Pasture Renovation and Improvement

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Evaluate your Pasture?

This can range from:

Simply observing that
  “It’s still green out there”

Sophisticated assessment of:
  - plant species diversity
  - plant / tiller density
  - amount of DM / inch of pasture height
From USDA-NRCS

‘Pasture condition’ scoring focuses on:

Vegetation traits
- Diversity, desirability, % legumes, ‘vigor’
- Plant cover, uniformity of use, severity of use,
- Tree/shrub canopy cover

Site / Soil traits
- Active erosion ?, degree of plant residue

Management
- Compaction, fertility, insects & diseases

10 factors 0-4 ranking for each - - high score 40
Of what value is pasture condition scoring?

It’s a ‘snapshot in time’

It forces a detailed look at important pasture and grazing factors

It gives guidance for immediate or future management changes
A problem often associated with non-uniform pasture production is a mis-match between forage needs and for availability.
Approximate ‘season-long’ pasture needs per average sized beef cow, with pasture providing most, if not all, of the nutrition:

1 - 2 Ac.  Excellent, dense sod, permanent pasture

2 –2 ½ Ac.  ‘Average’ permanent pasture
(This will have spring excess OK summer forage in ave. years.)

3+ Acres  ‘thin’, poor sod, unmanaged
(Supplemental forage will likely be needed !!!)

Note! Supplement hay etc. when needed
We are often challenged with the ‘roller coaster’ growth pattern of our ‘cool-season’ grass-based pastures!

A more productive Cool-Season grass
‘Bromegrass’
‘Orchardgrass’
doesn’t solve the problem

Ky bluegrass
Adding Nitrogen to grass pastures?

Grass responds to N more than any other fertilizer nutrient!

Simply produces more grass when there is already a surplus!
Adding a ‘warm-season grass pasture to compliment the cool-season grass pastures?’

Sudangrass
Millets
Switchgrass
Big bluestem
Etc.

Ky bluegrass
Other forages are productive during other parts of the growing season.

Add a Legume *
Two pasture condition scenarios:

More pasture than animal power

‘Spot grazing’ – selective grazing

Animals in ‘good condition’

Significant areas avoided, mature grasses (headed)

Weeds invading
Another scenario; the other extreme:

More animals than pasture

Can ‘keep up’ with Spring growth (maybe)

Short pasture summer, fall (winter ?)

Need to feed supplement hay / feed

Weeds invading

Thin sod, and active erosion areas
Management ‘Fixes’ for the two scenarios.

1st Scenario (excess pasture)

- add animals
- reduce grazed area
- clip seedheads and weeds, keep a surplus situation
- harvest excess as hay
2nd Scenario ("over stocked")

- reduce animal numbers !!!

- supplement some of daily needs as hay or feed

- manage weeds (animals will begin to ‘test’ less desirable plants)

- implement rest / rotation grazing

- boost production of the pasture
Guide for Year-Round Forage Supply

IOWA STATE UNIVERSITY
University Extension

This publication is a planning guide to evaluate your current forage/livestock balance during the grazing season and to explore alternative types of pastures or their management to achieve a better pasture balance and ways to extend the grazing season.

Table 1 and the table 1 worksheet can be used to enter and calculate your existing livestock numbers and their forage needs, in animal unit months (AUMs). Again, the forage needs can be calculated by month for each type of livestock and totaled.

Table 2 is a worksheet that you can use to enter and calculate monthly needs, you can quickly see where your seasonal production deficits are.

Table 1. Livestock Needs Animal Unit Factors

<table>
<thead>
<tr>
<th>LIVESTOCK DESCRIPTION</th>
<th>Animal Unit Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yrlg Steers/Hefs-Med Frame</td>
<td>0.7</td>
</tr>
<tr>
<td>Yrlg Steers/Hefs-Large Frame</td>
<td>0.9</td>
</tr>
<tr>
<td>2 Yr Hfrs-M Milk-8-1000 lb</td>
<td>1.0</td>
</tr>
<tr>
<td>2 Yr Hfrs-M Milk-10-1200 lb</td>
<td>1.1</td>
</tr>
<tr>
<td>2 Yr Hfrs-Hi Milk-8-1000 lb</td>
<td>1.1</td>
</tr>
<tr>
<td>2 Yr Hfrs-Hi Milk-10-1200 lb</td>
<td>1.2</td>
</tr>
<tr>
<td>Cows-Mod Milk-9-1100 lb</td>
<td>1.0</td>
</tr>
<tr>
<td>Cows-Mod Milk-11-1300 lb</td>
<td>1.1</td>
</tr>
</tbody>
</table>

1 AUM [animal unit month] =
Forage energy needs of a 1000# beef cow & calf for 1 month

~ 28 lbs DM per day or ~ 850 lbs DM per month
## Seasonal pasture productivity – by month

<table>
<thead>
<tr>
<th>PASTURE/FORAGE TYPE</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
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<tbody>
<tr>
<td><strong>Continuous Grazing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimproved Bluegrass</td>
<td>0.6</td>
<td>0.6</td>
<td>0.3</td>
<td>0.2</td>
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<tr>
<td>Improved Bluegrass+Orchard</td>
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<td>0.85</td>
<td>0.45</td>
<td>0.25</td>
<td>0.3</td>
<td>0.2</td>
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<td></td>
<td></td>
<td>3.0</td>
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<tr>
<td>Improved Bluegrass+N or Leg</td>
<td>0.2</td>
<td>1.1</td>
<td>1.1</td>
<td>0.6</td>
<td>0.3</td>
<td>0.4</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.0</td>
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<tr>
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<td>1.1</td>
<td>1.1</td>
<td>0.5</td>
<td>0.4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
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<tr>
<td>Unimproved Orchard/Brome Gr</td>
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<td>0.3</td>
<td>0.4</td>
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<td>Orchard or Brome +N or Leg</td>
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<td>0.8</td>
<td>1.2</td>
<td>1.0</td>
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<td></td>
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<td>Tall Fescue + N or Leg</td>
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<td>1.6</td>
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<td>6.0</td>
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<td></td>
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<td>3.5</td>
</tr>
<tr>
<td>Alfalfa/Gr 2 Cut then graze</td>
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<td>0.4</td>
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<td>Cornstalks</td>
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<td>5.0</td>
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<td>1.0</td>
<td>0.8</td>
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<td></td>
<td>7.6</td>
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<tr>
<td>Improved Orch/Brm 8 Paddocks</td>
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<td>1.8</td>
<td>1.8</td>
<td>1.0</td>
<td>0.6</td>
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<td>6.5</td>
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<tr>
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<td>1.7</td>
<td>1.6</td>
<td>1.1</td>
<td>1.0</td>
<td>0.6</td>
<td>0.6</td>
<td>0.4</td>
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<td></td>
<td></td>
<td>7.5</td>
</tr>
</tbody>
</table>
### Table 1. WORKSHEET - YOUR LIVESTOCK NEEDS

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Mature Cattle</td>
<td>30</td>
<td>1.0</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Calves (over 3 mos.)</td>
<td>29</td>
<td>0.3</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
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</tr>
</tbody>
</table>

**Total AUMs of Forage Needed**

<table>
<thead>
<tr>
<th>Animal Units to Be Carried Each Month3</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

1. Enter number of each kind of livestock in column 2 and AU factor (from table 1) in column 3.
2. Animal units = Number in column 2 x AU factor in column 3.
3. Enter the total animal units as shown in column 4 that will be on hand each month.

### Table 2. WORKSHEET - YOUR FORAGE SUPPLY

<table>
<thead>
<tr>
<th>Example</th>
<th>Total Available</th>
<th>Animal Unit Months per Acre2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unimproved Bluegrass</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Trefol Grass</td>
<td>20</td>
<td>94</td>
</tr>
</tbody>
</table>

**Total AUMs Available**

<table>
<thead>
<tr>
<th>Animal Unit Months per Acre2</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

1. AUM = Acres in column 2 x total AUMs for each kind of pasture as shown in last column in Table 3.
2. AUM per acre = Acres in column 2 x AUM per acre for each month given in Table 3.
Adjusting animal numbers gets a bit more tricky as pasture sizes get smaller.

+ 1 animal  \rightarrow  overstocked situation

- 1 animal  \rightarrow  less efficient use

( but better for the animals and the pasture ! )
What can fertilization do?
Ky bluegrass

Early spring  60-80 lbs/A

Late spring (Optional) extra 30-40 lbs/A

& / or Late Summer (Optional) extra  30-40 lbs/A

Tall, Cool-Season Grasses

Early spring  80-120 lbs/A

Late Spring (Optional) extra 40-60 lbs/A

& / or L- Summer (Optional) extra 40-60 lbs/A

Orchardgrass
Legume-Grass Mixed Pastures

If more than 1/3 legume –
no nitrogen is recommended

If less than 1/3 legume –
treat as a grass pasture

These mixed pastures with will respond more to P and K.

*Note for Legume-Grass Mixed Pastures:

High & frequent Spring applications of nitrogen leads to grass dominance and less legumes.

Consider deferring N applications until late summer or fall
Phosphorus (P), Potassium (K) and Lime Needs and rate are determined by a soil test!

Existing pasture
For P & K
Sample to a 6 inch depth
For Lime Rec
Sample to 2 to 3 inches

New seeding or re-seeding
Sample to ‘Tillage Depth’
Why is Lime recommended?

The soil ‘acidity’ (pH) influences the availability of fertilizer nutrients and soil microbial activity.

Lime is used to raise a low soil pH (acid condition)

### pH for Forage Crops

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Target pH</th>
<th>Don't Worry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>6.8 - 7.0</td>
<td>6.5 - 7.5</td>
</tr>
<tr>
<td>Clover &amp; BFT</td>
<td>6.5 - 7.0</td>
<td>6.0 - 7.5</td>
</tr>
<tr>
<td>Forage Grass</td>
<td>6.0 - 7.0</td>
<td>5.7 - 7.5</td>
</tr>
</tbody>
</table>
Phosphorus (P), Potassium (K)

P & K needs and rate are determined by a soil test!

Yield responses to phosphorus (P) and potassium (K) are not dramatic nor consistent.

Forage plants will respond to added (P) and (K) when.

‘Optimum’

Very Low

‘Optimum’

Low
Manage Pasture Weeds

Livestock eat some of those pasture weeds!!!
Blue vervain  Horse nettle  Buffalo bur

Giant ragweed  Goldenrod  Burdock
Less palatable

Downy brome

Squirreltail barley
Foxtail barley

Little barley
Pasture weed control –cont.

**Cultural Weed Management**

Establish & maintain thick grass stands of grasses and legumes that are adapted to your climate and site.

Use proper fertilization

Use proper grazing management
‘Mechanical’ Management

Clip, mow or dig:

1) prevent new seed production
2) minimize effect of competition on pasture

(mowing is not very effective for low-growing weeds!
--- spray will be better for these.)

Spray Management

Most pasture herbicides are to control ‘broadleaf’ weeds and keep the grasses -- !! Kills legumes !!

Timeliness is important
- weed become harder to kill when they are mature
Biennial weeds  (bull thistle, plumeless thistle, musk thistle)

1st growing season
  Dig; or
  Spray in the fall while the weed is still in the ‘rosette' stage

2nd growing season the biennial weed will ‘bolt’ (shoot a seed stem, and die)
  Spraying during this growth stage is less effective
Perennial weeds (Canada thistle, vervain, multiflora rose)

(can grow for many years, reproduce by seed & roots)

1) Mow
2) spray during vegetative growth stage;
   -- ‘more active’ herbicides are normally used
   -- systemic herbicides very useful
3) multiple treatments needed to “starve-out” the plant

Extreme situations - may have to kill the grass too!
Grazing Management

A successful way to maintain and improve pasture productivity is to improve grazing management.
If given the choice, animals will return to a previously grazed area (spot grazing), ignoring taller, more mature forage.

This lead to ‘over grazing’ of some areas.
After a grazing (defoliation), a plant needs to ‘mobilize’ its stored sugars, proteins, and growing points to establish new leaf area.

IT REQUIERS SOME REST FOR THE Plants !!!!
How Pasture Plants Grow

To make good pasture management decisions, you need to understand the growth and development of grasses and legumes. Pasture use and production can be improved by carefully managing forage plant grazing. Making grazing decisions based on plant growth may seem unappealing, but it is the key to successful grazing management.

Structure of the grass plant
The structure of grass plants is similar among the many species of grasses (Figure 1). A grass plant is a collection of tillers or shoots that grow from buds at the base of the plant. Each tiller is composed of a series of repeating units consisting of a leaf, stem node, stem internode, and a bud. Each leaf is attached to the stem at a node, with an associated dormant bud. Early in the development of a grass tiller, the distance between nodes (internodes) on the stem is very short and the stem remains compact at the base of the plant. At the top of the stem is the growing point where new stem and leaves originate. As long as this growing point remains intact, it is capable of producing new

The vegetative growth period is the growth of leaves. The stem, with its growing point, remains compact near the soil line. Once a critical number of leaves has formed on a tiller, the older and lowermost leaves generally die at approximately the rate of new leaf growth, and the number of leaves on a tiller remains relatively constant.
Rest can be created by dividing the pasture into smaller grazing areas.

- This may not be very practical for mall acreages!
- Includes issues associated with...
  fencing, water, building access, feeding etc.
How much ‘improvement’ from rotational grazing?

Depends upon where you start!

- 8 to 10+ paddocks: 10 to 20% more *
- 3 to 4 paddocks: 10 to 15% improvement *
- ‘Abusive’, continuous grazing

25 to 35+ % total *

* Assumes appropriate stocking rates
  And good day to day management
‘Patching’, ‘Thickening’ and Replacing Pasture

Assess whether what you have now is worth keeping.

Add more or more productive grasses

Add legumes

Start over!
Frost Seeding

Simple – broadcast seed on pasture in late winter / very early spring (late-February through March)
Frost Seeding - continued

There are several other important steps that make frost seeding more consistently successful.

- **Weeds should be under control**
  
  - Fertility – good enough for legumes?

- **Grass sod should be short**

- **Graze seeding year to allow establishment**

- **Graze later years to keep new plants !!!!!**
Sod-Seed or Inter-seed

Use no-till pasture drill to seed into existing pasture sod in early spring (March and April)

No-till drills provide:

A disk-type or other sod/seedbed opener

A seed metering and placement mechanism

A press wheel to provide for seed-to-soil contact
Sod-Seed or Inter-seed

Most interseeding is done in early spring (March and April)

Consider late summer (Aug thru very early Sept) IF soil moisture is adequate

Some county conservation agencies rent these
Sod-Seed or Inter-seed - continued

As with frost seeding, some management practices improve interseeding success

- Weeds should be under control
  - Fertility – good enough for legumes?
- Grass sod should be short

Consider sod suppression herbicides

- Drill seed to a depth of ¼ to ½ in. and cover
- Graze seeding year to allow establishment
- Graze later years to keep new plants !!!!
Types of ‘Seedbeds’

Reduced tillage

Conventional tillage

Consider maintaining crop residues...
Tilled seedbed

Mostly fine, with some pea to marble sized clods

Firm enough –

That you don’t sink in any deeper than the sole of your shoe, or the tread of a pick-up truck tire
Excellent Seeding Technique

- Uniform distribution of seed across the seeded area
- Uniform final depth of placement 1\(\frac{3}{4}\)-1\(\frac{1}{2}\) inch (after all equip. passes)
- Excellent seed – to – soil - contact
“Spinner-Type” Broadcast Fertilizer Spreaders
New Dry Fertilizer Application Technology
No-Till forage planting

Into  Killed sod
     Crop residues

Other establishment principles apply !!!
‘Native’ wm-season grasses

Truax (native grass drill)

appropriate ‘seed metering’
mechanism
Improving Pasture by Frost Seeding

Frost seeding, sometimes referred to as overseeding, establishes new grass in existing grass pastures. Legumes such as orchardgrass, very thin sows of Kentucky bluegrass, or smooth bromegrass. Frost seedings are also often successful in bare and disturbed pasture areas. It seems that bunch-type grasses and thin sows offer less competition to legume seedlings than vigorous stands of sod-forming bromegrass and bluegrass.

Frost seeded legumes and grasses often have poor establishment in years with abnormally dry springs or early summer weather.

Research at Iowa State University demonstrated that alfalfa, red clover, birdsfoot trefoil, and smooth bromegrass stands. These studies with warm-season grass stands have under field-scale grazing

Legume or legume and intended grasses that are successfully frost seeded into bromegrass stands. These studies with warm-season grass stands have under field-scale grazing

Steps to Establish and Maintain Legume-Grass Pastures

Drills that are designed to accomplish this are marketed by: Deerfield, N.D.; Falcon Corp., Md.; Merco, Butler, Ill.; Hanover, Ind.; S.E. stickers that are designed to accomplish this are marketed by: Deerfield, N.D.; Falcon Corp., Md.; Merco, Butler, Ill.; Hanover, Ind.; S.E.

Steps to Follow for Interseeding

A number of precision seeders are effective in no-till bromegrass and red clover are competitive for interseeding into tall grass swards.

Application

Application rates vary with the species and seed size. For pasture use, apply 1 to 2 lbs of seed per acre or 1 to 2 lbs of seed per acre or 1 to 2 lbs of seed per acre.