Management of Pastures During and Following Drought

Larry A. Redmon
Texas AgriLife Extension Service

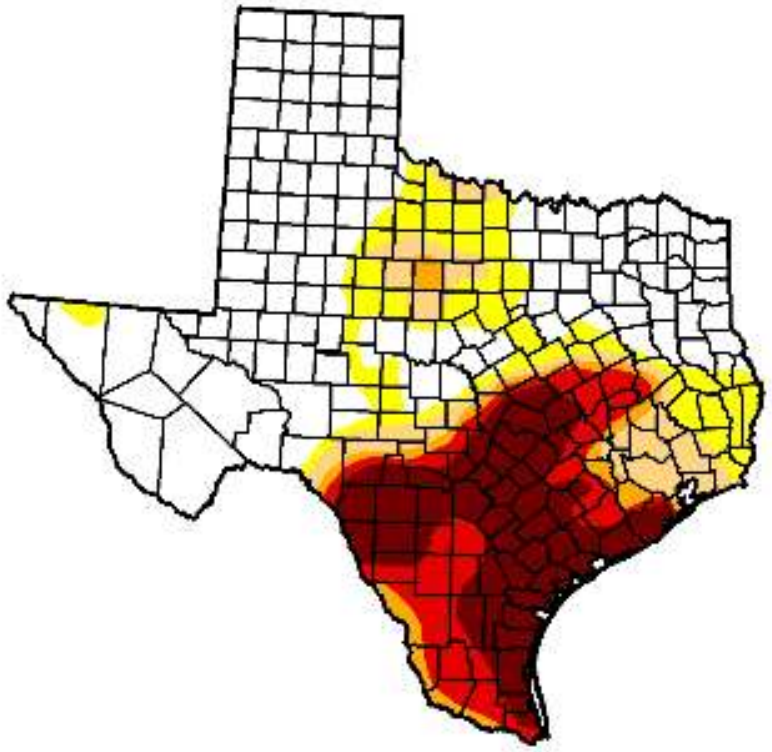
U.S. Drought Monitor

Texas

September 8, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	51.5	48.5	35.8	28.5	24.9	16.1
Last Week (09/01/2009 map)	48.3	51.7	35.3	28.8	26.5	17.3
3 Months Ago (06/16/2009 map)	27.0	73.0	45.5	27.8	16.5	7.6
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0
One Year Ago (09/09/2008 map)	52.9	47.1	25.1	10.0	3.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

http://drought.unl.edu/dm

Released Thursday, September 10, 2009

Author: R. Tinker, CPC/NOAA

Present Drought Timeline

What is drought?

- Meteorological, **agricultural**, hydrologic, and socioeconomic droughts.
- Agricultural drought occurs when there is **inadequate soil moisture** for the needs of a particular crop at a particular time.
- Generally, when precipitation is **< 75% of the average amount** (SRM, 1989).

Drought…

- **Reduces** vegetative ground **cover**.
  - Especially if stocking rate is not adjusted.
- Sets the stage for significant topsoil **loss** during precipitation events that follow.
- Creates a **downward** spiral of deteriorating conditions.
- Can cause a severe depletion in **cash assets** when trying to feed your way out of a drought.
  - **Can result in loss of the ranch…**

NOTE:

- Well-managed forages recover **more rapidly** and **more completely** than those that are not well managed.
- Well-managed means:
  - **Fertilized** appropriately
  - **Stocked** appropriately
  - Not grazed/hayed **too short** beyond Sept.

What are the effects of drought on forages?

Reduced aboveground growth

↓

Reduced root development

↓

Reduced aboveground growth

↓

Dormancy/death

Which species are the most effected by drought?

- Shallow-rooted **annuals**
  - Grasses = crabgrass, small grain/ryegrass seedlings
  - Legumes = clover, burr medics, cowpeas
- Relatively **shallow-rooted perennials**
  - Common bermudagrass, bahiagrass, dallisgrass
- **Deep-rooted perennials**
  - Hybrid bermudagrass, kleingrass, Old World bluestems, weeping lovegrass, many rangeland species

NOTE: The first species to show up after rain begins will be the annuals!

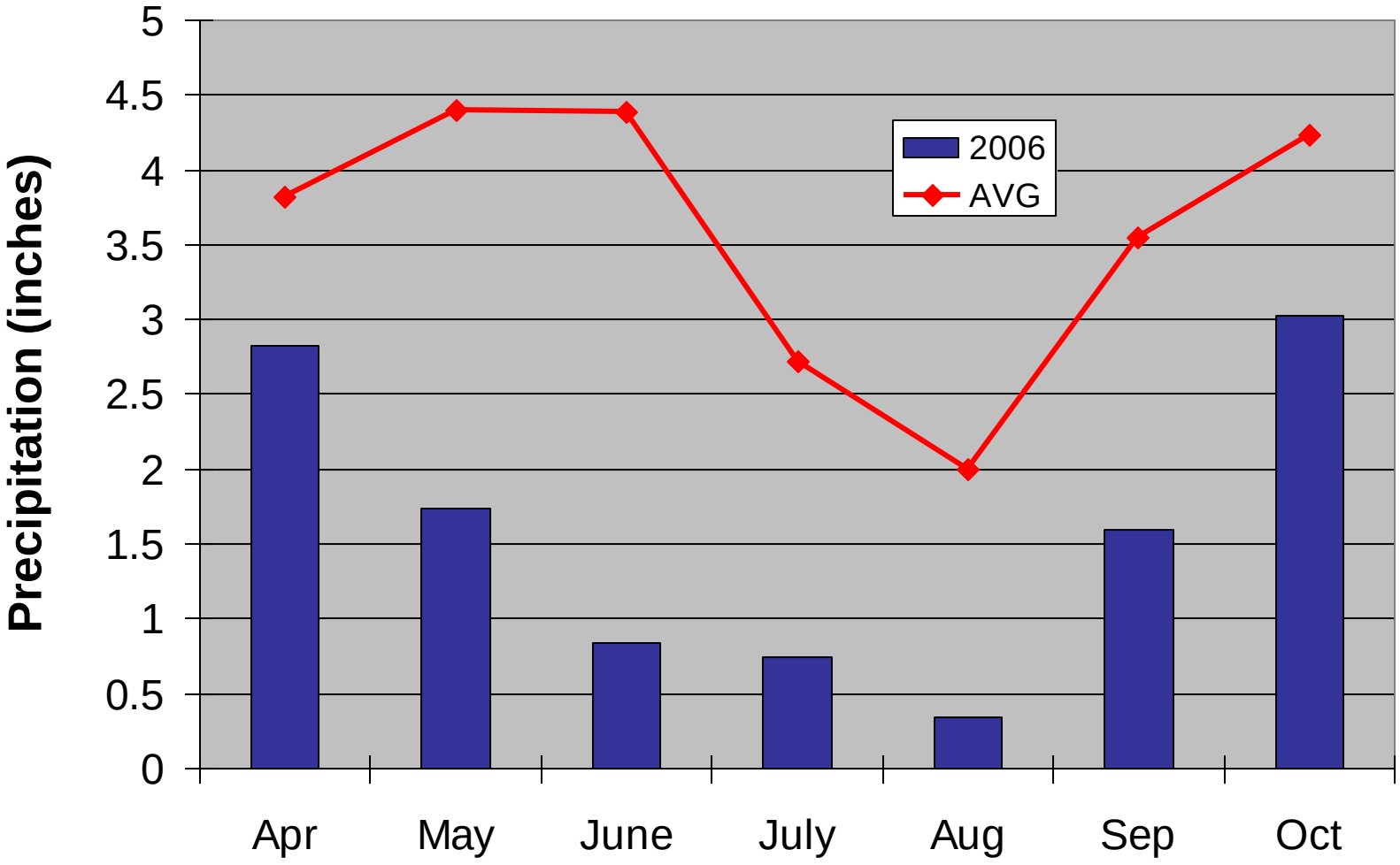
Drought & Forage Nutritive Value

- If drought **is not severe**, forage nutritive value may actually be enhanced.
  - Slower development **may** actually **improve forage nutritive value**.
  - Drought has **little effect on digestibility** as long as leaves are intact.
    - Higher DM, less moisture content)
- **Severe drought =** reduced tillering, more rapid death of established tillers.
  - Perennial species may go **dormant**.
  - Nutrients (N & CHOs) are **translocated** from leaf to roots.
  - **Leaf loss** due to senescence.

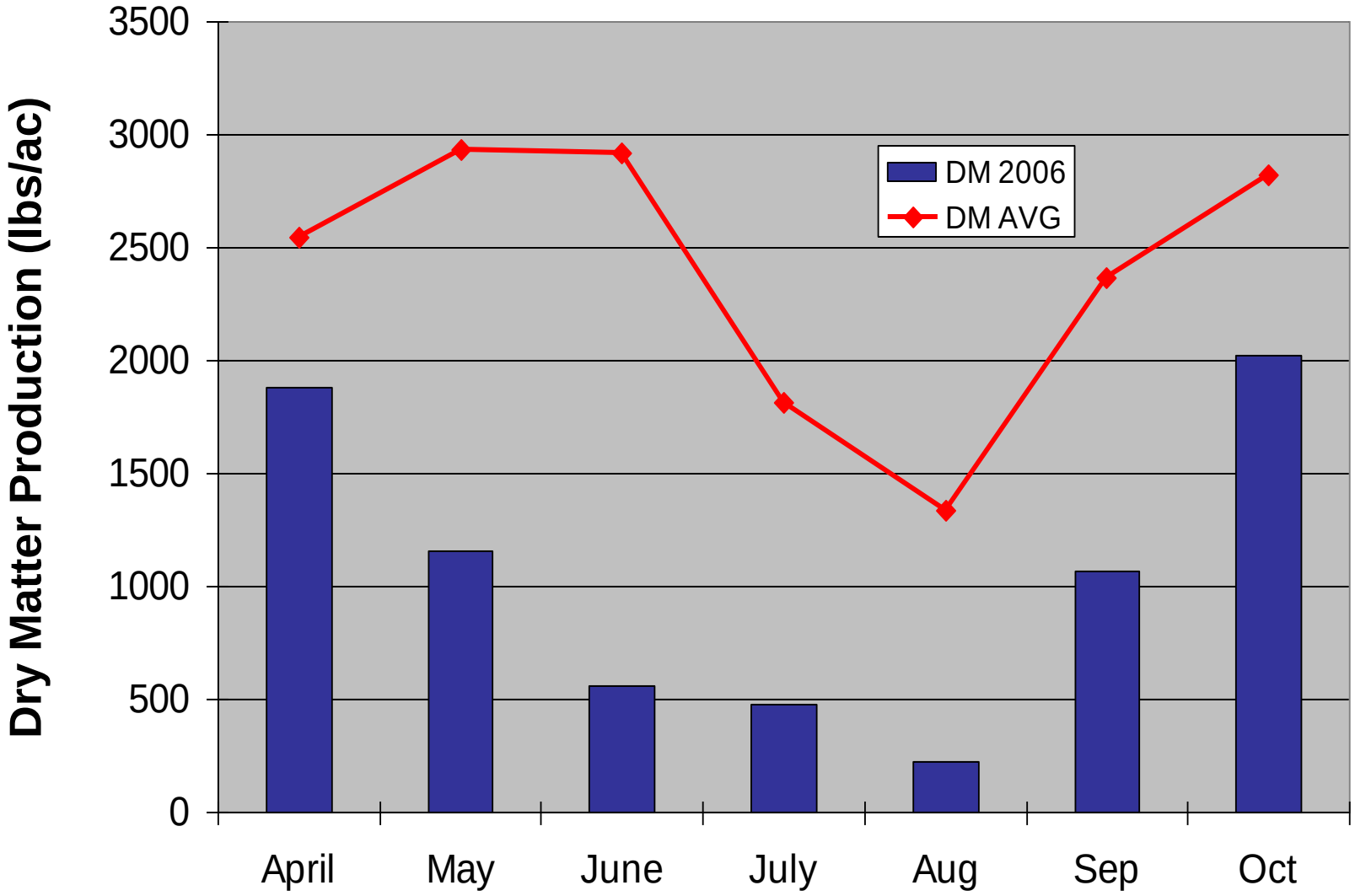
During a Drought

- Landowners will be tempted to keep all of their cattle…**DON’T!**

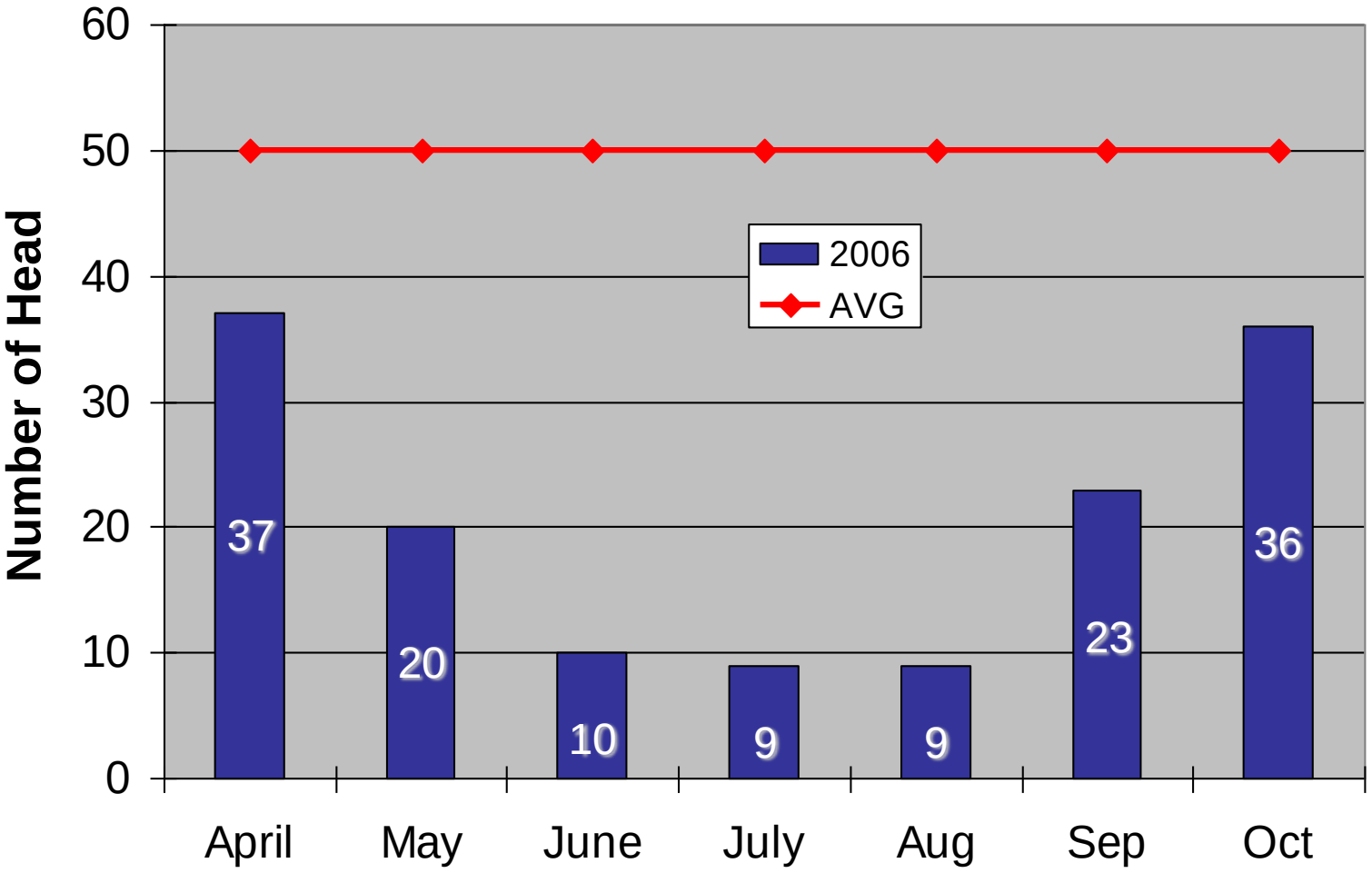
Current Year and Long-term Historical Precipitation at Overton, TX



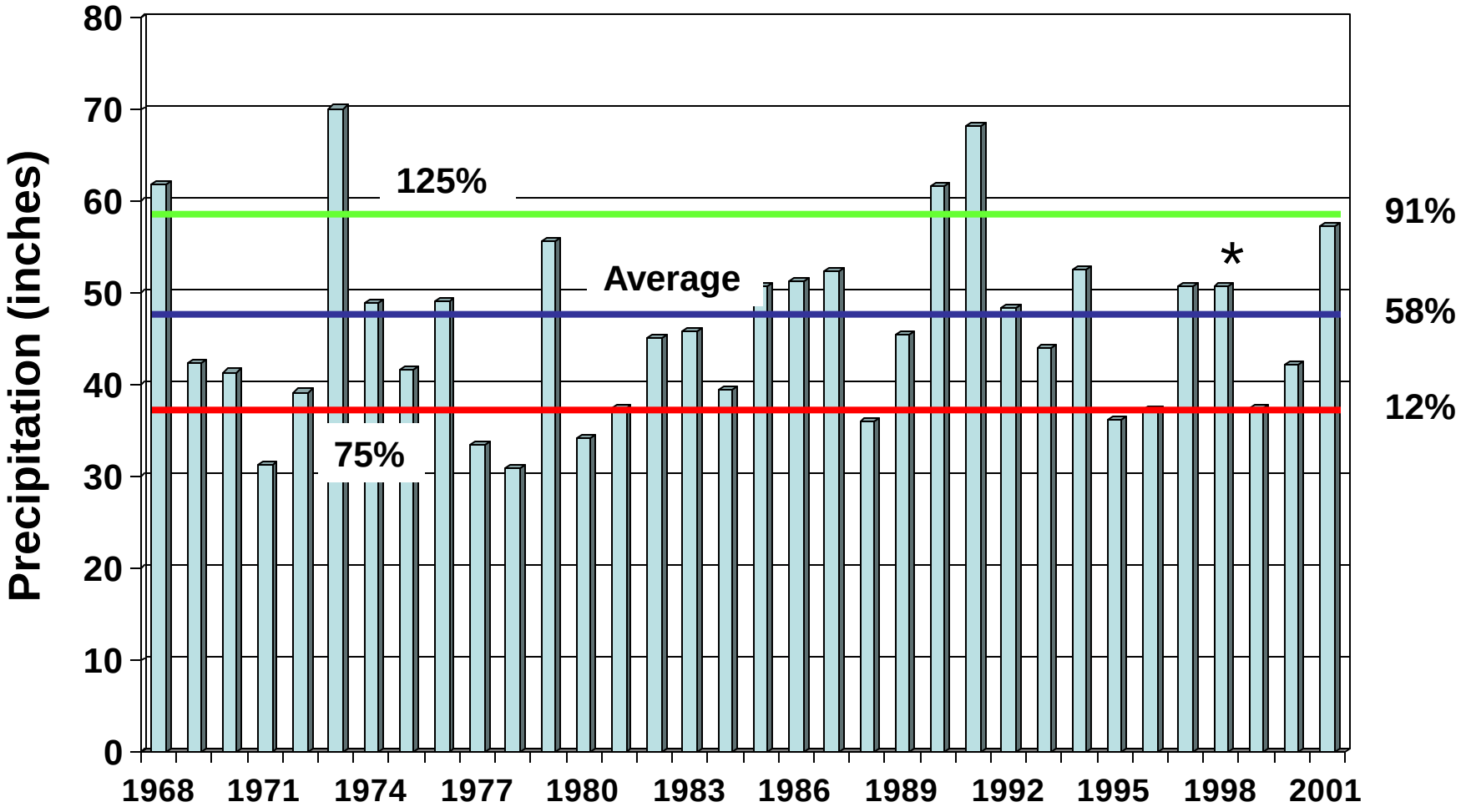
Drought Effect on Forage Dry Matter Production as Influenced by Precipitation. 2006



Drought Effect on Stocking Rate as Influenced by Precipitation. 2006

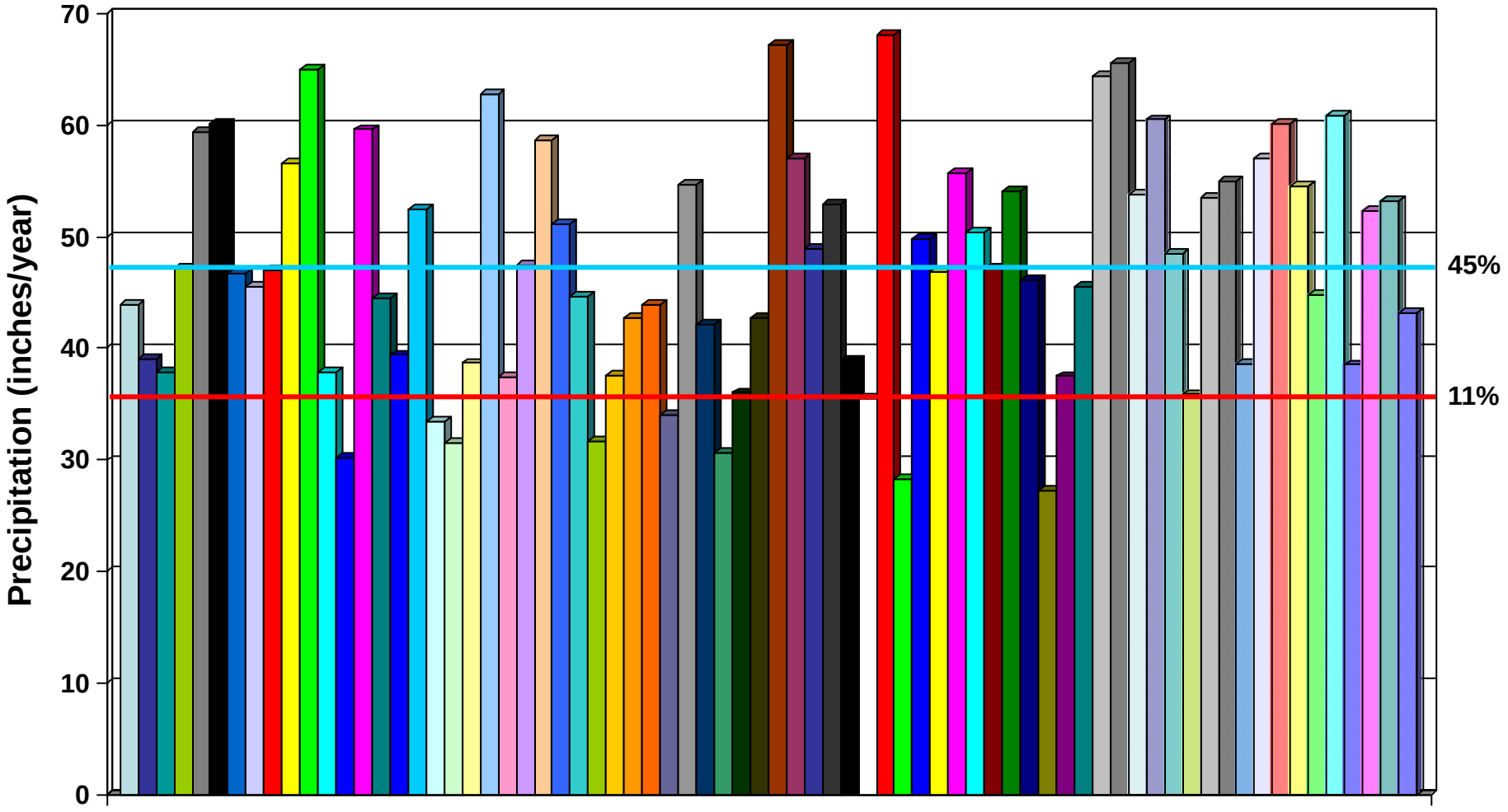


Long-term annual precipitation at Overton, TX. 1968 - 2001



* Incomplete data

Long-term precipitation data for Walker Co., TX 1936 - 2008



During a Drought

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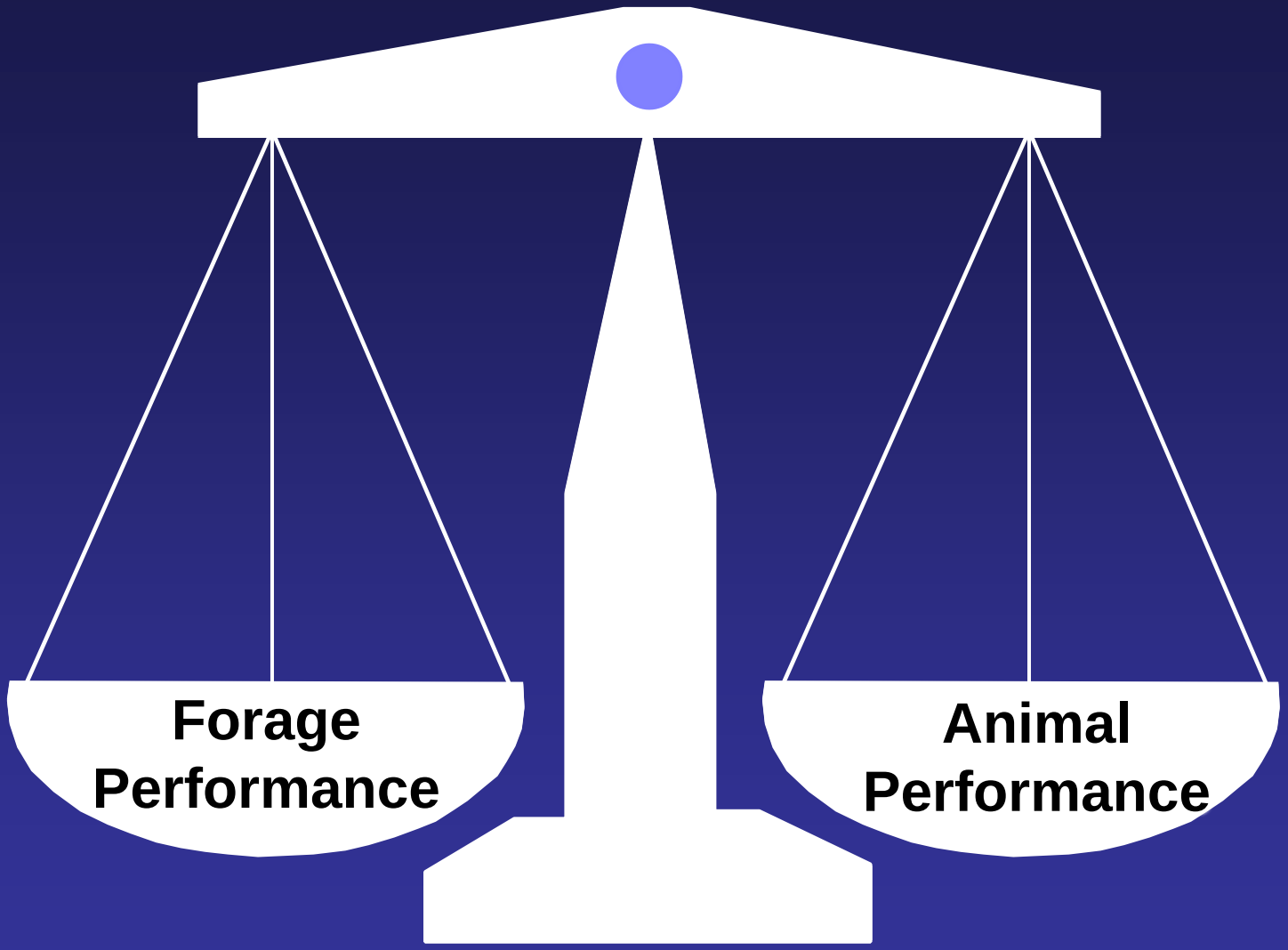
- Landowners will be tempted to graze pastures down to the soil surface…**DON'T!**


Forage
Performance
Animal
Performance

During a Drought

- Landowners will be tempted to keep all of their cattle…**DON'T!**
- Landowners will be tempted to graze pastures down to the soil surface…**DON'T!**
- Landowners will likely have to purchase hay to feed…**GET A FORAGE ANALYSIS!**

Table 1. Crude protein (CP) and total digestible nutrients (TDN) levels required in diets of different kinds and classes of grazing livestock.[1]

Animal kind/class	CP (%)	TDN (%)	NEm (Mcal/day)	NEg (Mcal/day)	NEl (Mcal/day)
Growing beef steer					
450 lbs (1.7 lb/day gain)	11-13	65		2.0	
650 lbs (1.7 lb/day gain)	10-11	68		2.7	
Beef cow					
Lactating	10-12	60		n/a	4.2
Dry, pregnant	8-10	50	8.54	n/a	
Sheep					
Lamb (finishing)	12	70			
Ewe (lactating)	13	65			
Ewe (maintenance)	9	55			
Fallow deer					
Doe (lactating)	14-6	66			
Growing buck	12-14	60-64			
Meat-type goat					
Doe (lactating)	12	62			
Growing buck	12-13	62-66			
Horse (maintenance)	10-11	70			

[1] Adapted from *Southern Forages*, 2nd ed., 1998.

AgriLIFE EXTENSION
Texas A&M System

Forage Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
345 Heep Center, 2474 TAMU
College Station, TX 77843-2474
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu
Sample received on: 11/23/2009
Printed on: 12/7/2009

Report generated for:
Bryan Farms [redacted]

[redacted]
[redacted] County

Laboratory number		87006	87007		
Customer Sample ID		#2 Bryan Farms	#1 Bryan Farms		
Forage Type		Sudan/Sorghum Hay	Bermudagrass (T[redacted]) Hay		
Forage Use					
Crude Protein	%	9.5	7.8		
Acid Detergent Fiber	%	32.1	36.7		
TDN-based on ADF	%	60.1	56.0		
Net Energy Lactation	Mcal/lb	0.61	0.57		
Mineral Analysis					
Phosphorus	%	0.16	0.39		
Potassium	%	1.13	1.67		
Calcium	%	0.39	0.58		
Magnesium	%	0.30	0.15		
Sodium	ppm	414.	1667.		
Zinc	ppm	49.	58.		
Iron	ppm	192.	72.		
Copper	ppm	8.	11.		
Manganese	ppm	154.	61.		

0.15

Results reported on a 100% dry matter basis.
For more information visit: http://soiltesting.tamu.edu - the laboratory website
http://forage.tamu.edu - Forageval program for estimating rate of gain for beef cattle
http://forageselltexas.tamu.edu - collection of information on forages grown in Texas

Warm-season Annuals

- ***Can*** provide good to excellent cattle performance.
- ***Can*** provide high quantities of fair to good hay.
- Are relatively expensive to use compared with perennial species.
- ***Can*** accumulate nitrates to toxic levels in hay.
  - Get a **NITRATE** analysis
- Some can cause prussic acid poisoning.

During a Drought

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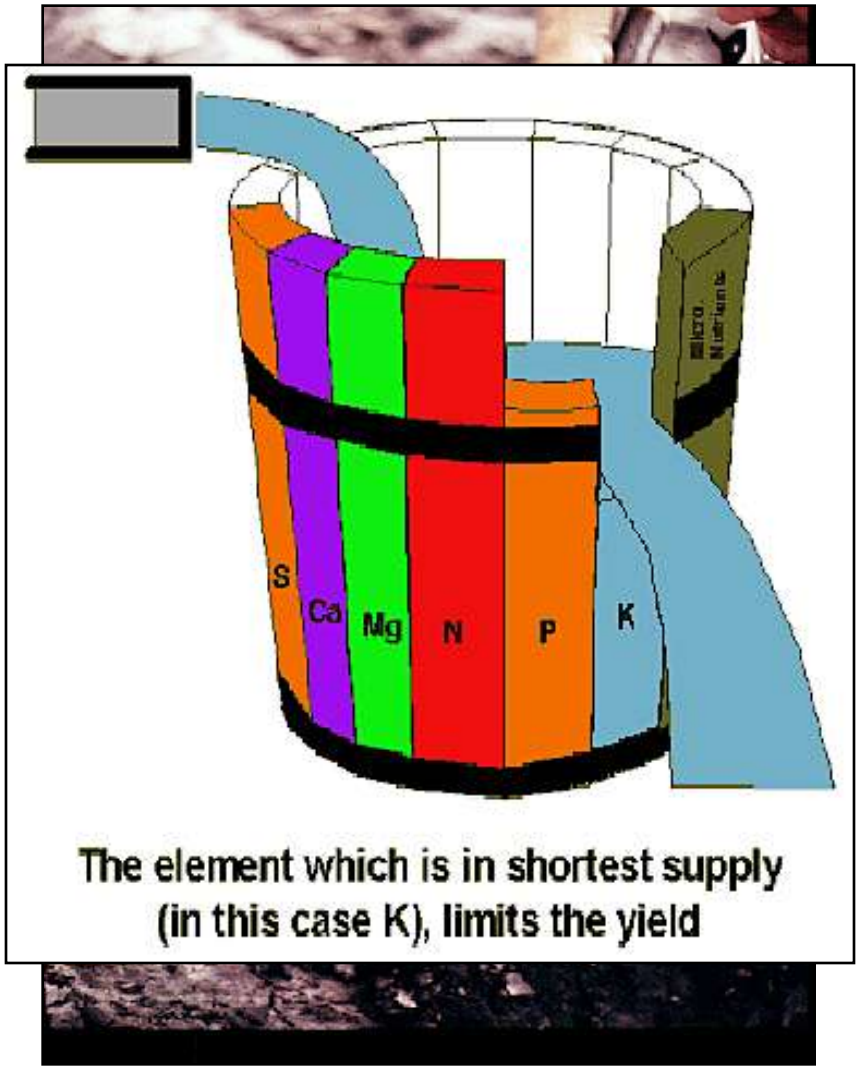
- Landowners will be tempted to graze pastures down to the soil surface…**DON'T!**
- Landowners will likely have to purchase hay to feed…**GET A FORAGE ANALYSIS!**
- When it rains again, **landowners** will be tempted to forget what just happened…**DON'T!**

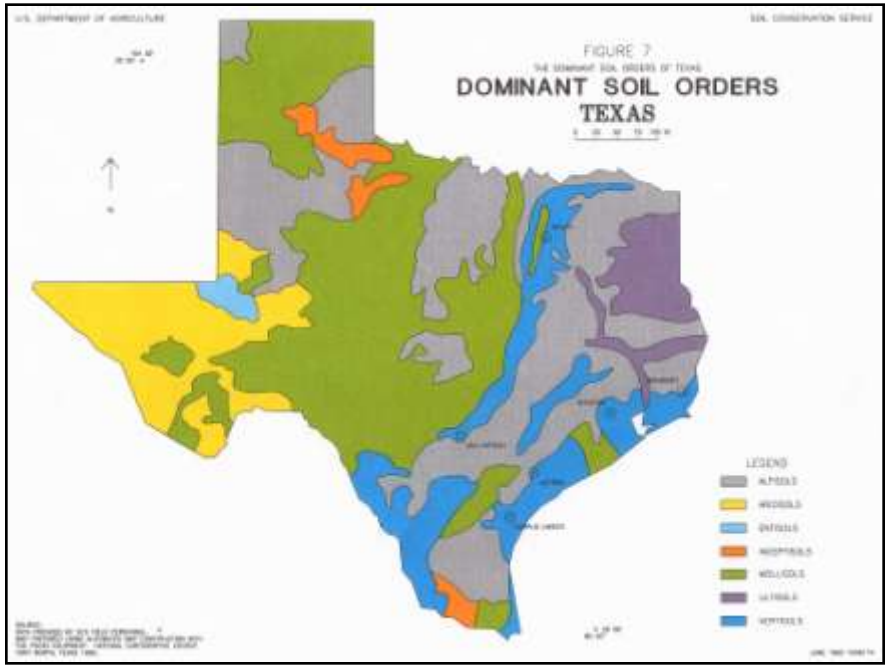
Pasture Management Following Drought

- Soil Test!
- Apply fertilizer based on soil test recommendations.
  - P = Root growth/development
  - K = Drought tolerance



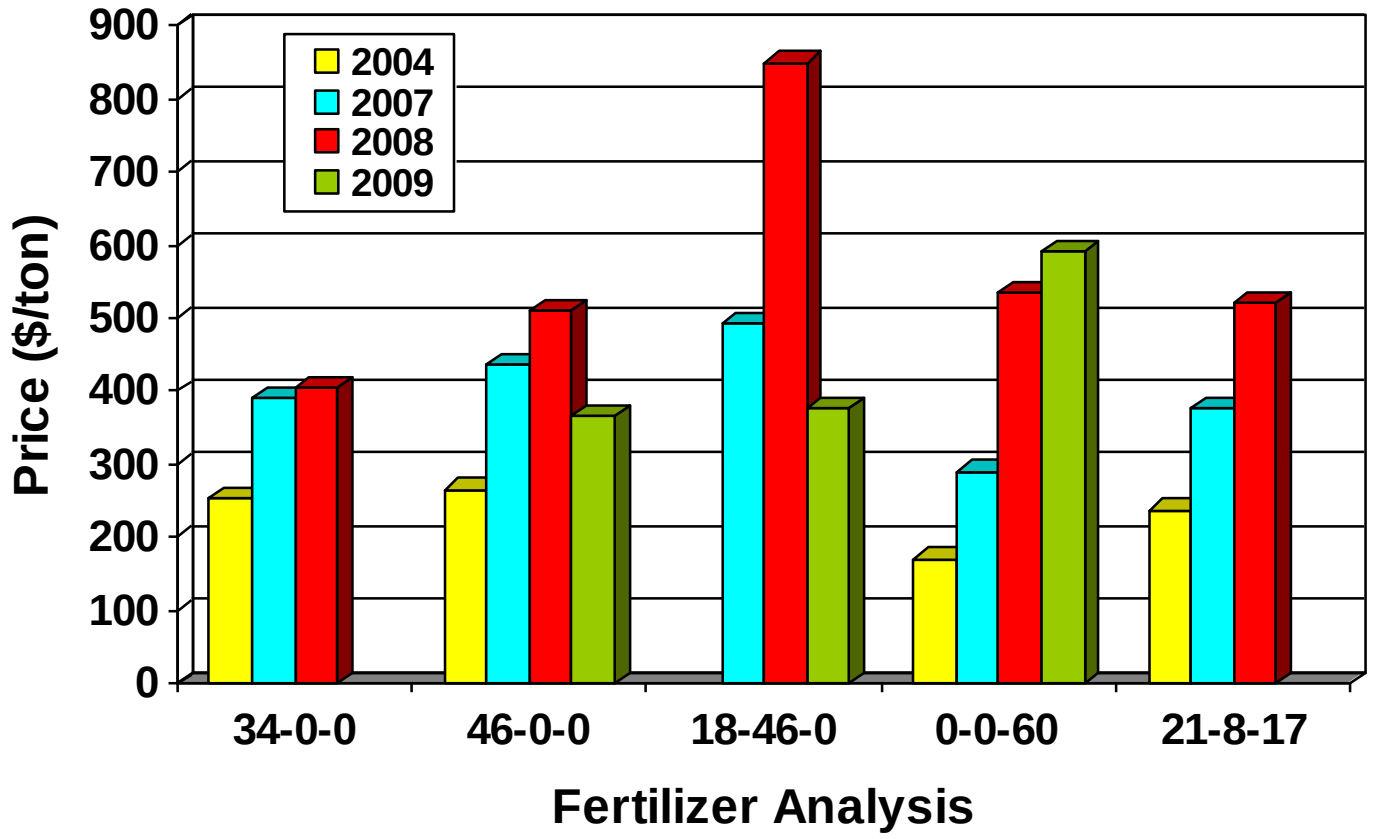
Soil Test

- Without soil testing you:
  - Over-apply expensive nutrients
  - Under-apply needed nutrients
  - Never apply the correct level of nutrients



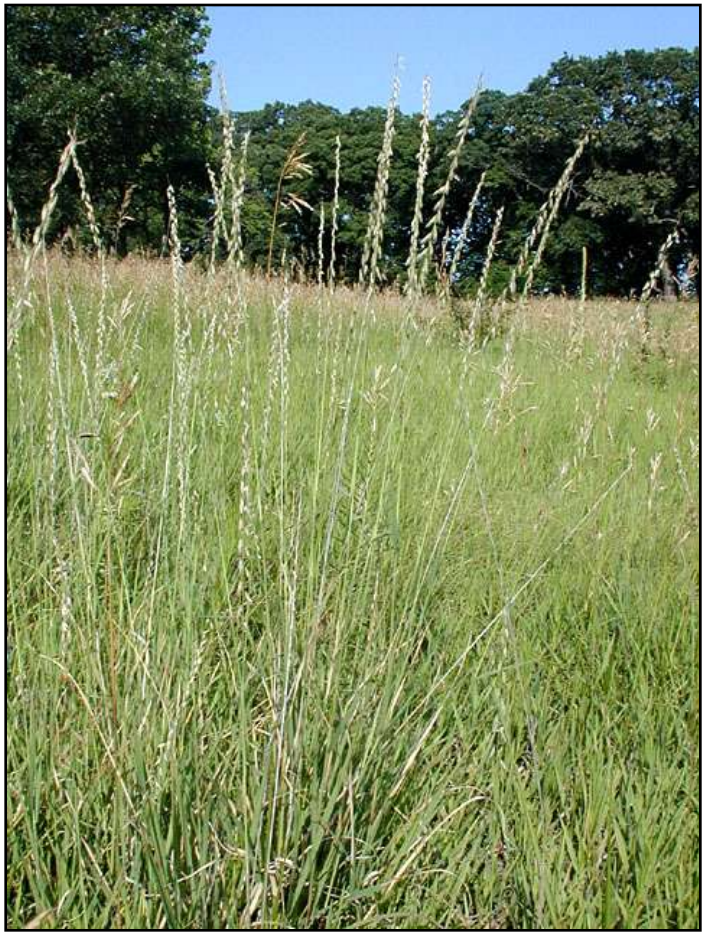
What about the HIGH price of fertilizer?

Fertilizer Price Changes



Consider your forage base

- Bahiagrass, kleingrass, WW-Dahl OWB, others where adapted
  - Persistent under low-input management
- Transition to native forages
  - Reduced stocking rate…but
    - Enhanced profit?
    - Maintain **ag exemption**
    - Maintain **Schedule F**
    - Maintain **lifestyle**
    - Improve **wildlife** habitat
    - **Reduced** inputs



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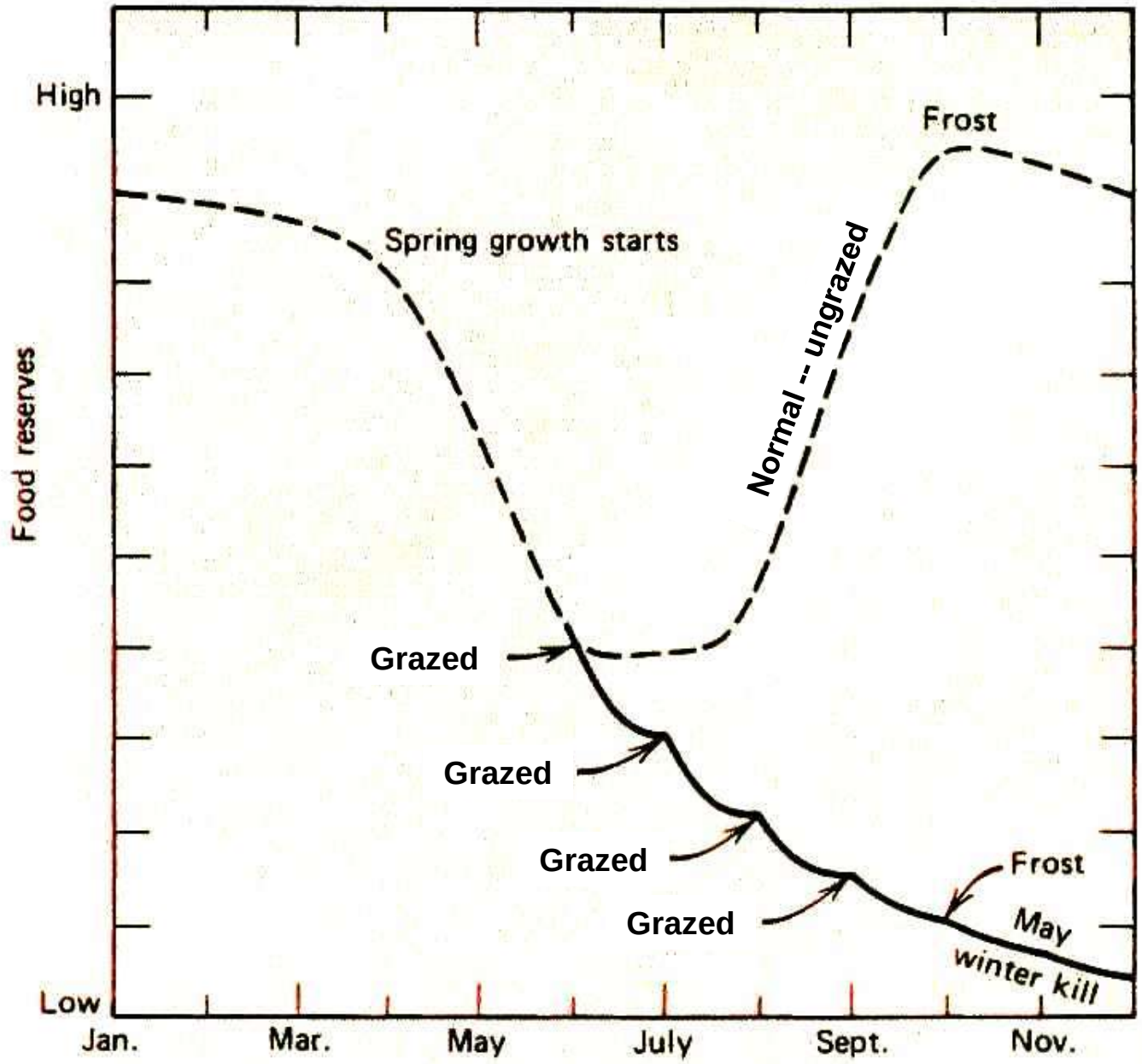
- **IF** you have winter pasture on the warm-season perennial grass, get it off before greenup!
- **Reduce stocking or completely de-stock**.
  - Delay grazing as long as possible.
  - Chasing the green…



CHO reserves of a perennial ungrazed plant versus a repeatedly grazed plant.

Pasture Management Following Drought

- Pay attention to weeds.
  - Can **inhibit recovery** due to competition for moisture, sunlight, nutrients…
- Pay attention to **insects**…
  - Grasshoppers
  - Fall armyworms

321 Fall armyworm,
Spodoptera frugiperda, caterpillar

Insect Pests

Even a moderate infestation of 10 grasshoppers m^2 can typically consume up to **60% of the available forage**.

Likewise, fall armyworms can be equally destructive.

Costs to Control Insects

- Control for Grasshoppers
  - Dimilin 2 oz/acre = **$4.46/acre**
    - Must be applied to young hoppers
    - Has ~ 30 days residual
    - 1 day hay restriction
  - Malathion 57%, 4 oz/acre + Sevin XLR, 4 oz/acre = **$2.50/acre**
    - 14-day grazing or haying restriction
    - Only apply 2 X per year
- Control for Fall armyworm
  - Malathion (57%) @ 4 oz/acre + Sevin XLR @ 4 oz/acre = **$2.50/acre**
  - Grizzly 2 – 3 oz/acre = **$3.13 – $4.70/acre**
    - 3rd generation pyrethroid, 7-day hay restriction
  - Intrepid 4 – 8 oz/acre = **$7 – $14/acre**
    - Dow AgroSciences, 14-day residual, 7-day hay restriction

Texas Forages - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://forages.tamu.edu/

Texas Forages

AgriLIFE EXTENSION

- Novice Workshop
- Publications
- Pasture Gazette
- Forage Specialist
- Weed Control
- Forage Pests
- Forage Research
- Upcoming Events
- Useful Links
- Plant ID
- Wildlife

FORAGES:
They're good for life!

Click for Drought Management Info

...PUTTING THE PIECES TOGETHER...
IT'S NOT A PUZZLE, IT'S A CHALLENGE...

HOWDY, and WELCOME to the Texas A&M University Agriculture Program **FORAGES** web site! At this site you will be able to read or download forage-related publications that will help with forage species selection, establishment, management, and utilization. There is information on soil fertility, grazing management, incorporating legumes into your forage system, and minimizing winter feeding costs. You will also find information about our Pasture & Livestock Management Workshop for Novices, how to manage forage pests, information about upcoming events, and a new feature, *The Pasture Gazette*.

This site is under construction. Please check back periodically for updates. For questions or comments, please contact Dr. Larry Redmon @ 979-845-4826.

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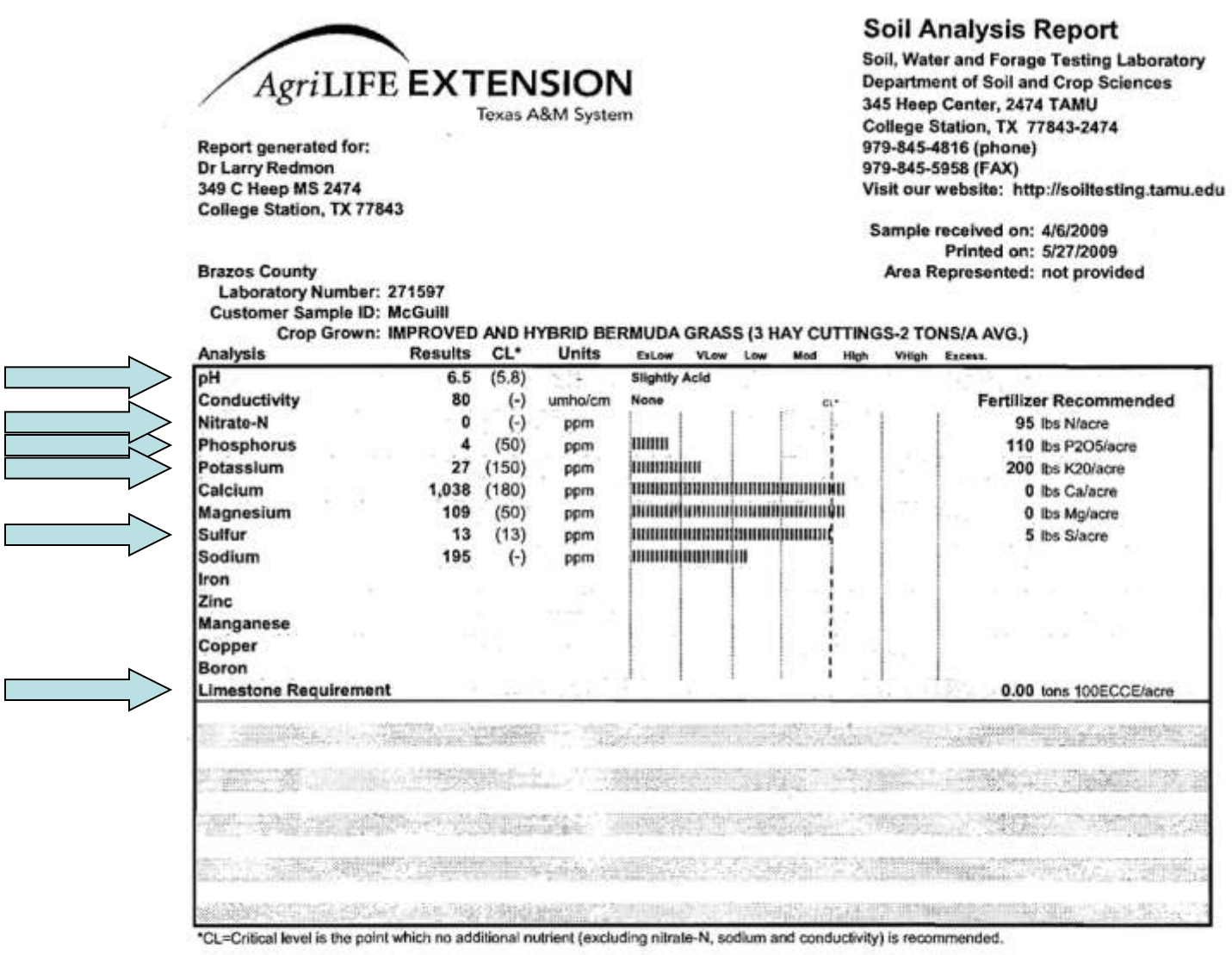
http://forages.tamu.edu

Done

start

Think forage…

Questions?



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Texas A&M System

Soil Analysis Report

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Department of Soil and Crop Sciences
345 Heep Center, 2474 TAMU
College Station, TX 77843-2474
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Dr Larry Redmon
349 C Heep MS 2474
College Station, TX 77843

Sample received on: 4/6/2009
Printed on: 5/27/2009
Area Represented: not provided

Brazos County
Laboratory Number: 271597
Customer Sample ID: McGuill
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow VLow Low Med High VHigh Excess.	Fertilizer Recommended
pH	6.5	(5.8)	-	Slightly Acid	
Conductivity	80	(-)	umho/cm	None	
Nitrate-N	0	(-)	ppm		95 lbs N/acre
Phosphorus	4	(50)	ppm		110 lbs P2O5/acre
Potassium	27	(150)	ppm		200 lbs K20/acre
Calcium	1,038	(180)	ppm		0 lbs Ca/acre
Magnesium	109	(50)	ppm		0 lbs Mg/acre
Sulfur	13	(13)	ppm		5 lbs S/acre
Sodium	195	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended.

Always apply what is recommended…

Potassium: Split apply potassium fertilizer if recommendation is for more than 75 lbs K2O per acre.
Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

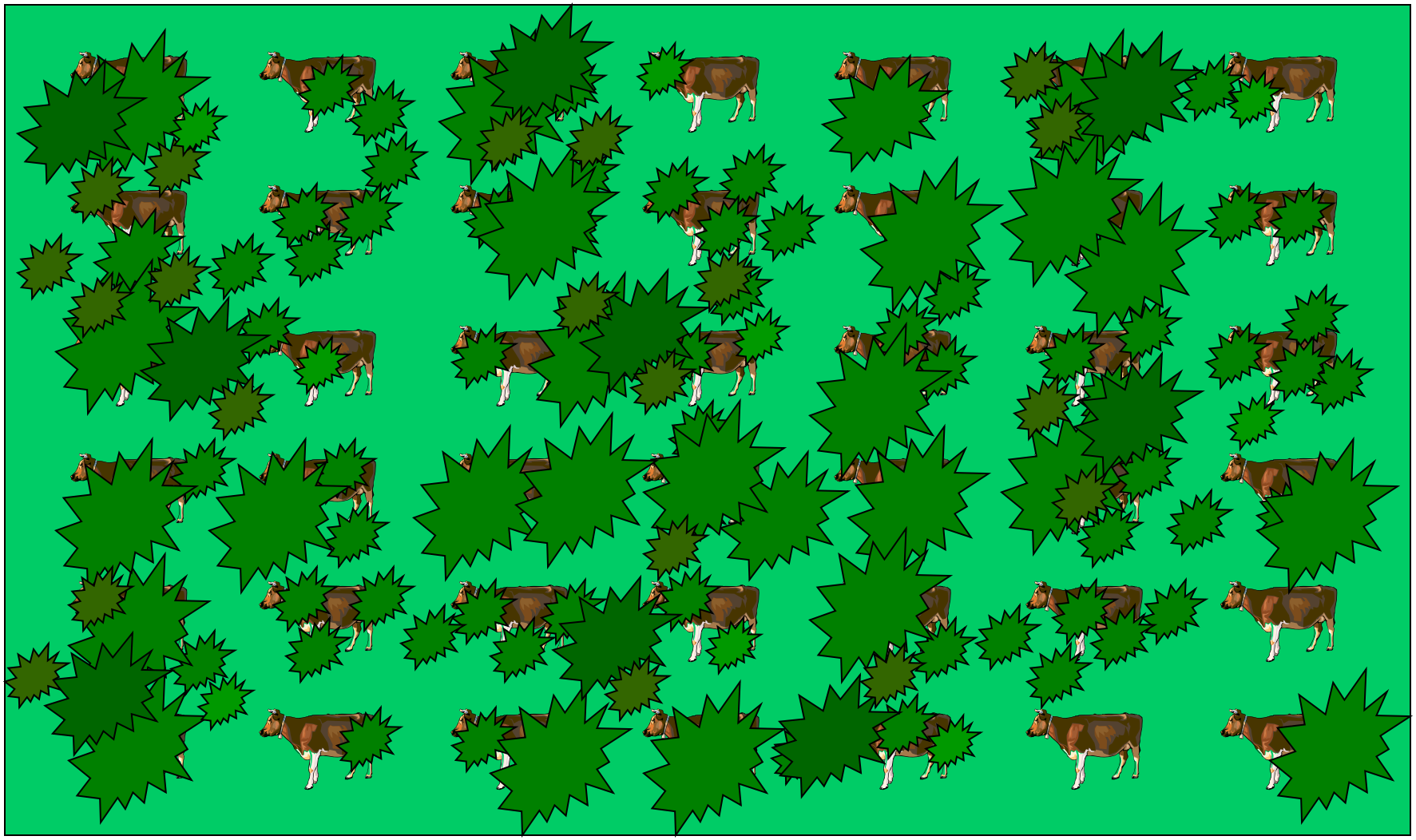
Evaluate Your Stocking Rate

Many are overstocked…

What Leads to Overstocking?

- Larger cattle
  - Grand dad's cattle = **800 lbs**
  - Today's cattle = **1200 lbs**
  - Same # head = 50% increase in SR
- Other factors reducing carrying capacity
  - **Reduced** soil fertility
  - **Weed** infestation
- Factors that reduce **grazeable** acres
- Brush encroachment

Brush Effect on Stocking Rate



Stocking Rate: Previous = 1 AU per 4 acres; Current = 1 AU per 8 acres

Back to the Past…

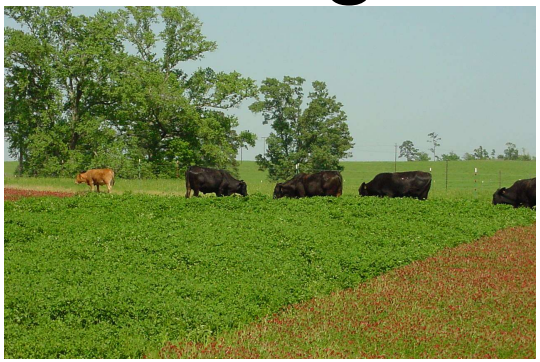
In general, ranges that were **properly managed** before and during the drought came through in fair to good condition; **overstocked ranges were severely damaged and subsequent recovery has been very limited**. Thus, ranchmen have evidence of the need for carrying out proper management practices year after year, not only to meet drought periods, but to build for an economic unit by capitalizing on the years of favorable moisture.

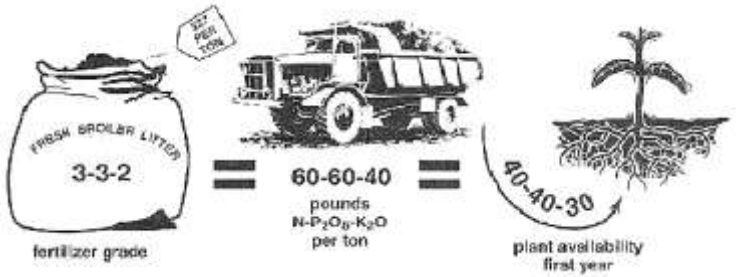
Thus the old rule still prevails that **close grazing does not pay**.

Vernon A. Young, Professor and Head, Department of Range and Forestry, Texas A&M College, 1956.

Alternatives to inorganic fertilizer

- Forage legumes
- Broiler/turkey litter
  - **60-60-40** per ton analysis on broiler litter.
- Class A Biosolids (municipal sludge)
  - **120-60-0** per ton analysis.
- Be aware of **P** accumulation over time.
- **Availability**???





Consider your forage base

- Bahiagrass, where adapted
  - Persistent under low-input management
- Transition to native forages
  - Reduced stocking rate…but
    - Maintain ag exemption
    - Maintain Schedule F
    - Maintain life style
    - Improve wildlife habitat
    - Reduce inputs

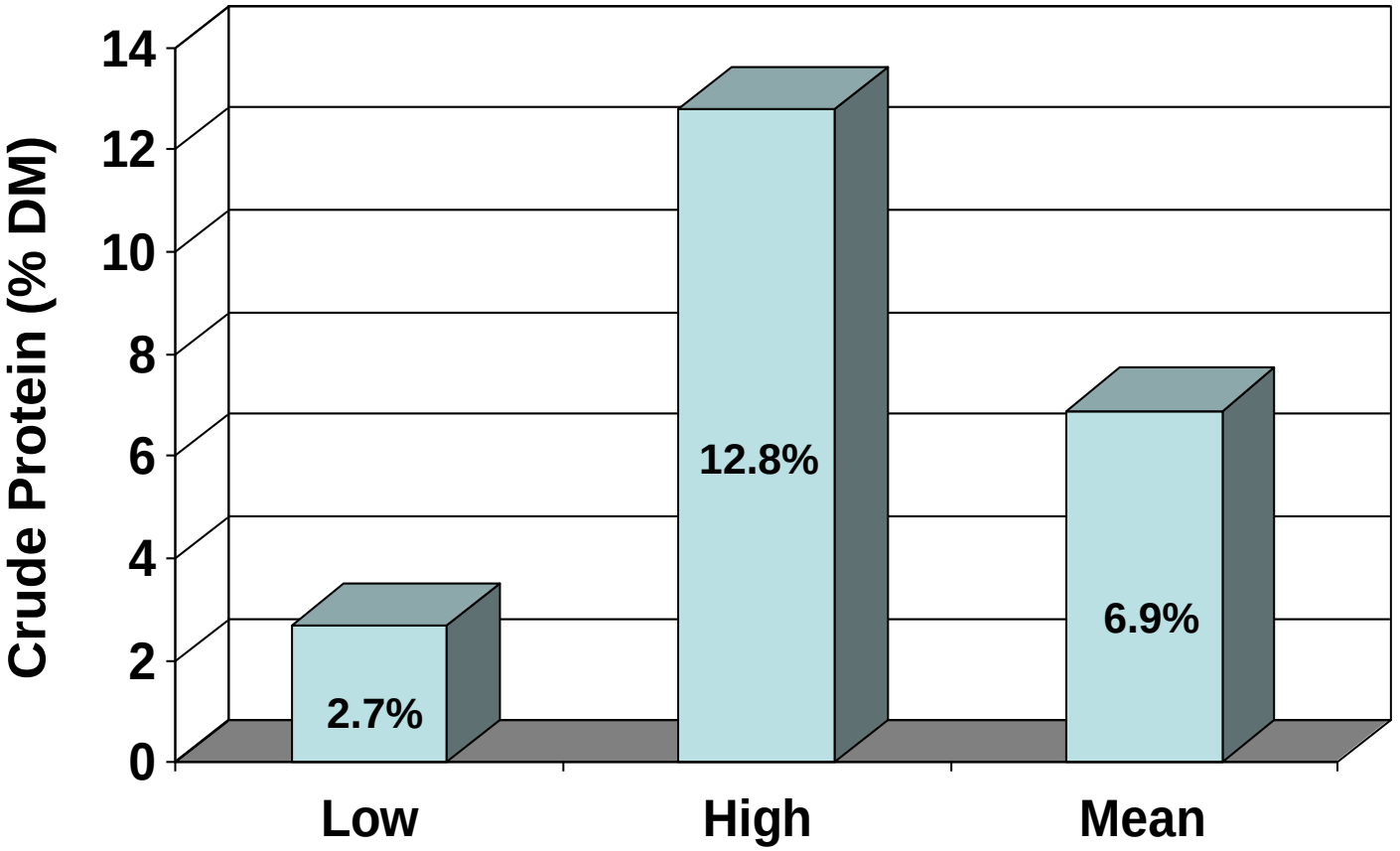
Drought Management Considerations

- Do…
  - reduce stocking rate and maintain until pasture recovery is complete.
  - leave some leaf.
  - give pastures longer rest periods.
  - use hay or energy supplements.
  - for introduced forages, apply fertilizer based on soil test recommendations.
  - control weeds.
  - control insects.
  - consider rotational stocking.
- Do Not…
  - graze to the soil surface.
  - graze recovering pastures too quickly…continue to feed…
  - fail to soil test for introduced forages.
  - apply herbicides during the drought. Look for periods of good growing conditions to apply the herbicide…or mow.
  - simply do nothing and expect things to get better.

Hay Sampling Program

- Samples obtained from **five counties in 2005**.
  - Calhoun, DeWitt, Goliad, Jackson, Victoria
- Samples obtained from **eight counties in 2006**.
  - Added Burleson, Milam, Leon counties.
- **Bermudagrass** hay only.
- Hay **sampler** used for obtaining samples.
- Hay was being sold at "**RETAIL**".
- Comments regarding **how hay was represented** were recorded.
- Limited **physical** characteristics noted.

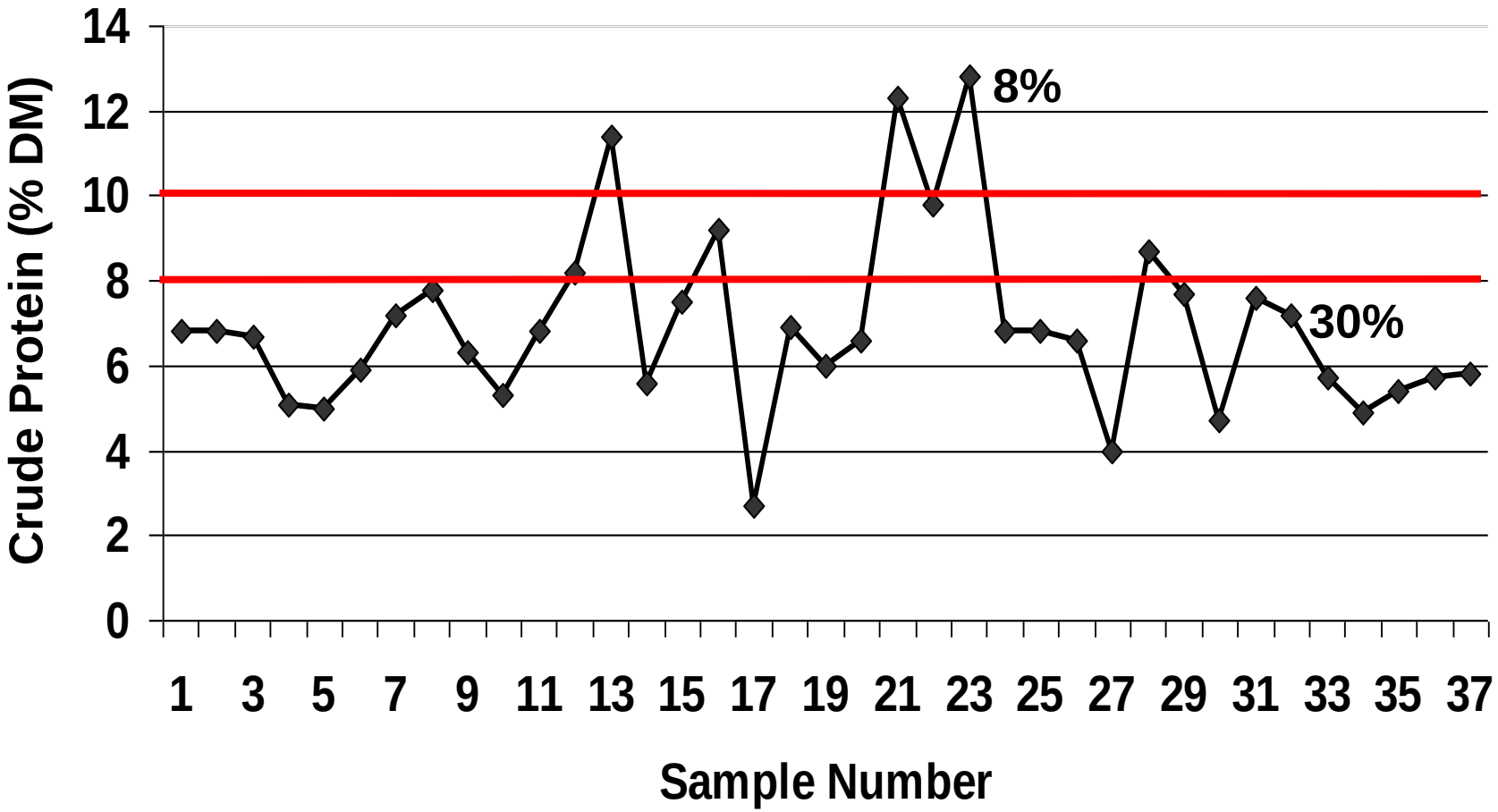
Purchased Hay Crude Protein



Medium green, heavily fertilized, no seed heads…

Light green, no seed heads…

Crude Protein Content of Retail Hay 2005 South Texas Samples



Pasture Herbicides to Consider

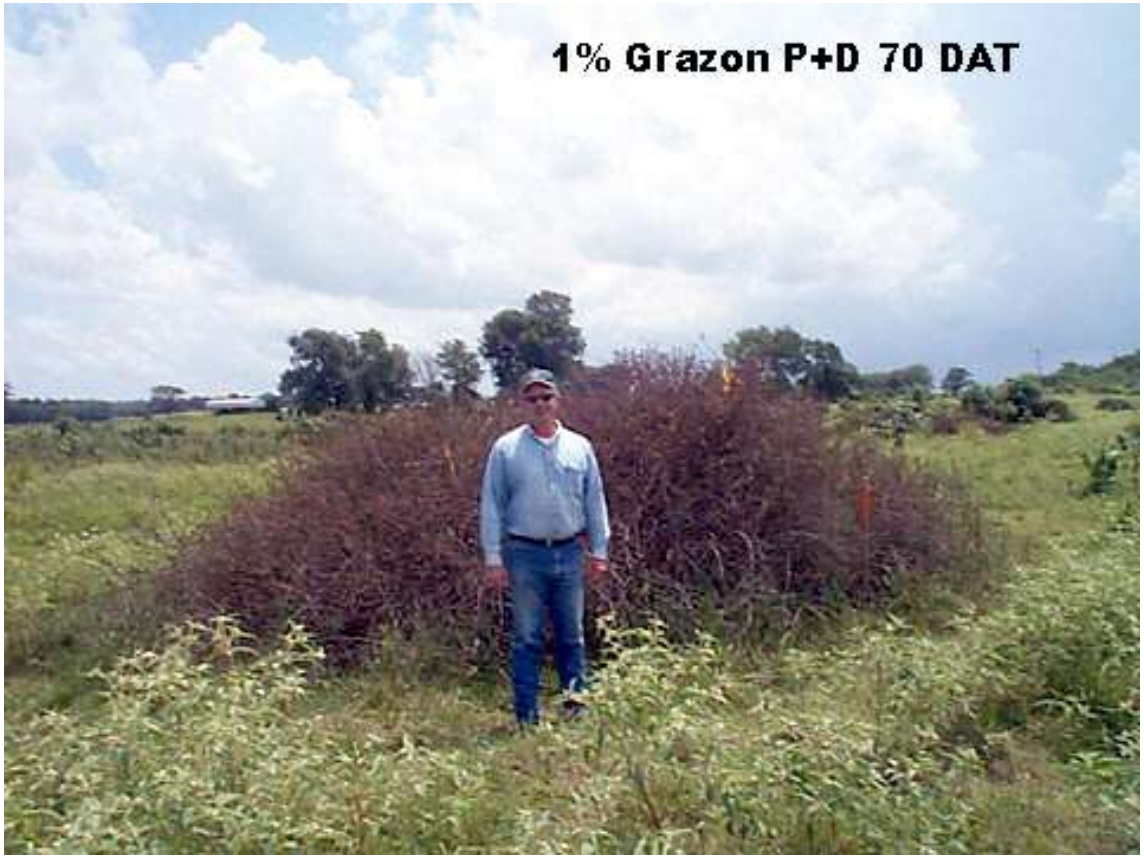
- Legume Program
  - 2,4-D
  - Weedmaster
  - Outlaw (Agri Star)
  - Range Star (Agri Star)
    - Generic Weedmaster

- Non-Legume Program
  - Milestone* (Dow)
  - Grazon P+D (Dow)
  - Gunslinger* (Agri Star)
    - Generic Grazon P+D
  - Cimarron Max (Du Pont)
  - Curtail (Dow)
    - Clopyralid + 2,4-D
  - Commando* (Agri Star)
    - Generic Curtail
  - Redeem (Dow)
    - Clopyralid + Triclopyr

* New

Brush Herbicides to Consider

- Grazon P+D
  - Gunslinger*
- Remedy
  - Remedy Ultra**
- Pathfinder II
- Vista*
  - Floroxypyr
- Reclaim
  - Pyramid*
- Surmount
- PastureGard
- Tordon 22K
  - Triumph 22K*



* New
** 2007

Also…

- **Maverick***
  - Section 18 through June 20, 2007 for control of johnsongrass in bermudagrass.
  - Little detrimental effect on bermudagrass.
- **Stem (basal) treatment***
  - 30-35% PastureGard + diesel.
  - Less expensive than Remedy + diesel.
- **Cut stump treatment***
  - Use PastureGard at rates above.
  - Use Pathfinder II undiluted.

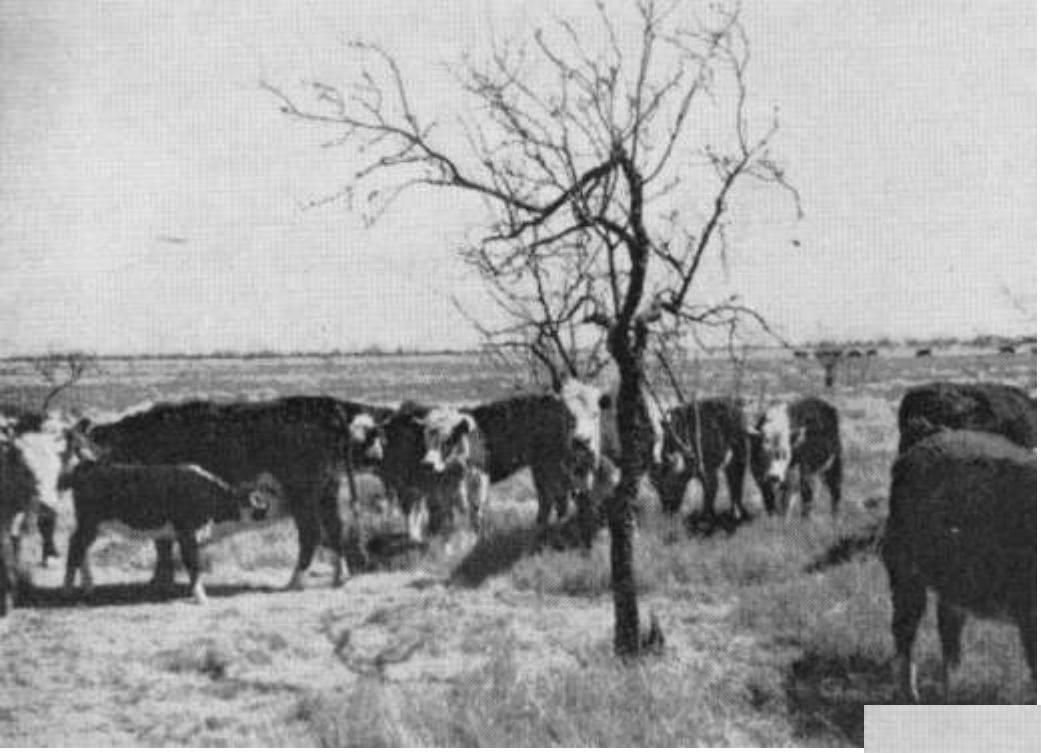
* New

Drought

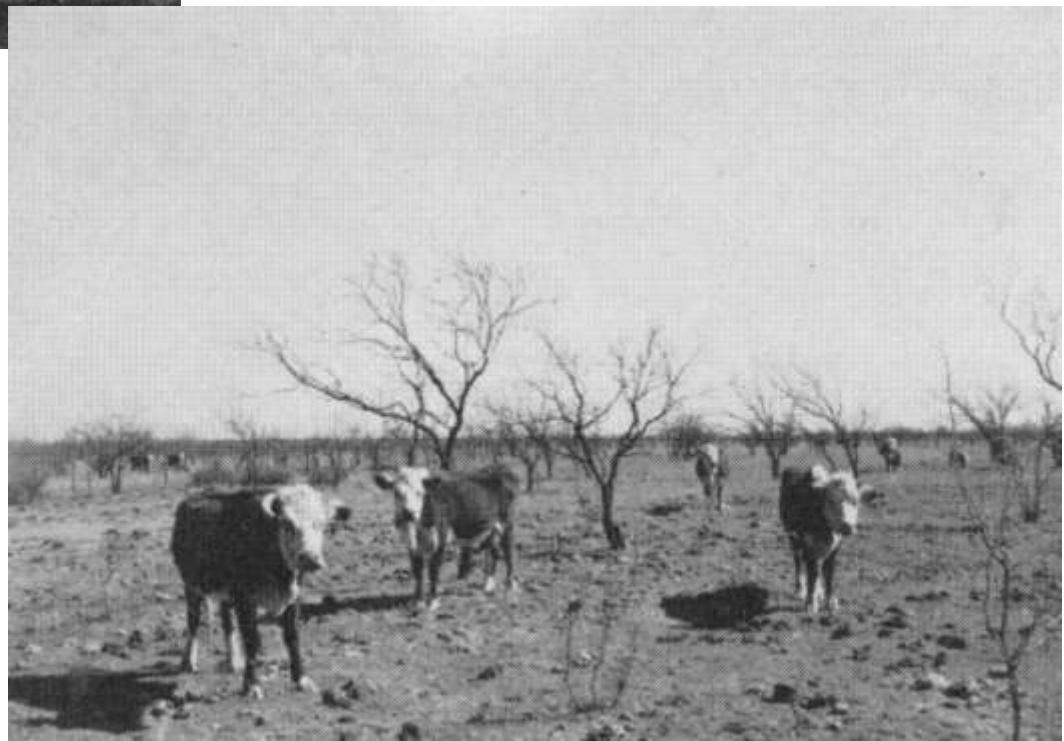
- What is drought?
- What are the effects of drought on forages?
- Which species are the most effected by drought?
- What should I do to encourage **forage recovery** from drought?

Class A Biosolids

- Available from municipalities.
- Low cost, “organic” product.
- Good N & P content, low to no K.
  - Sustanite
    - City of Houston product.
    - 120-60-0 per ton for $41 delivered.
  - Waco
  - Georgetown
  - Others
- May require an inorganic N “boost”

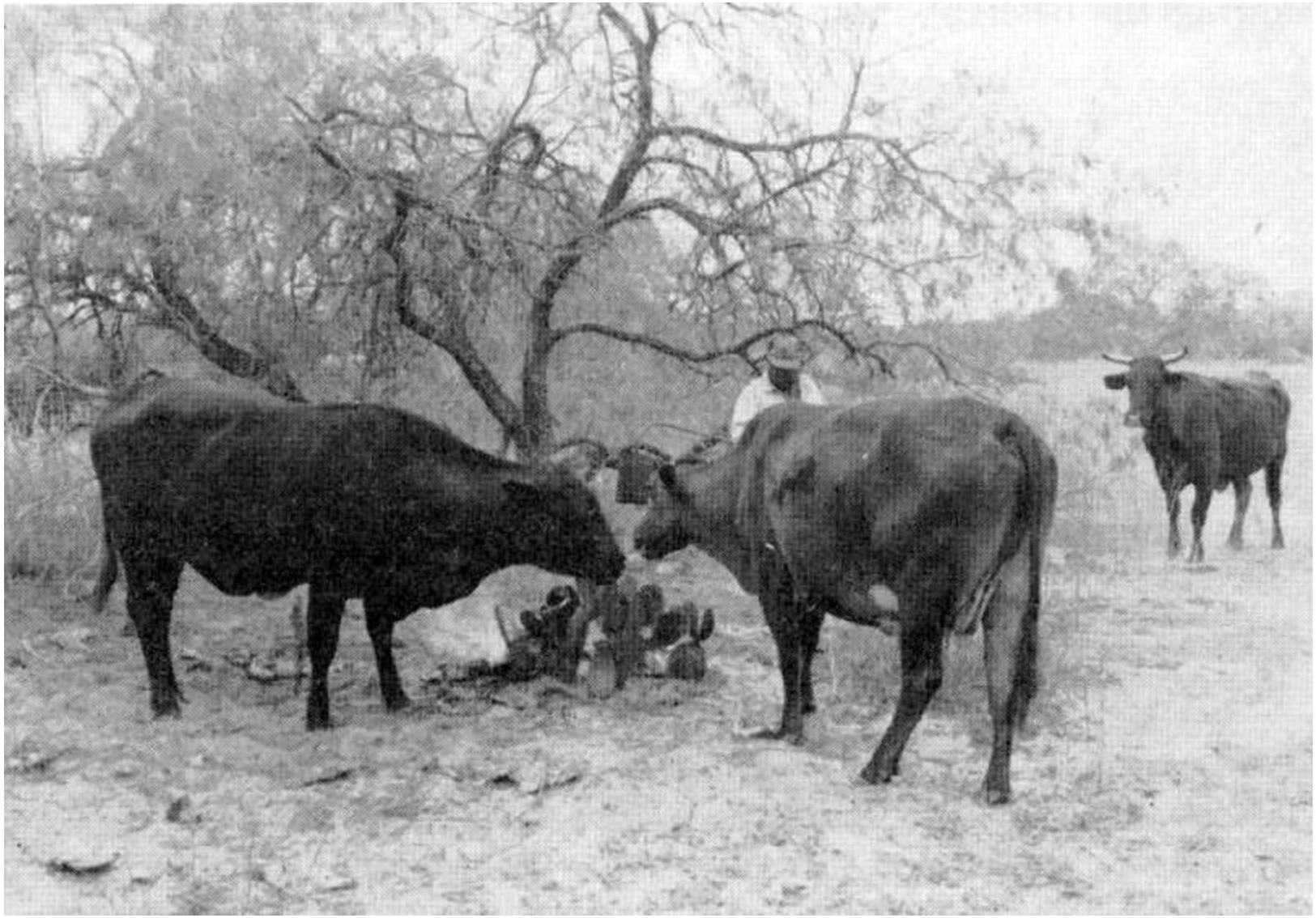


Left. A properly stocked pasture on the Texas Range Station near Barnhart in good condition, Feb 1951. In 1955 this area had made a remarkable recovery from the drought.



Right. A heavily stocked adjacent pasture after two years of drought. In 1955 this pasture, stocked at a rate common to the general region of the Edwards Plateau, had only partially recovered from drought.

Young, Vernon A. 1956. The effect of the 1949-1954 Drought on the Ranges of Texas. JRM. pp. 139-142.



Cattle eating prickly pear as soon as the rancher burns off the spines. Note absence of grass plants and loose condition of soil. Young, 1956.

Grasshopper Facts

- Grasshoppers eat approximately **one-half of their body weight** in green forage per day.
- **Seven or eight** grasshoppers per square meter in a 10-acre field will **consume as much forage as a cow**[1].
- Even a moderate infestation of 10 grasshoppers/square meter can typically consume up to **60% of the available forage**.

[1] **Hewitt, G. B. 1977. Review of forage losses caused by rangeland grasshoppers. USDA Misc. Pub. 1348.**

Armadillo Burr Medic

- Blacklands ecoregion
- Soil type: clay loam
    - Well drained
- Soil pH: 6-8
- Limited cold tolerance
  – Best use south of Waco
- Use: overseeding pastures 5-10 lb/A

Devine Little Burr Medic

- Blacklands ecoregion
- Soil type: clay loam
  - Well drained
- Soil pH: 6-8
- Limited production
  - 1500-4000 lb/A
- Use: overseeding pastures 3-5 lb/A

White Clover

- Best adapted to bottomland sites (wet and poorly drained)
- Generally a reseeding annual in east Texas
- Late spring forage production
- Economical establishment

Apache Arrowleaf Clover

- Apache arrowleaf is a new, disease tolerant cultivar released by Texas A&M Univ. System from the Overton Clover Breeding Program
- Forage production season starts (almost) as early as crimson and continues through May
- Can be managed for reseeding

Rose Clover

- Overton R18 developed at Overton
- High hard seed percentage
- Planting rate can be reduced from 16 to 8 lb/ac for more economical establishment
- Early spring forage production not as good as crimson
- Good choice for reliable reseeding on upland sites
- Not adapted to wet, poorly drained sites

Ball clover

- Soil type: loam, clay loam
- Soil pH: 6.5-8
- Adapted to wetter sites
- High bloat potential
- Use: overseeding pastures 2-3 lb/A
- Excellent reseeding

Texas AgriLife Research

Texas AgriLife Research and Extension Center at Overton

Clover Species Selection Table

Clover Species	Preferred Soil Characteristics			Plant Characteristics				Seeding Rate (lb/ac)
	pH	Texture	Drainage	Maturity	Bloat Potential	Reseeding Potential	Cold Tolerance	
Arrowleaf	6.0-7.0	sandy loam	good	late	low	high	good	8-10
Ball	6.5-8.5	loam, clay	fair	late	medium	high	good	2-3
Berseem	6.5-8.5	loam, clay	poor	late	low	low	poor	12-16
Crimson	6.0-7.0	sandy loam, clay	good	early	medium	low	good	16-20
Persian	6.0-8.0	loam, clay	poor	medium	high	medium	fair	6-8
Red	6.5-8.0	loam, clay	good	late/biennial	low	low	good	10-12
Rose (Overton R18)	6.0-8.0	sand, loam, clay	good	early-late	low	high	good	12-16
Subterranean Subterranean spp. (Karridale, Denmark) Brachycalycinum spp. (Clare, Nuba)	6.0-7.3 7.0-8.0	loam, clay loam, clay	fair fair	early-late medium	medium medium	low low	fair poor	16-20 16-20
White	6.0-7.5	loam, clay	poor	late	medium	high	good	3-4

http://aggieclover.tamu.edu/cool/species.htm