

Nutrition 101

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6 major nutrients groups

- proteins
- carbohydrates
- lipids
- vitamins
- minerals
- water



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Nutrients Cattle Require

- | | |
|---|--|
| <ul style="list-style-type: none"> • protein • energy <ul style="list-style-type: none"> - carbohydrates - lipids <ul style="list-style-type: none"> · short or long chain - excess protein • vitamins <ul style="list-style-type: none"> - A, D, E, K - B-vitamins | <ul style="list-style-type: none"> • minerals <ul style="list-style-type: none"> - macro <ul style="list-style-type: none"> · Ca, P, K, Mg, Na, S - micro <ul style="list-style-type: none"> · Cu, Zn, Mn, Se, I, Co, Fe, • water • other nutrients <ul style="list-style-type: none"> - linoleic acid - linolenic acid - etc. |
|---|--|

*nutrients in red are not essential in the diet
 (i.e. they can be supplied by rumen microbes)

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Nutrient Usage

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> • maintenance • pregnancy • lactation • gain | } | <ul style="list-style-type: none"> energy protein minerals vitamins water all other nutrients |
|---|---|---|

maintenance energy – the amount of energy it takes to maintain an animal (i.e. the animal is not gaining or losing weight or condition)

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total digestible nutrients (TDN)

> TDN = energy

crude protein (CP)

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highest nutrient needs as % of diet DM

calves

stocker cattle

lactating cows

replacement heifers

dry cows

lowest nutrient needs



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Description	% CP	% TDN	% Ca	% P
2-yr-old lactating cow, peak lactation	11.5	60	0.28	0.18
3-yr-old lactating cow, peak lactation	12.5	61	0.30	0.19
mature lactating cow, peak lactation	12.5	61	0.30	0.19
coming 3-yr-old dry cow, 270 d pregnant	9.0	58	0.26	0.17
mature dry cow, 270 d pregnant	8.5	55	0.26	0.17

*Estimated dietary requirements for high marbling cows with no weather stress. Assumes 1,300 lb mature weight and 25 lb milk potential at maturity (NRC, 2016)

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Nutrient Requirements

700 lb yearling steer

ADG	% TDN	% CP	% Ca	Ca, gm	DMI, lb
1.0	53	8	0.26	21.3	18.1
1.5	57	9	0.32	26.5	18.5
2.0	61	10	0.38	31.6	18.7
2.5	65	11	0.43	36.1	18.7
3.0	70	12	0.50	41.7	18.7

*Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.

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Nutrient Requirements

comparison at 2.0 lb/d

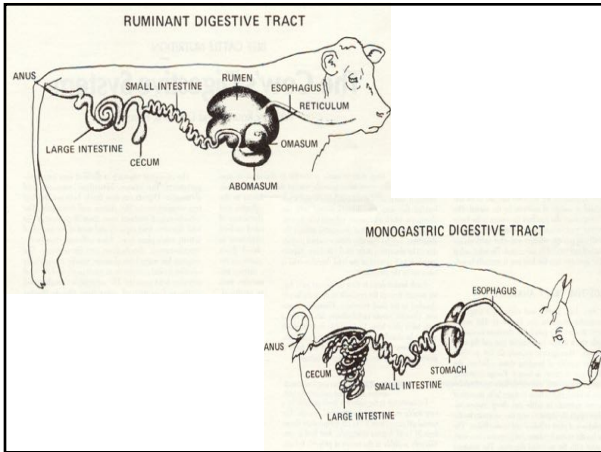
weight	% TDN	% CP	% Ca	Ca, gm	DMI, lb
500	65	12.7	0.55	32.2	13.0
600	63	11	0.45	32.3	15.9
700	61	10	0.38	31.6	18.7
800	61	9.5	0.34	31.4	20.6

*Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.

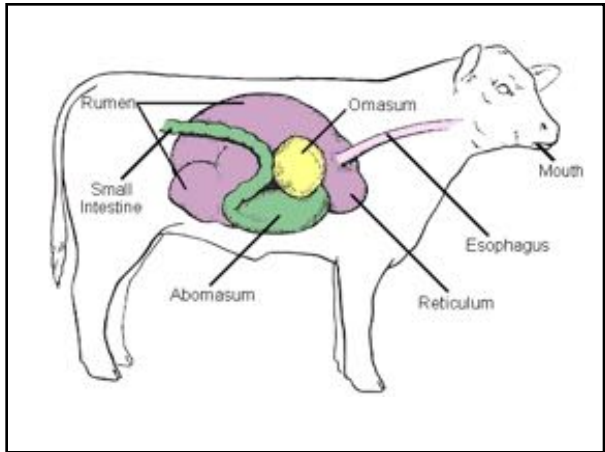
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Acidosis

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pH 0	Battery Acid
pH 1	Stomach Acid
pH 2	Lemon Juice, Vinegar
pH 3	Orange Juice, Soda, Some Dental Rinses
pH 4	Tomato Juice, Beer
pH 5	Black Coffee
pH 6	Saliva, Cow's Milk
pH 7	Pure Water
pH 8	Sea Water, pH-Neutralizing Dental Rinses
pH 9	Baking Soda
pH 10	Antacids
pH 11	Antacids, Dental Treatment Rinses
pH 12	Soapy Water

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(photo courtesy of vetnext.com)

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(photo courtesy of FiveF)

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TMR VS. Supplementation

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When do we have confined feeding?

- feedlot
- dairy
- backgrounding yard
- drought
- winter in Northern states

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TMR

3 components

- roughage
- energy source
- protein, mineral, vitamin premix

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When do we supplement?

- forage doesn't meet nutrient requirements
- BCS is too low
- improve forage utilization
- improve ADG of growing cattle

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Energy and/or Protein Supplements

components

- not worried about roughage
- energy
- protein

separate mineral & vitamin supplement
generally provided

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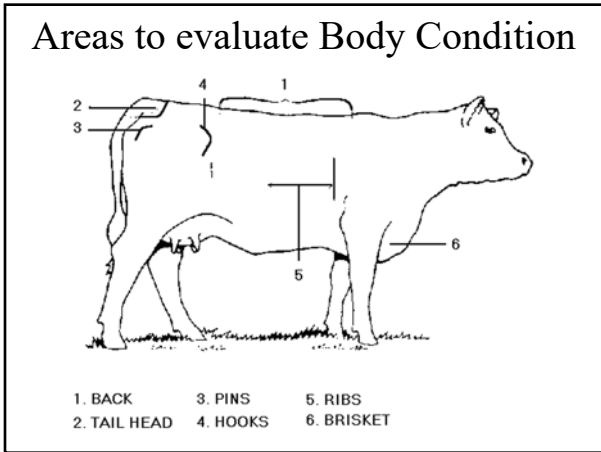
Performance Terminology

Growing Cattle: ADG

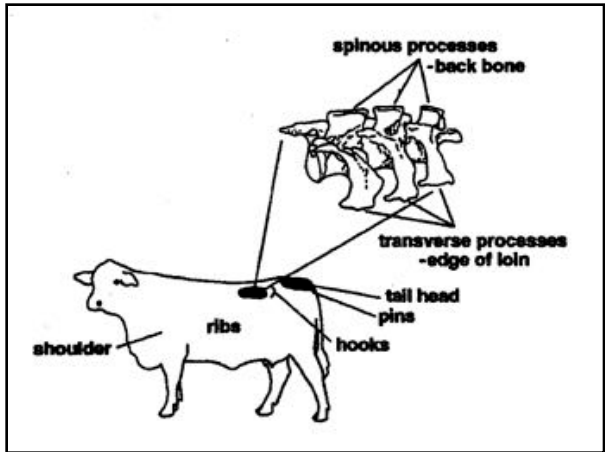
Cows: BCS



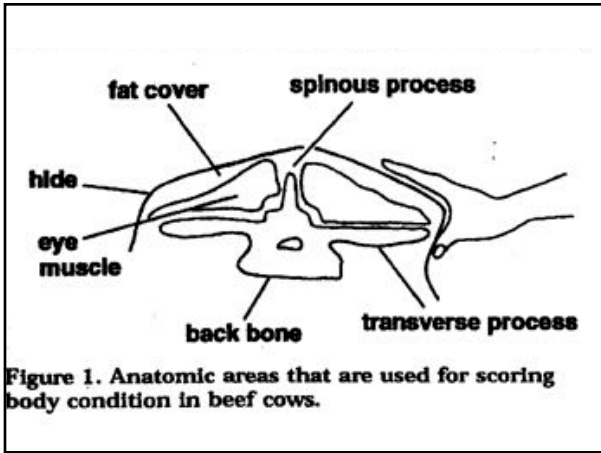
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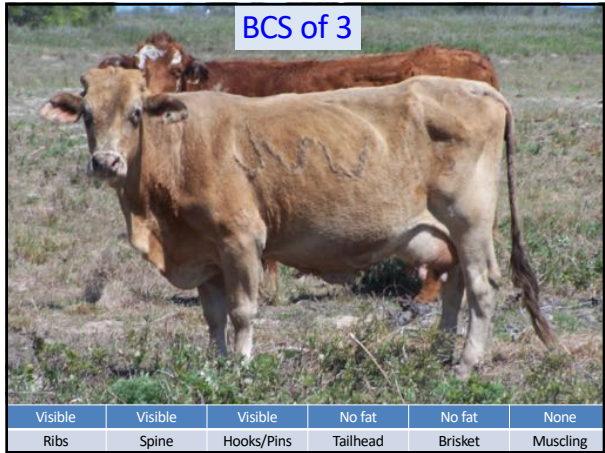
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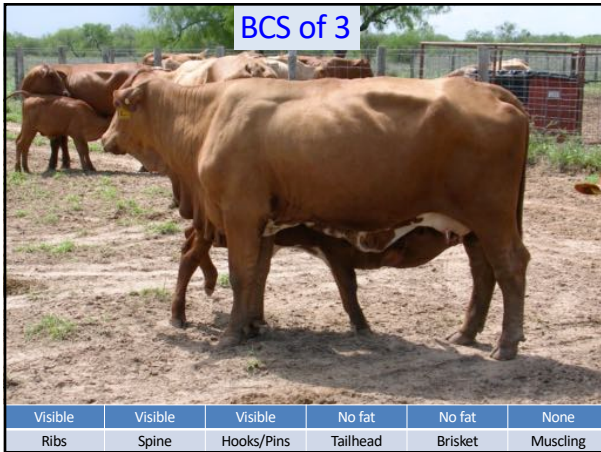
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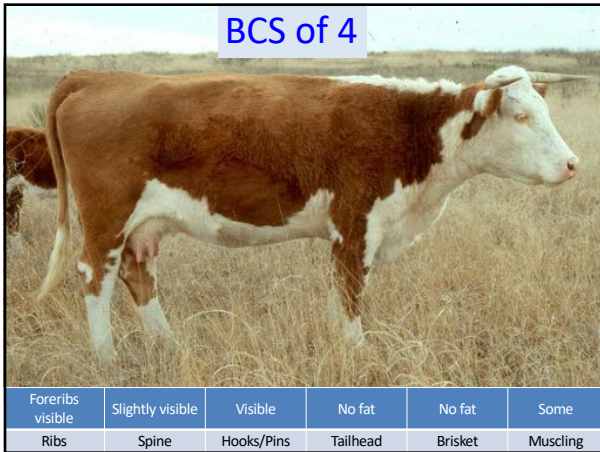
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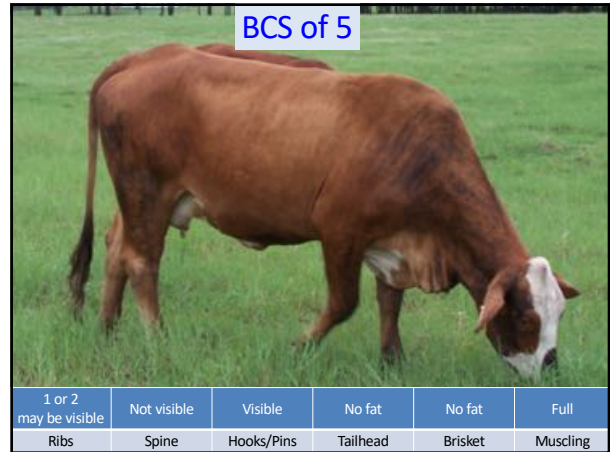
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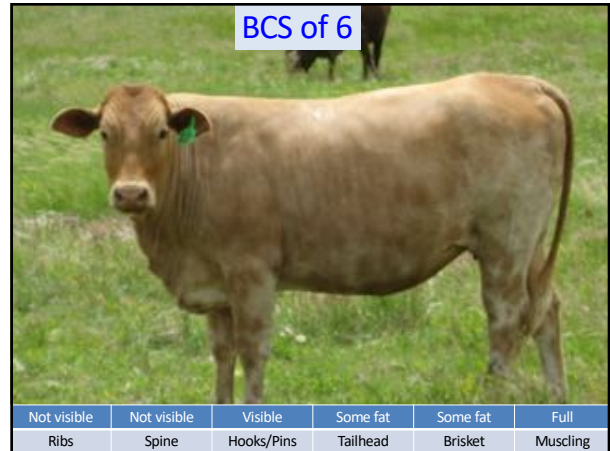
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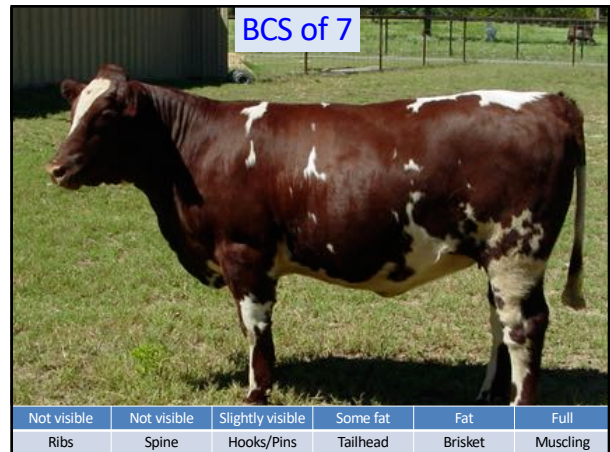
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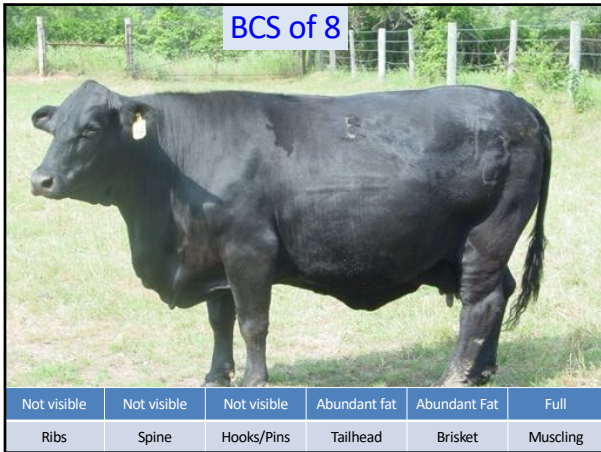
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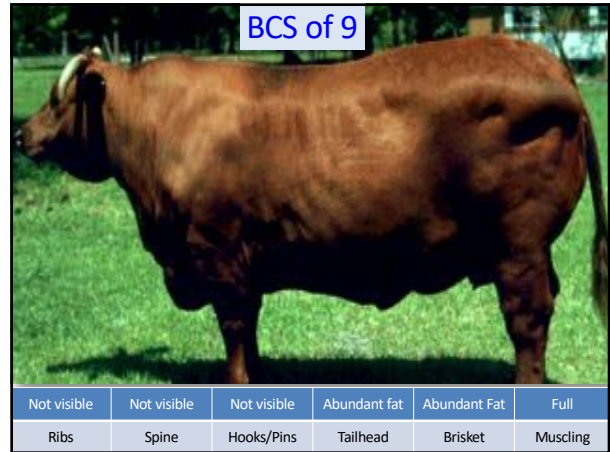
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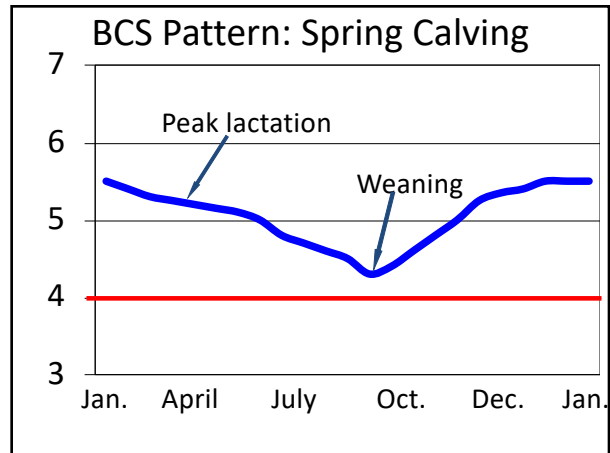


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When should you take BCS?

- at weaning
 - most important time
- every few months
- score the same cows in the herd
- a digital camera can be a good tool

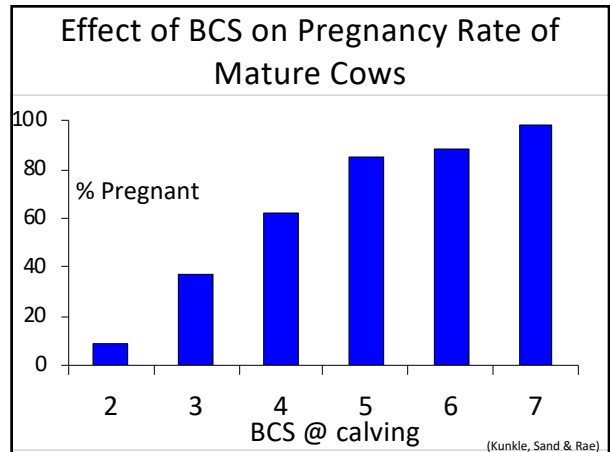
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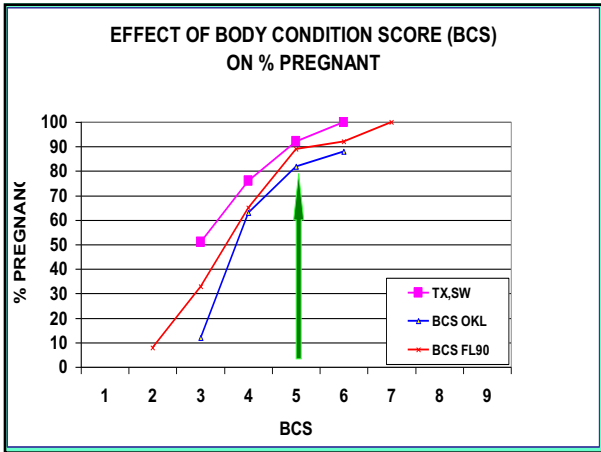
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BCS and Pregnancy Rates

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<http://beef.tamu.edu>

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Forages the Key to Cow-Calf and Stocker Nutrition

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Beef Industry is a Grass Industry



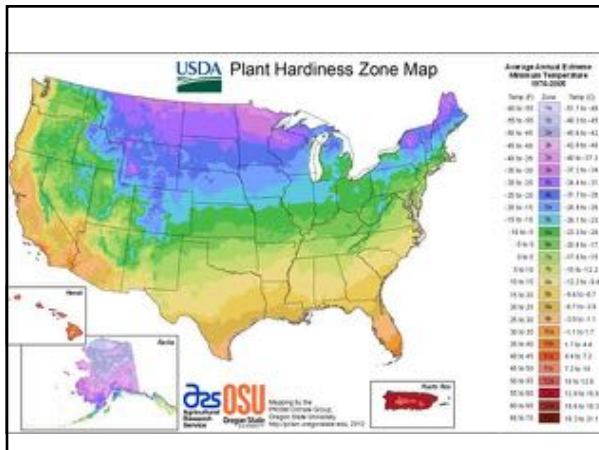
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What is the goal of a forage system?

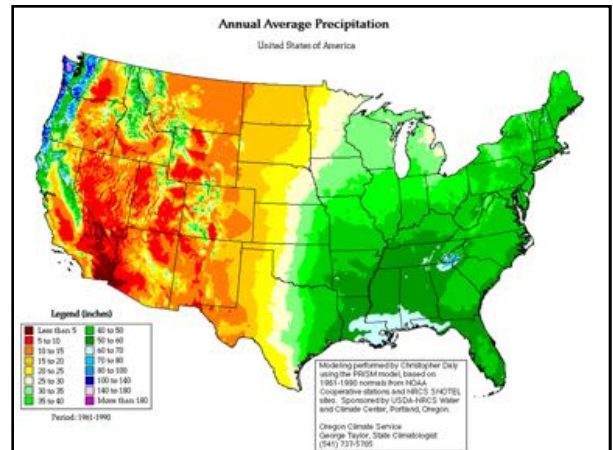
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Customized to Your Operation, Soil Type, and Resources

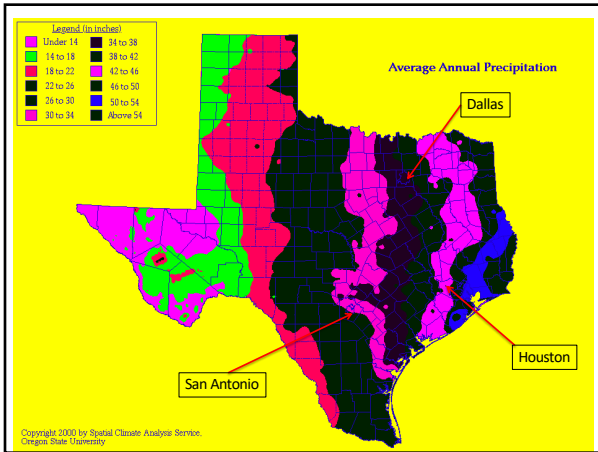
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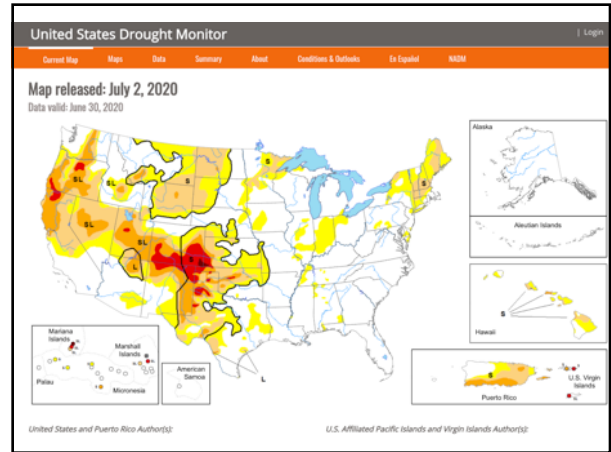
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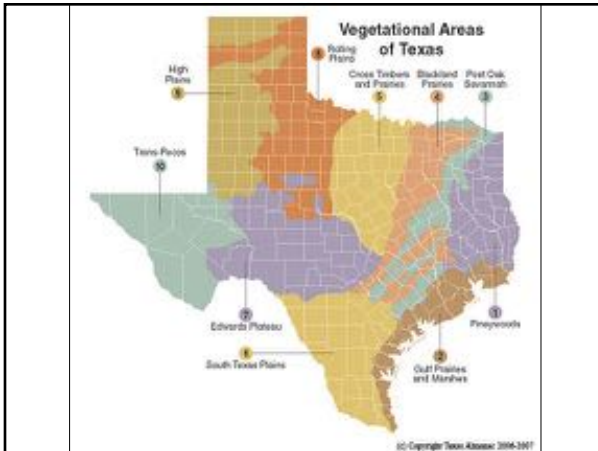
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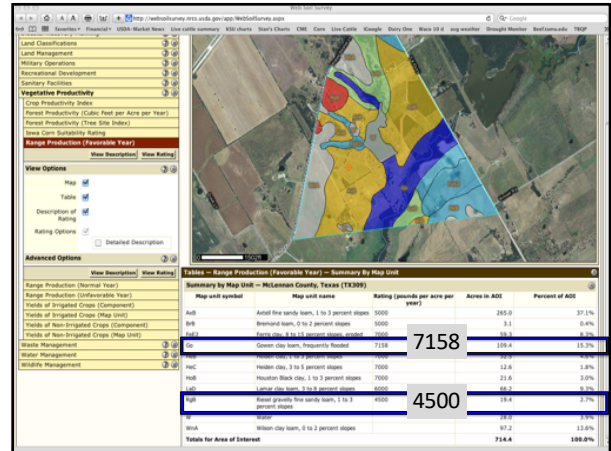
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Cow-Calf Systems are based on Perennial Forages

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Native Warm-Season Perennial Forages

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Protein is often
first limiting with
Native Warm-Season
Perennial Forages

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Native Range Systems

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Introduced
Warm-Season
Perennial Forages

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(photo courtesy of Joe Paschal)

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(photo courtesy of Joe Paschal)

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(photo courtesy of Joe Paschal)

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Energy is often first limiting with Introduced Warm-Season Perennial Forages

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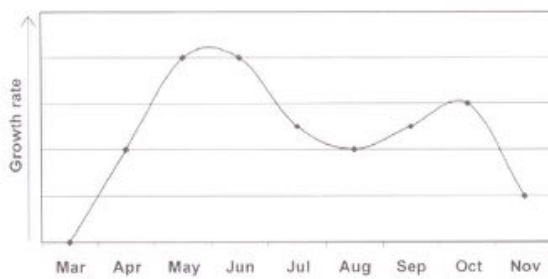
Bahia and Bermudagrass Systems

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How long does bahia and bermudagrass grow?

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Utilizing Warm-Season Perennial Grasses (bermudagrass, bahiagrass, etc.)



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How do we fill in the gaps?

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What about winter annuals?

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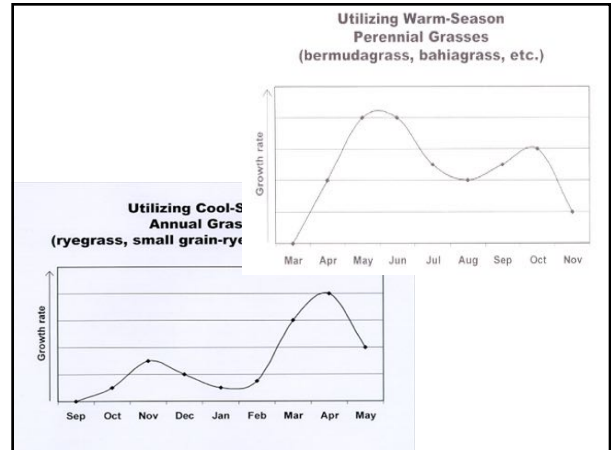
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What about
summer annuals?

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Management Factors
Affecting
Forage Production

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Grazing Pressure and Stocking Rate

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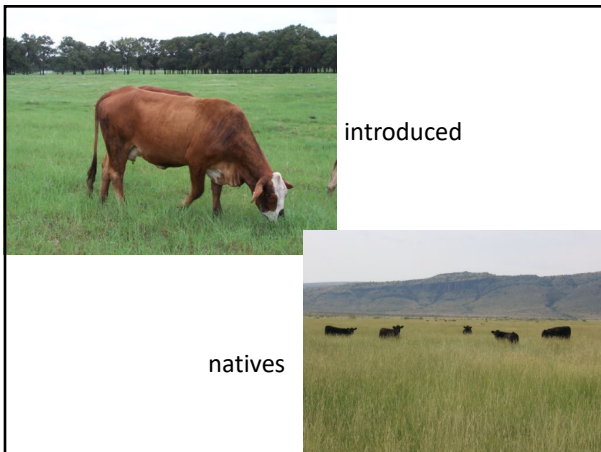
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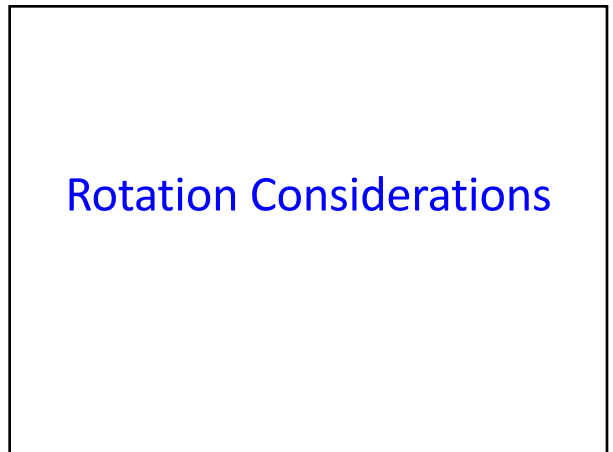
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Stocking Strategies and Factors

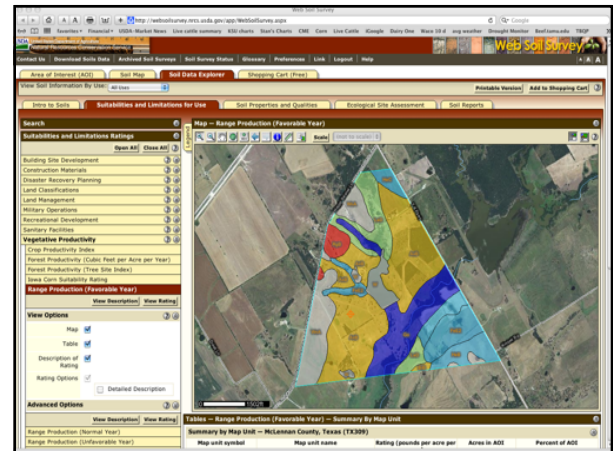
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Stocking Rate is a Moving Target

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How many acres do you need per cow?

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general intake guidelines

- dry gestating cow: 1.8 to 2.0% of BW
- lactating cow: 2.3 to 2.5% of BW



(intake guidelines from Lardy et al., 2004)

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Estimated Annual Intake

assume cow consumes 2.25% of BW on DM basis

$$1,000 \text{ lb} \times 2.25\% = 22.5 \text{ lbs/d}$$

$$22.5 \times 365 = \underline{8,213 \text{ lbs/year}}$$

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Estimated Forage Allowance

Should you let the cows consume everything that is produced?

let cow consume 70%

$$8,213 \div 0.70 = \underline{11,733 \text{ lbs}}$$

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70% consumption

Cow Weight	1,000	1,200	1,400
Cow intake, (2.25% of BW)	8,213	9,855	11,498
Calf Intake	1,508	1,810	2,111
Pair Intake	9,721	11,665	13,609
Forage Allowance, let cow consume (70%)	13,887	16,664	19,441
Forage Production, lbs/ac	4,500	4,500	4,500
Stocking Rate, ac/pair	3.09	3.70	4.32

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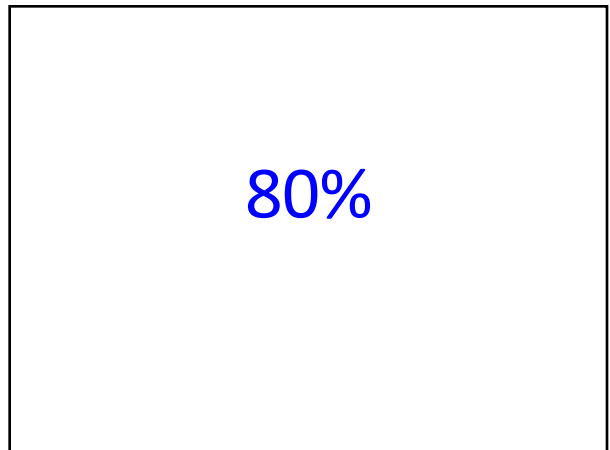
(photo courtesy of Bruce Carpenter)

64

25% consumption

Cow Weight	1,000	1,200	1,400
Cow intake, (2.25% of BW)	8,213	9,855	11,498
Calf Intake, lbs/year	1,508	1,810	2,111
Pair Intake, lbs/year	9,721	11,665	13,609
Forage Allowance, let cow consume (25%)	38,884	46,660	54,436
Forage Production, lbs/ac/yr	3,000	3,000	3,000
Stocking Rate, ac/pair	12.96	15.55	18.15

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Using Excess Forage

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skip an application of nitrogen

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