Drought and Stocking Adjustments on Range and Pasture

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Great Bend, KS
Regardless of Grazing Strategy:

Precipitation and Stocking Rate are the Two Most Influential Factors on Annual Rangeland and Livestock Production
Stocking Rate: - affects animal performance
- affects grass composition
- affects grass yield
- affects resilience to stress
- affects net return
Drought ....

Occurs 1 out of every 5 years in western Kansas
The primary response of grass to drought is....

reduced growth and forage yield
CH₂O production

Leaf growth

Root growth

Tiller & bud initiation

CH₂O storage

Nutrient & water uptake

Root volume & root depth

Soil interception

Light interception
What can we learn from rangelands during the drought of the 1930’s?
Buffalograss and Blue Grama Cover-Moderate Grazed Pasture

1935 - 72%  
1937 - 3%  
1939 - 27%

Fig. 24. Quadrat on moderately grazed short-grass type with dense cover. Cover of short grasses in the fall of 1935 (left) was 72.4 percent. A minimum cover of 0.15 percent of buffalo grass (large dots) and 2.8 percent of blue grama (small dots) was reached by 1937 (center). Significant gains were made by these grasses during 1938 and 1939 and, when charted in the fall of 1939 (right), buffalo grass had a cover of 3.1 percent and blue grama grass 24.2 percent.
Buffalograss and Blue Grama Cover-
Heavy Grazed Pasture

1935 - 20%  1936 - 1%  1939 - 19%

Fig. 26. Quadrat in typical overgrazed area of closed-type short grass. The buffalo grass (large dots) and blue grama (small dots) were not charted separately in 1935 (left), when the cover of the two grasses was 19.8 percent. The minimum of 0.84 percent was reached in 1936 (center). Note the rather uniform distribution of the surviving clumps throughout the quadrat. The basal cover increased to nearly 19.0 percent in 1939 (right).
1934 1936

Palmer Drought Severity Index
August, 1934

Palmer Drought Severity Index
August, 1936

Palmer Drought Severity Index
September, 1954

Palmer Drought Severity Index
October, 1956

1954 1956

National Climatic Data Center, NOAA
2011

Palmer Drought Severity Index
September, 2011

National Climatic Data Center, NOAA
2012

Palmer Drought Severity Index
November, 2012

National Climatic Data Center, NOAA
How long will it take rangelands to recover from stress, overuse, or heavy stocking rates?
Moderate Stocking Rate

Yield (kg/ha)


FORB  ANNG  AGSM  BOGR  BUDA
Heavy Stocking to Light Stocking

Yield (kg/ha)

Four basic things can help pastures recover from stress or overuse:

1. Reduce stocking rates
2. Provide a rest period during the growing season
3. Combination of 1 & 2
4. More Rain!
Some grazing systems that allow for extended rest:

1. Rest rotation – one pasture rested all season
2. Deferred rotation – all pastures grazed, some allowed rest over half the season
3. Intensive early stocking – grazed first half of season then rested
4. Other systems with only one occupancy period
Can we predict season pasture yield?
Predictability of End of Year Yield from Precipitation Intervals - 35 Years

\[ y = 136.7x + 285 \]

\[ r^2 = 0.61 \]
## Predictability of End of Year Yield from Precipitation Intervals - 35 Years

<table>
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<tr>
<th>Total Year</th>
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<th>Mar-May</th>
<th>May-Jun</th>
<th>Jun-Jul</th>
<th>May-Jul</th>
<th>Apr-Sept</th>
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### Graph

- **Equation**: $y = 90.9x + 2657$
- **$r^2$**: 0.11

The graph shows the relationship between yield (lb/acre) and precipitation (inches) with a linear regression line indicating a moderate positive correlation.
Predictability of End of Year Yield from Precipitation Intervals - 35 Years

\[ y = -41.5x^2 + 779.0x + 320.0 \]
\[ r^2 = 0.56 \]

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Can You Prepare for Drought?

Make a drought plan and plan for stocking adjustments
How Do You Prepare for Drought?

Establish moderate recommended stocking rates as a baseline

Manage for greater plant vigor and soil cover

Diversify with stocker cattle

Set critical dates for destocking
  Monitor rainfall
  Monitor range production & utilization
  Early weaning
  Early culling
Diversify with stocker cattle…
25-35% of acres…
110 cow/calf pairs for 6 months, 1920 acres
Shift to…

72 cow/calf pairs, 1260 acres
72 stocker animals, 660 acres
Can destock yearlings, and replace with cow/calf pairs on those acres during drought.

Fewer animals to graze or feed in winter, less overall hay or stockpile forage requirement.
Set critical dates for destocking

Monitor rainfall
Monitor range production & utilization
Early weaning
Early culling

Nov. 1- Drought and grass overutilized
    - reduce stocking rate by 10-15%
May. 30- low May precipitation
    - plan for early stocker removal
June 30- May and June precipitation < 80% or less, reduce stocking rate by 25% or more
    - destock stocker cattle, reallocate acres to cow/calf pairs
    - destock obvious cull cows
    - plan for early preg check and cull
    - plan for early weaning
What We Did In 2012

Nov. 1, 2011- Drought and grass stressed
-reduced cow number from 275 to 235
May 30- low May precipitation, planned for early wean
June 30- May and June precipitation 40% of average, set date to wean, and reduced cow number to 200, planned for further stocking reduction at early preg check
July 10- early weaned, destocked obvious cull cows
Aug 10- early final preg check, culled opens, culled large cows and from clean-up bred cows to 150 head, fed all replacements as fat cattle (no replacements grazing in 2013)
What We Will Do In 2013

Nov. 1, 2012 - Drought and grass stressed- start in May with 10-15% fewer cows than end of 2012
May 30 - May precipitation 80% or less, plan for early wean, plan for pulling off pasture
June 30 - low May and June precipitation, early wean and place weaned calves in feedlot, place cows in feedlot for limited feeding trial
www.drought.unl.edu/ranchplan