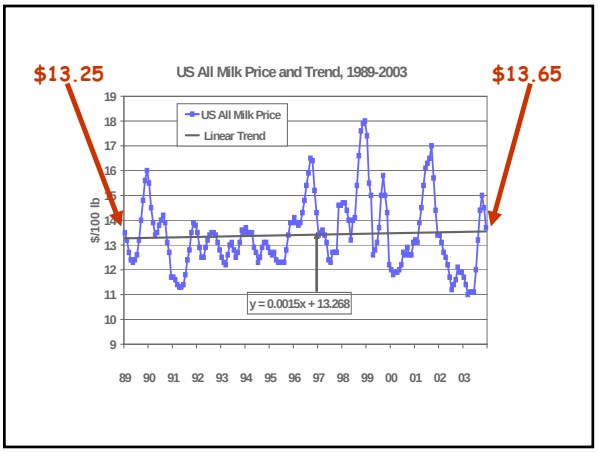

Prescribed Grazing Management Practices and Strategies that
Maximize the Environmental Benefits of Pasture
on Water Quality
Dr. Darrell L. Emmick
State Grazing Land Management Specialist
USDA-NRCS
Cortland, New York

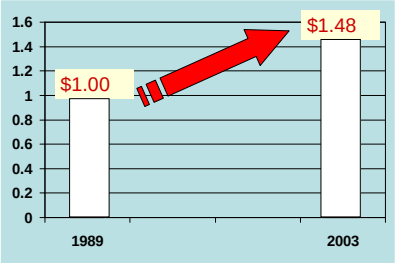
New York State
NYC
Latitude (degrees)
Longitude (degrees)


Darrell Lives Here
NYC
Latitude (degrees)
Longitude (degrees)

New York is a Dairy State


$13.25
US All Milk Price and Trend, 1989-2003
$13.65
US All Milk Price
Linear Trend
$/100 lb
19
18
17
16
15
14
13
12
11
10
9
y = 0.0015x + 13.268
89 90 91 92 93 94 95 96 97 98 99 00 01 02 03

$13.25 to $13.65 = 3.0% increase in the price received by the producers



…the purchasing power of the dollar eroded a lot!

Thus, while milk price increased by 3.0% between 1989 and 2003, the cost of just about everything else increased by 48%

On the average dairy farm, the cost to feed a dairy cow represents over 50% of the total cost of operation.

Because this one expense is so great, anything a farmer can do to reduce this cost will have a major impact on the bottom line.

No machine can harvest a ton of food cheaper than a cow can through grazing.

Thus, the more it is utilized, the lower will be the production costs.

The situation

Over the past five years, the cost to produce milk in the Northeast has averaged around $13.65 per hundredweight (CWT).

The price received by the producer around $13.75 per CWT.

To calculate profit per CWT, simply subtract the cost from the price.

$13.75 - $13.65 = .10 cents

Price - Cost = Profit

If a farm consisted of 100 cows producing 20,000 CWT per year, the profit would be

20,000 CWTs X .10 = $2,000 per year

That is not enough money to live on, so lets expand the herd by 10%

22,000 CWTs X .10 = $2,200 per year

Sure enough, herd expansion did in fact increase profit by $200.

Now let us see what happens to profit if we stop chasing our tails and reduce production costs by the same 10%

$13.65 – 1.36 = $12.29

$13.75 – 12.29 = $1.46 profit/CWT

instead of .10 cents

Thus, on a whole herd basis:

Increasing production by 10% improved profit by $200

But,decreasing production costs by 10% improved profit by

$27,200

All things remaining equal, if a farmer chooses herd expansion over cost reduction, at .10 cents/CWT profit they would have to increase herd size from 100 cows to 1360 to equal the profit generated simply by reducing production costs by 10%.

Real Farm Example

Dan and Anne Carey in Groton, New York milk 200 Holstein Dairy cows.

In the winter, their purchased feed costs are $3.96/cow/day.

During the 160 day pasture season, their purchased feed costs drop to 91 cents/cow/day.

Due the sums!

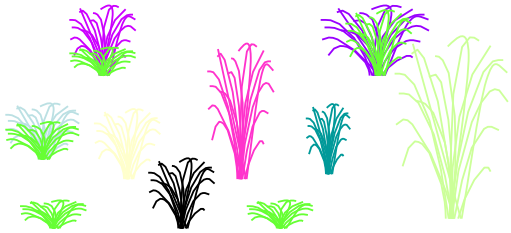
200 cows X $3.05/cow/day X 160 days = a savings of

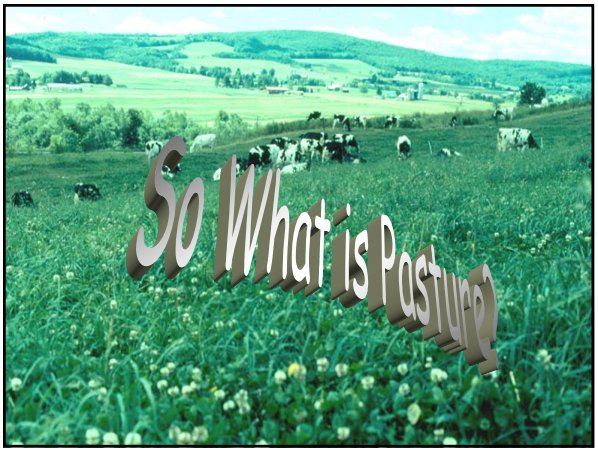
$97,600

And yet the institutional response has been and still is to tell dairy farmers to

"Get Big, Produce More, or Get Out"

Pasture is Different!

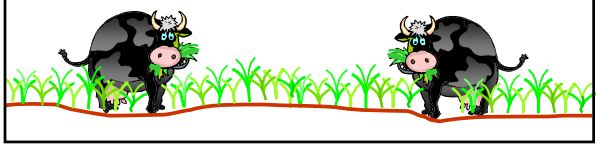




Pasture defined

Pasture can be defined as either a:

or a



Pasture defined as a Noun:

Ground covered with grass or herbage used or is suitable for the grazing of livestock.

Grass or herbage for feeding livestock

Pasture defined as a Verb

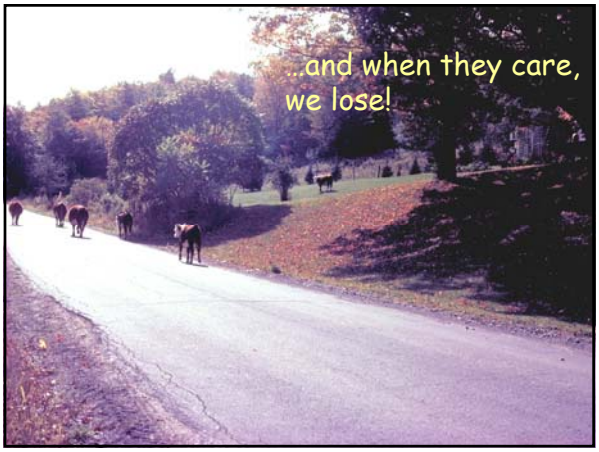
To feed livestock by putting them to graze on pasture

A Functional Pasture is:

A unit or area of land on which exists a suitable amount, type and distribution of vegetation that when utilized with a sufficient level of management complements or meets the nutritional requirements of the resident livestock

Pasture is Different!

Pasture is Different!



A Functional Pasture also:

Sustains the desired level of productivity and properly functioning ecological processes

Ecological Processes Include:

- Nutrient cycles
- Hydrologic cycles
- Energy flow patterns
- Healthy biotic communities

Pasture is not:

- A dirt lot
- An exercise lot
- A feed lot
- or
- A Parking lot

A dysfunctional pasture:

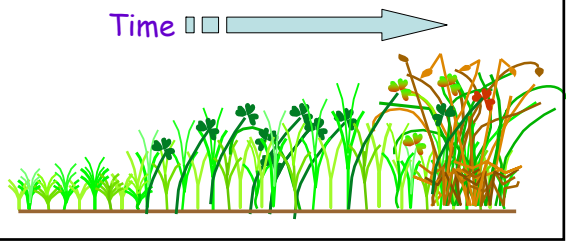
Does provide feed for livestock

Does sustain properly functioning ecological processes

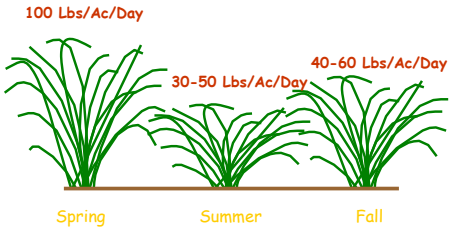
And people need to calling that which is not pasture, pasture!

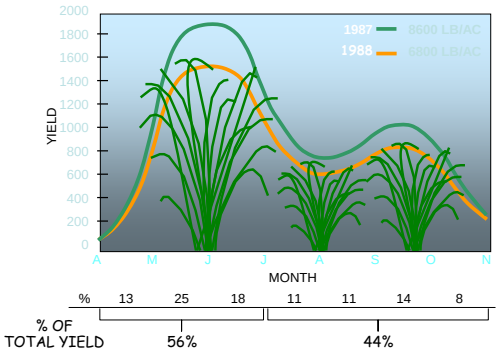
Understanding Plant Growth

Pasture plants are alive and actively growing. They change in yield and quality every day.

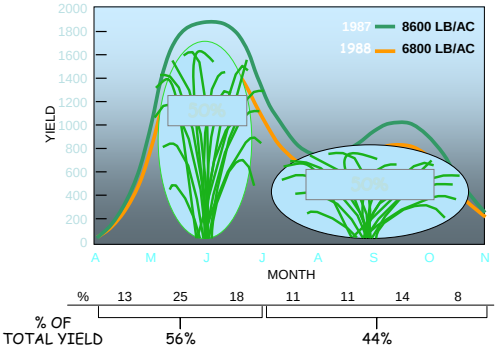


The rate of pasture growth changes over the season

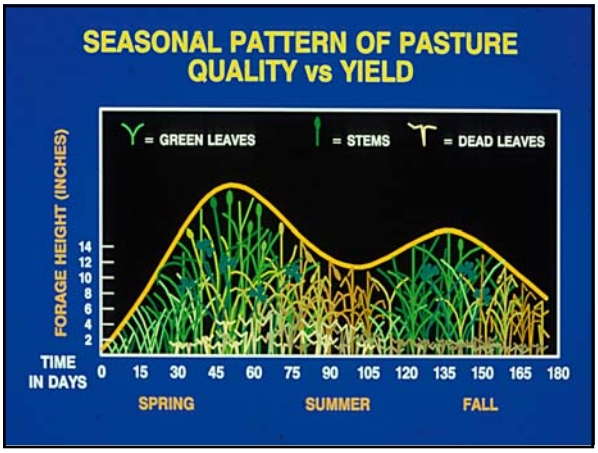




D.L.EMMICK, D.G. FOX, CORNELL UNIVERSITY, 1987 - 1988



D.L.EMMICK, D.G. FOX, CORNELL UNIVERSITY, 1987 - 1988



So how do we effectively manage pastures when they are constantly changing in yield and quality?

We use a planned grazing system with the appropriate method of stocking and the correct stocking rate!

There are two basic stocking methods:

Continuous and Rotational

The question is, is one method better than another, and if so, how so?

Stocking Method Comparisons

	16 PADDOCK ROTATIONAL IMPROVED	4 PADDOCK ROTATIONAL IMPROVED	1 PADDOCK CONTINUOUS IMPROVED	1 PADDOCK CONTINUOUS UNIMPROVED
ANIMAL UNITS/ ACRE	1.66[b]	1.11[c]	.76[e]	.92[d]
ANIMAL UNIT GRAZING DAYS/ ACRE	285[b]	173[c]	125[d]	115[d]
WEIGHT GAIN/ ACRE (LBS)	302[b]	295[b]	195[c]	234[c]
AVERAGE DAILY GAIN (LBS)	1.2[b]	1.4[b]	1.3[b]	1.4[b]
FORAGE YIELD LBS/AC	7410	4498	3250	2990

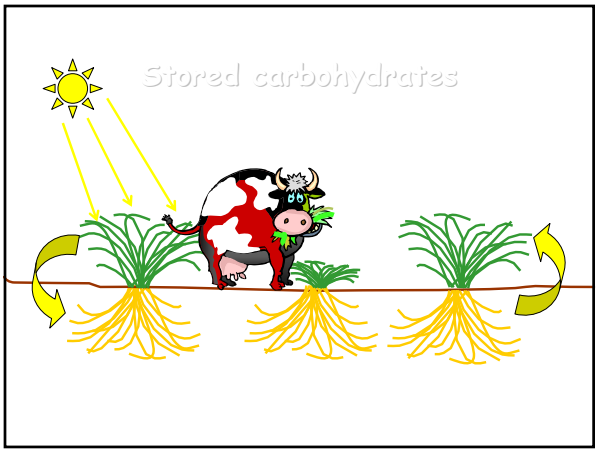
b,c,d,e MEANS ON THE SAME LINE WITH DIFFERENT SUPERSCRIPTS ARE SIGNIFICANTLY DIFFERENT (P<.05). HOLSTEIN STEERS WERE USED IN THIS EXPERIMENT.

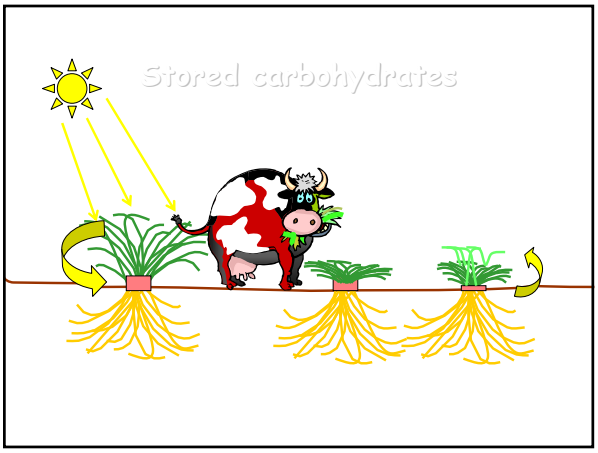
ADAPTED FROM EMMICK, FOX, AND SEANY 1990

August 8, 2007 7:00 P.M.

August 8, 2007 7:10 P.M.
Mowed to a 2-inch height

August 9, 2007 7:00 A.M.
2 inches
.75 of an inch


Stored carbohydrates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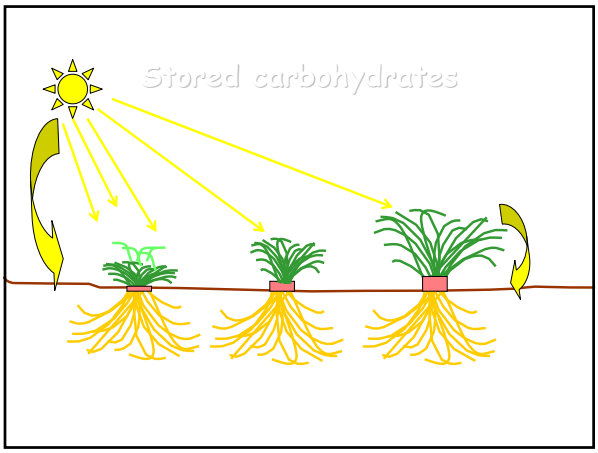
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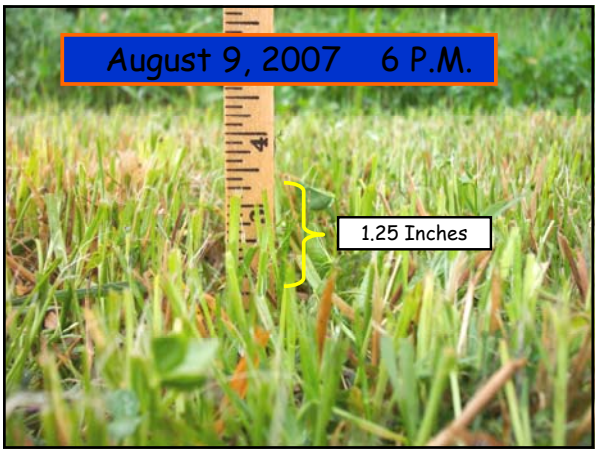
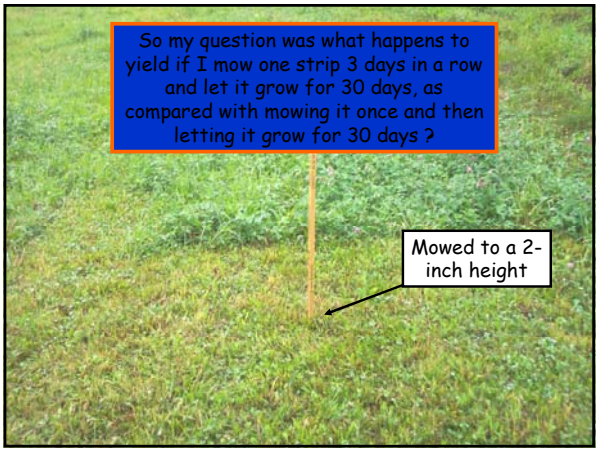

August 9, 2007 6 P.M.
1.25 Inches


So my question was what happens to yield if I mow one strip 3 days in a row and let it grow for 30 days, as compared with mowing it once and then letting it grow for 30 days ?
Mowed to a 2-inch height

September 11, 2007 30-days after mowing 3X
6-inches

September 9, 2007 after mowing 1X
9-inches

Stocking Method Comparisons

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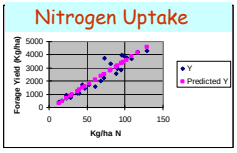
ADAPTED FROM EMMICK, FOX, AND SEANY 1990

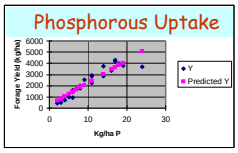
Take home message

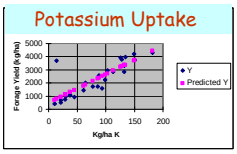
The greater the need for maximizing forage production per acre of pasture, the greater the need for using a rotational stocking method.

And more importantly, with very short residency periods.

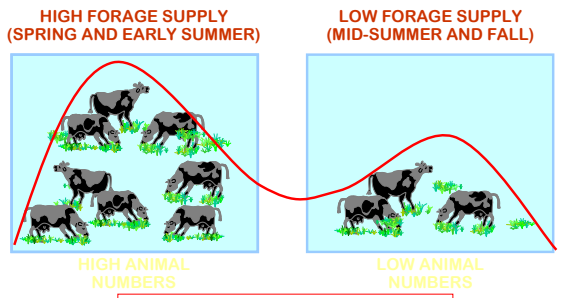
Influence of increasing forage yield on nutrient uptake and sedimentation reduction (adapted from Palazzo and Graham, 1981)



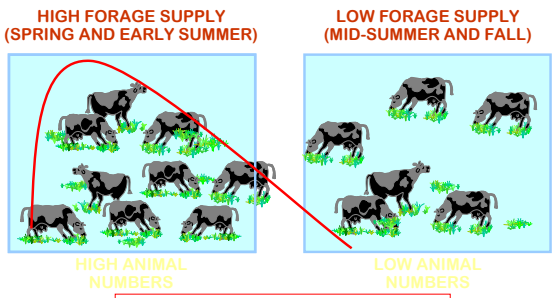




- A method of livestock deployment where livestock have the continuous or uninterrupted use of a pasture during the time period in which grazing is allowed
- As commonly practiced, it is a minimum management grazing method where a set number of animals are turned into a pasture to graze for as long as the forage supply lasts



The acreage remains constant but the number of animals changes



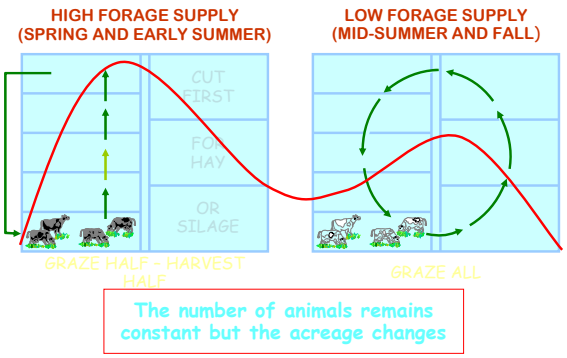
The acreage remains constant but the number of animals changes

- Without proper planning and management, the continuous stocking method leads to resource depletion, environmental degradation and reduced livestock performance on both a per acre and per animal basis
- With proper planning and management, it can be a useful alternative for some livestock operations or specific land use objectives

INDICATIONS FOR USE

- Livestock operations where animal numbers can be adjusted +/- to maintain proper balance between forage supply and forage demand i.e., cow/calf, ewe/lamb, growing animals
- When the resource inventory indicates the forage supply exceeds the forage demand and you have no need for the surplus forage
- Re-ordering succession i.e., weed and brush control

- A method of livestock deployment that utilizes two or more grazing units or paddocks that are alternately grazed and rested during the time period in which grazing is allowed
- The size and number of paddocks utilized is dependent on the level of managerial control desired, the productivity of the pasture and the number of livestock

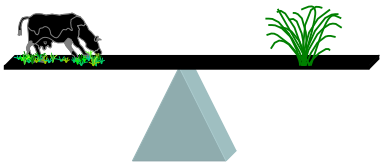


- Without proper planning and management, the rotational stocking method is no better than a continuous stocking method
- With proper planning and management, rotational stocking methods provide opportunity to maintain resource integrity, reduce environmental degradation, optimize livestock performance, and length of grazing season

INDICATIONS FOR USE

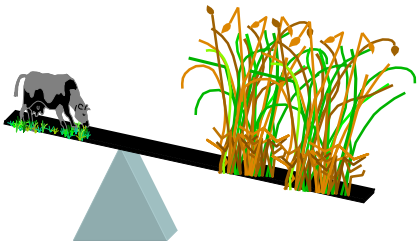
- When the livestock are lactating dairy cows, sheep, or goats
- When the resource inventory identifies a farm using a less intensive style of grazing management is running short on feed
- Any time you are looking to maximize production on a per acre basis

Either stocking method can be effective when the forage supply is kept in balance with the forage demand

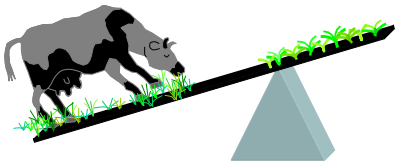


But neither one is effective when the forage supply is not kept in balance with the forage demand!

Too much forage/Not enough demand **(Under-stocked)**



Too much demand/Too little forage **(Over-stocked)**



If you do not maintain the correct number of animals for the forage base, regardless of the method of stocking you use,

The system will fail!