

Ranch Tools: Grazing and Hay Records



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Nebraska Ranch Practicum - 2022

Grazing and Hay Records Spreadsheet

A Microsoft Excel® template that can be used for maintaining and summarizing pasture grazing records as well as records of hay fed to livestock.

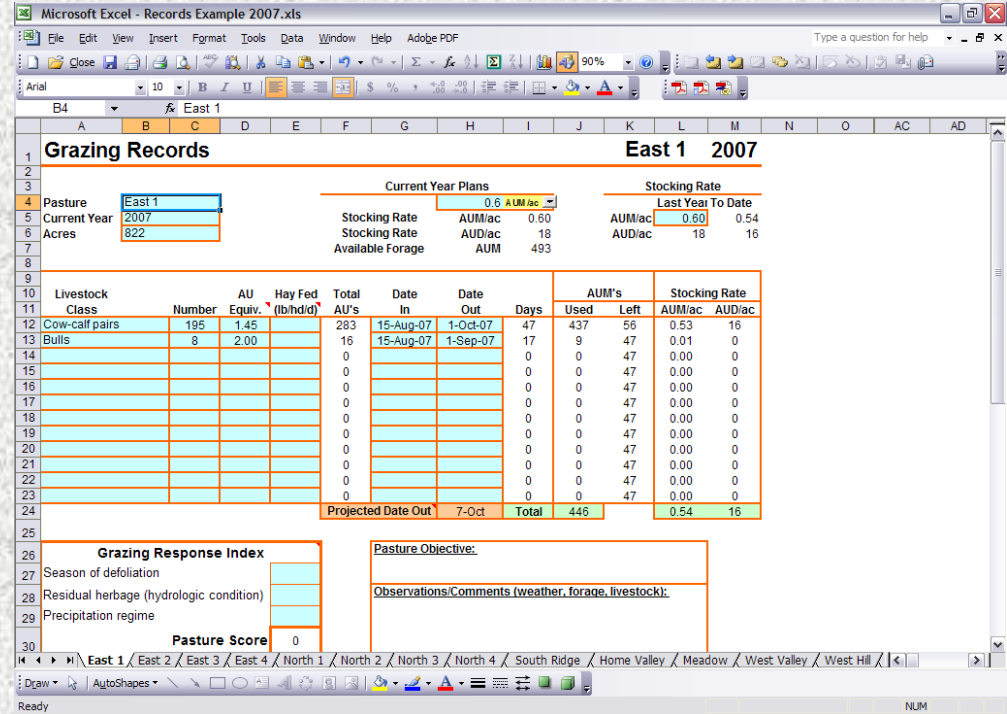
“You cannot manage if you do not measure!”

Grazing Records: an essential component of any range or pastureland management program

- **Planning next year's grazing (stocking rates, timing, rotation sequence, etc.)**
 - **Grazing lease arrangements**
 - **Carbon credit programs**
 - **Participation in NRCS programs (CSP, EQUIP, etc.)**
 - **Drought / insurance disaster relief**
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Input:

- Pasture name or number
- Current-year
- Acres (size of pasture)
- Livestock class
- Number of head
- AU equivalent
- Hay fed (enter in lb/head/day if any hay was fed while in that pasture)
- Date in pasture
- Date out pasture



Optional: (SanDRIS: Sandhills Defoliation Response Index System)

- Season of defoliation
- Residual herbage (hydrologic condition)
- Precipitation regime

Animal Unit Equivalent (AUE)

For all classes of livestock, a preferred method of calculating AUE is: Average weight ÷ 1000

Examples:

<u>Class of cattle</u>	<u>AUE</u>
Dry cow (1200 lb)	1.2
Cow (1200 lb) – calf (300 lb) pair	1.5
Weaned calf (500 lb)	0.5
Yearling steer or heifer (700 lb)	0.7
Bull (1800 lb)	1.8

* Adjustments in the AUE can be made throughout the year based on animal weight gain (or loss).

Example spreadsheet

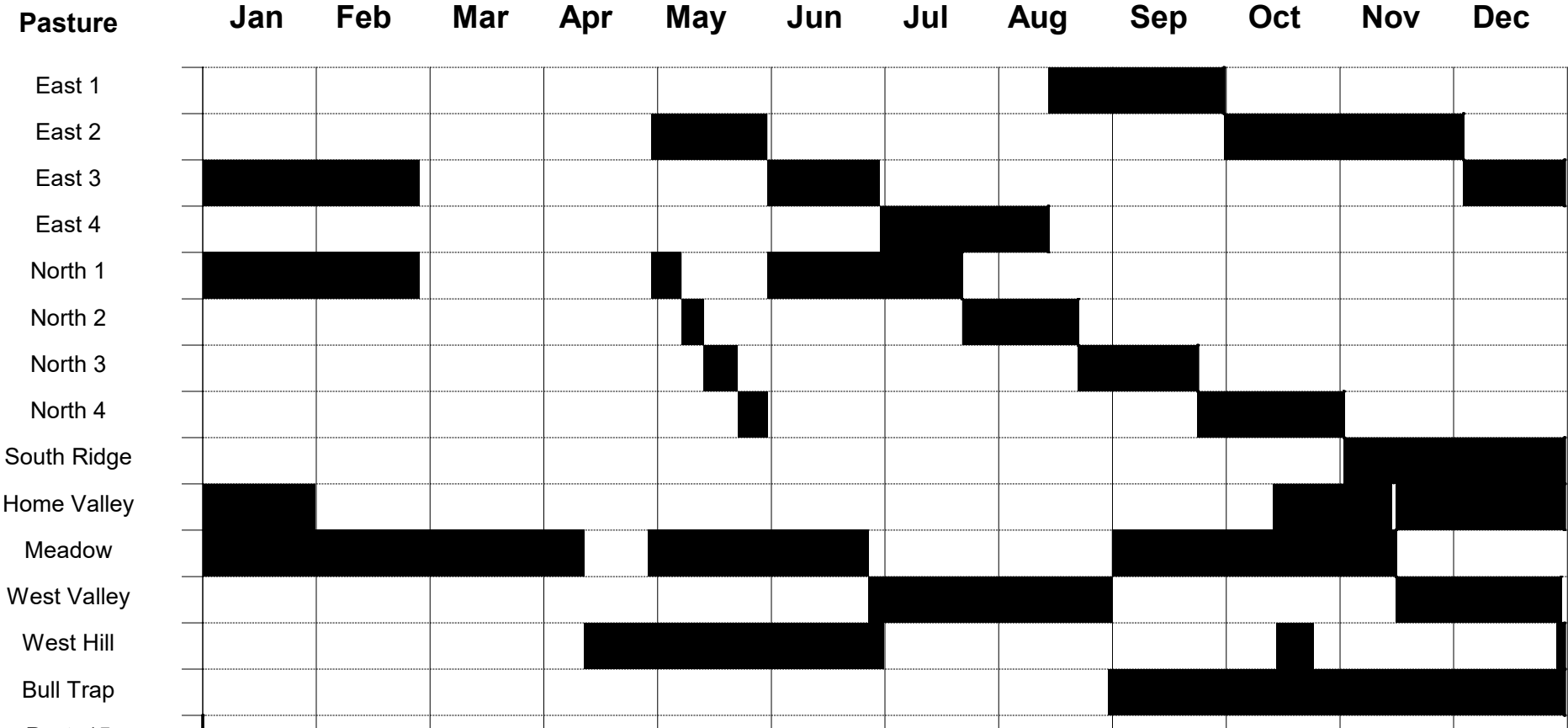
Output:

- For individual pastures, automatically calculates planned and available animal unit months (AUM) of grazing, days of grazing, stocking rates in AUM and animal unit days (AUD) /acre, used and remaining AUM.

Summary Sheets:

- ***Seasonal Distribution:*** Seasonal distribution of grazing for each pasture.
- ***Stocking Summary:*** Stocking rates for each pasture and entire ranch.
- ***Drylot Fed Hay:*** A sheet to record hay fed to cattle in drylot or on feed grounds.
- ***Fed Hay Summary:*** Hay fed on both pasture and drylot situations.
- ***Forage Demand Summary:*** Pasture forage demand (AUM).

Seasonal Distribution of Grazing



Stocking Rate Summary

Pasture	Acres	Total AUM / Pasture			AUM/ac			AUD/ac			Response Index Score
		Planned	Used	Left	Planned	Used	Left	Planned	Used	Left	
East 1	822	493	446	47	0.60	0.54	0.06	18	16	2	2
East 2	1260	819	797	22	0.65	0.63	0.02	20	19	1	1
East 3	1100	660	705	-45	0.60	0.64	-0.04	18	19	-1	0
East 4	832	416	441	-25	0.50	0.53	-0.03	15	16	-1	-3
North 1	1046	628	715	-87	0.60	0.68	-0.08	18	21	-3	-4
North 2	680	340	331	9	0.50	0.49	0.01	15	15	0	-2
North 3	560	364	369	-5	0.65	0.66	-0.01	20	20	0	0
North 4	500	325	383	-58	0.65	0.77	-0.12	20	23	-3	2
South Ridge	995	597	419	178	0.60	0.42	0.18	18	13	5	4
Home Valley	710	320	251	68	0.45	0.35	0.10	14	11	3	6
Meadow	230	575	538	37	2.50	2.34	0.16	76	71	5	-1
West Valley	635	318	314	3	0.50	0.49	0.01	15	15	0	-3
West Hill	362	217	148	69	0.60	0.41	0.19	18	12	6	0
Bull Trap	430	237	176	61	0.55	0.41	0.14	17	12	4	3

Total	10162	6308	6034	274	---	---	---	---	---	---	---
Pasture Avg.¹	---	---	---	---	0.71	0.67	0.04	22	20	1	0.4
Ranch Avg.¹	---	---	---	---	0.62	0.59	0.03	19	18	1	---

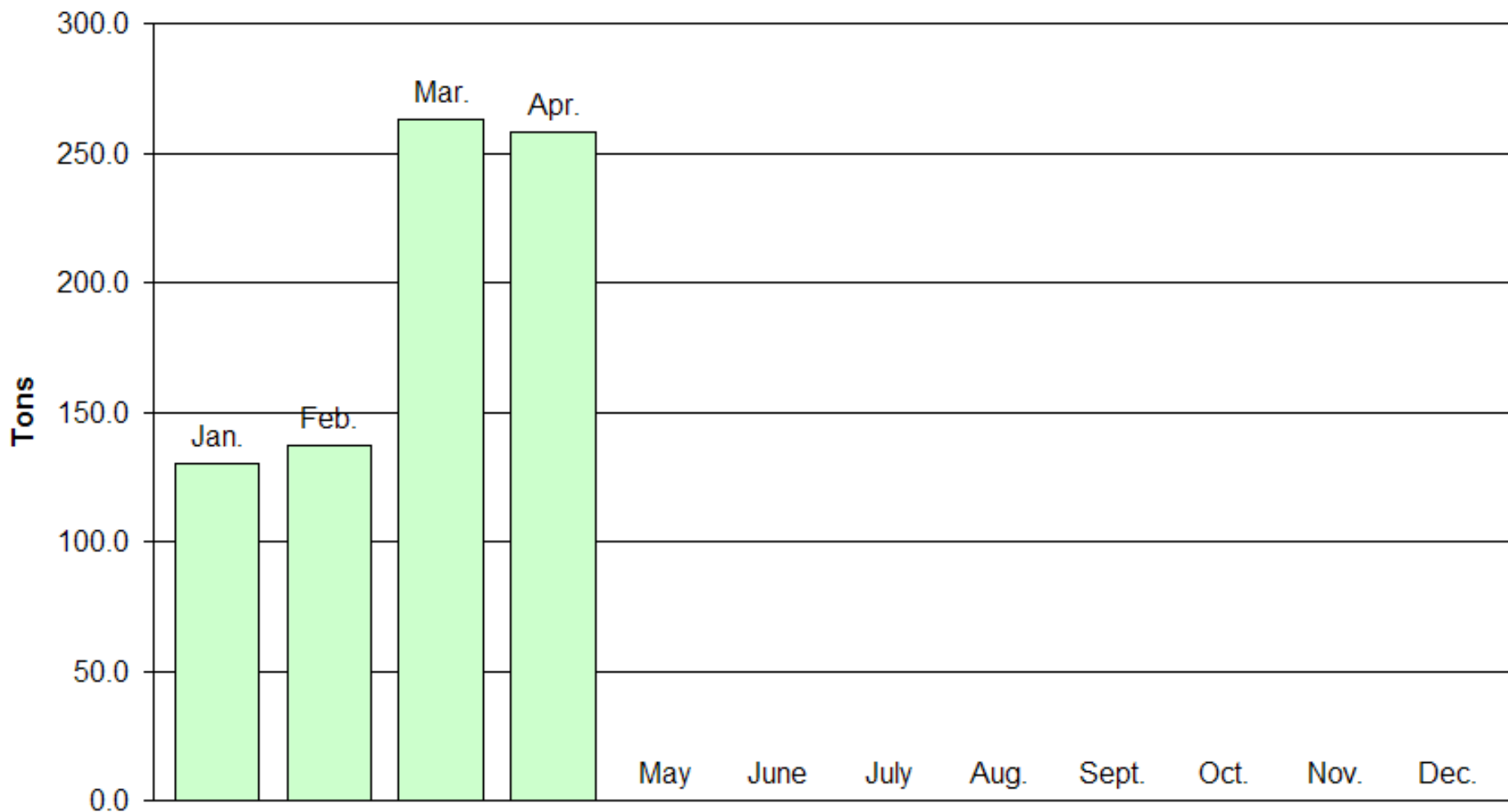
¹ Pasture average is calculated from the AUM/ac or AUD/ac of each pasture. Ranch average is calculated from total ranch acres and total AUM's used.

Drylot Fed Hay Records

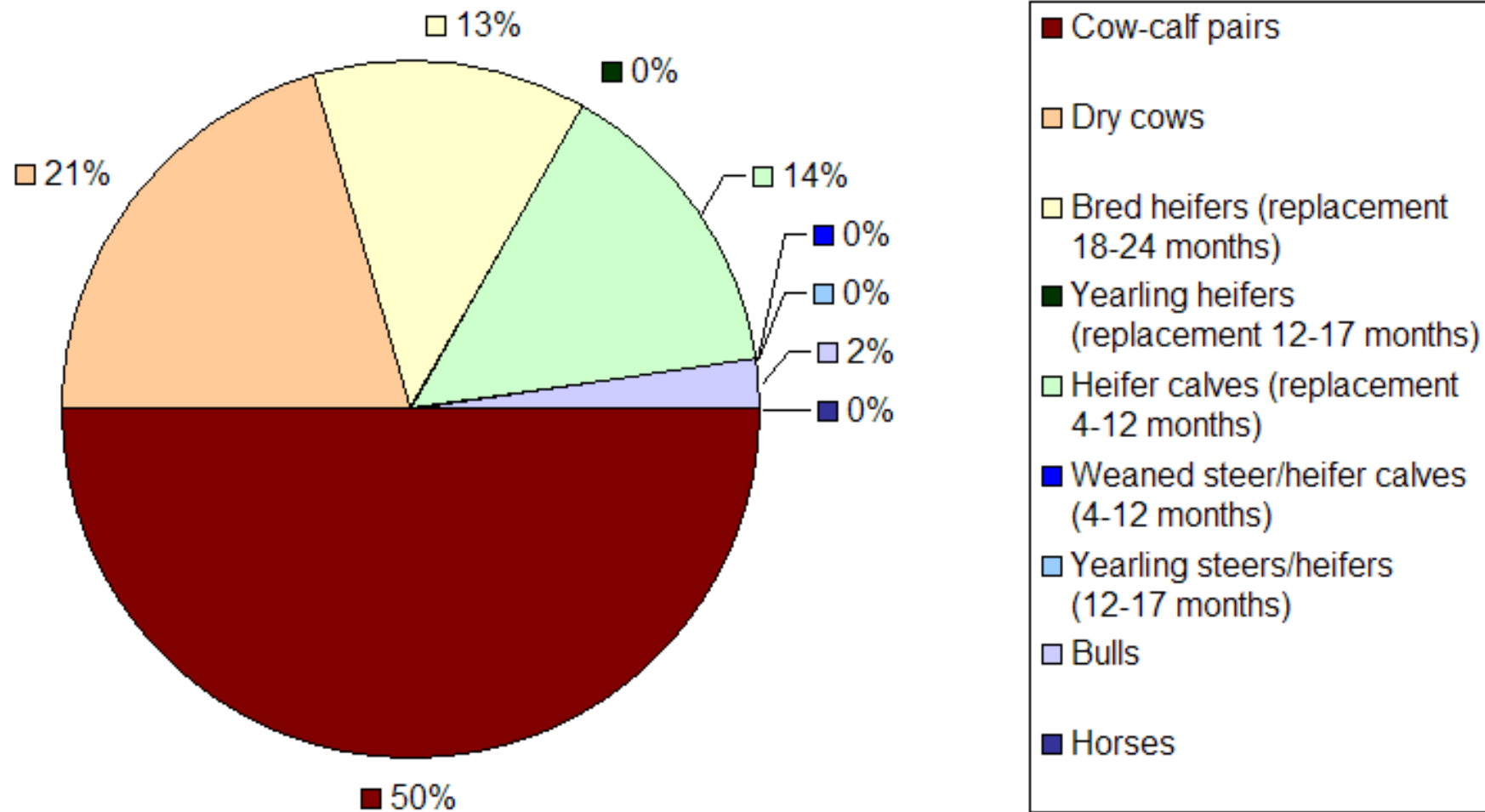
This sheet can be used to record hay fed to livestock when that hay is the primary roughage source; such as in drylot or feed trap. Hay fed as a supplement while grazing in a pasture should be recorded on individual pasture sheets.

Livestock Class	Location	Number	Hay Fed (lb/hd/d)	Begin Date	End Date	Days	Total Hay Fed (T)	Hay AUM
Cow-calf pairs	Calving grounds	195	35.0	1-Mar-07	30-Apr-07	60	204.8	517.8
Cow-calf pairs	Calving grounds	180	35.0	1-Mar-07	30-Apr-07	60	189.0	478.0
Heifer calves (repl.)	West lot	120	16.0	1-Jan-07	30-Apr-07	119	114.2	288.9
Bred heifers (repl.)	East lot	80	25.0	1-Feb-07	30-Apr-07	88	88.0	222.6
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
						0	0.0	0.0
Grand Total							596.0	1507.2

Total Hay Fed by Month



Percent of Total Hay Fed by Livestock Class

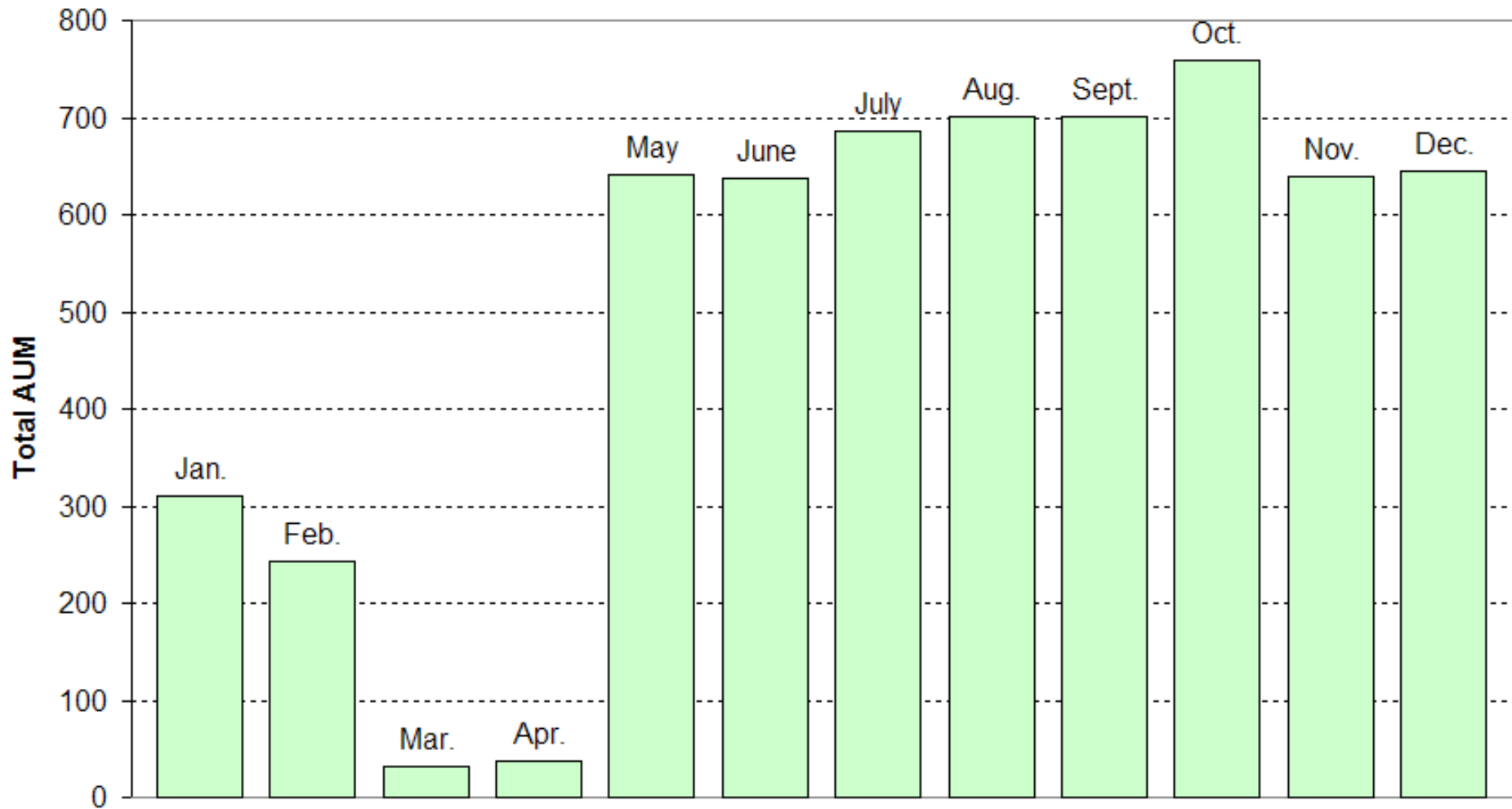


Pasture Forage Demand Summary (AUM)

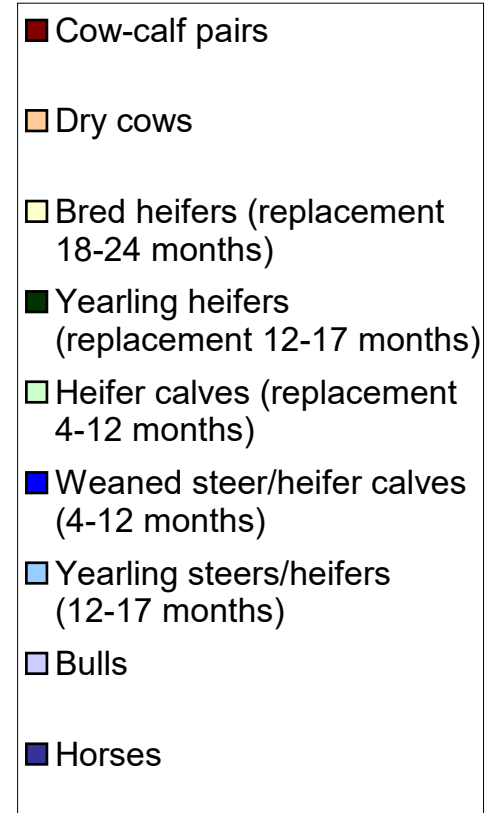
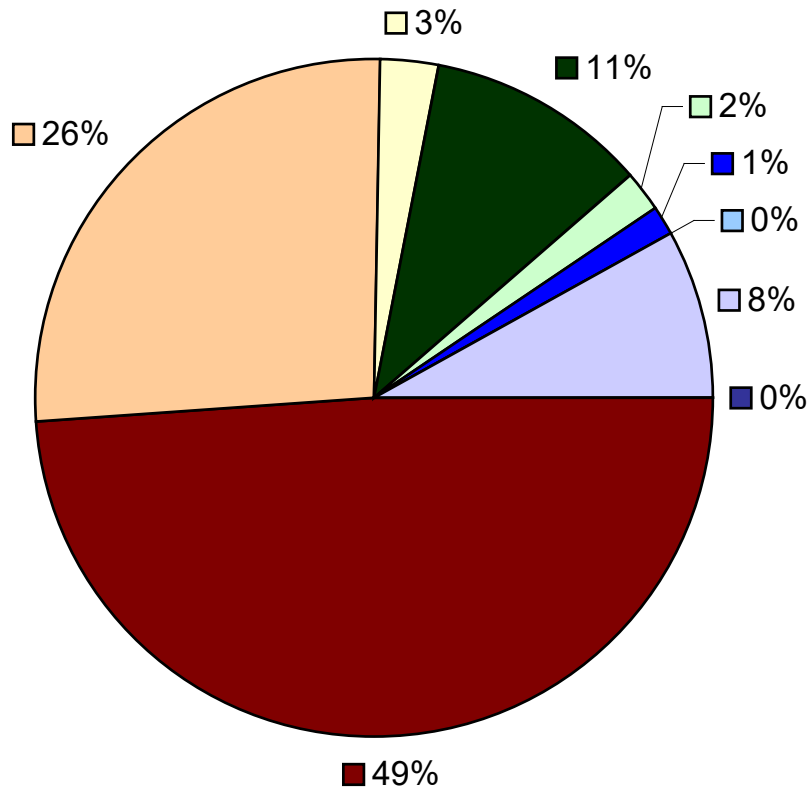
Total AUM from grazing by livestock class.

Livestock Class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Livestock Class Total
Cow-calf pairs					510	510	544	558	552	275			2951
Dry cows	230	215								244	444	459	1592
Bred heifers (replacement 18-24 months)	49										37	82	167
Yearling heifers (replacement 12-17 months)					86	84	98	98	106	110	57		638
Heifer calves (replacement 4-12 months)										4	58	60	122
Weaned steer/heifer calves (4-12 months)										80			80
Yearling steers/heifers (12-17 months)													
Bulls	31	29	32	38	45	43	45	45	43	45	43	45	484
Horses													
Monthly Totals	310	244	32	38	641	637	687	701	702	758	639	645	6034

Total Pasture Forage Demand (AUM) by Month



Percent of Total Pasture Forage Demand (AUM) by Livestock Class



SandDRIS for the Sandhills



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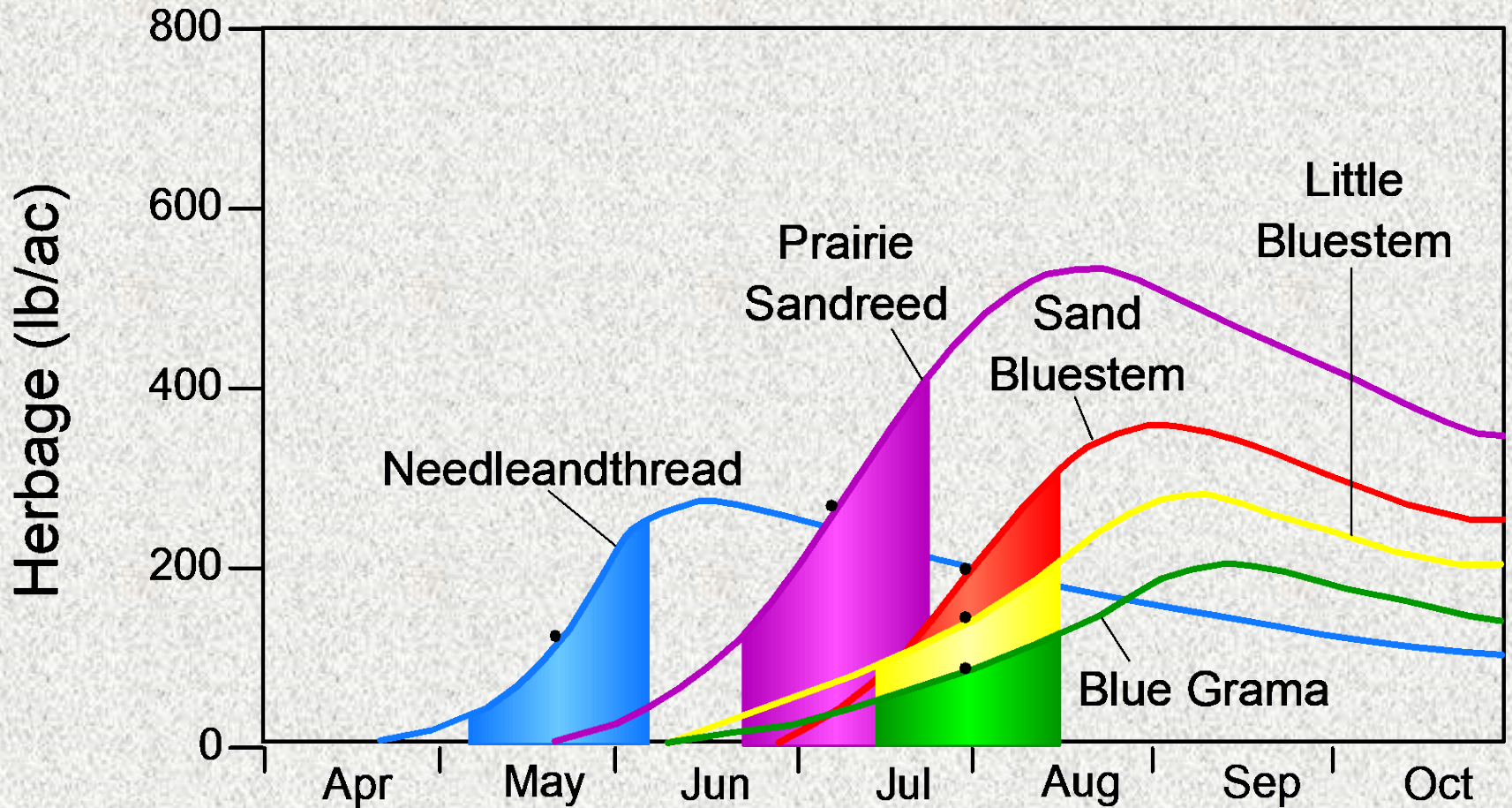
Sandhills Defoliation Response Index System

- **Decision support tool designed to optimize grassland production and use.**
- **Assist grassland manager with decisions about grazing land use in a variable environment.**
- **Ranks the suitability of pastures for future grazing based on the season of defoliation, recent precipitation regime, and residual herbage (hydrologic condition).**

Sandhills Defoliation Response Index System

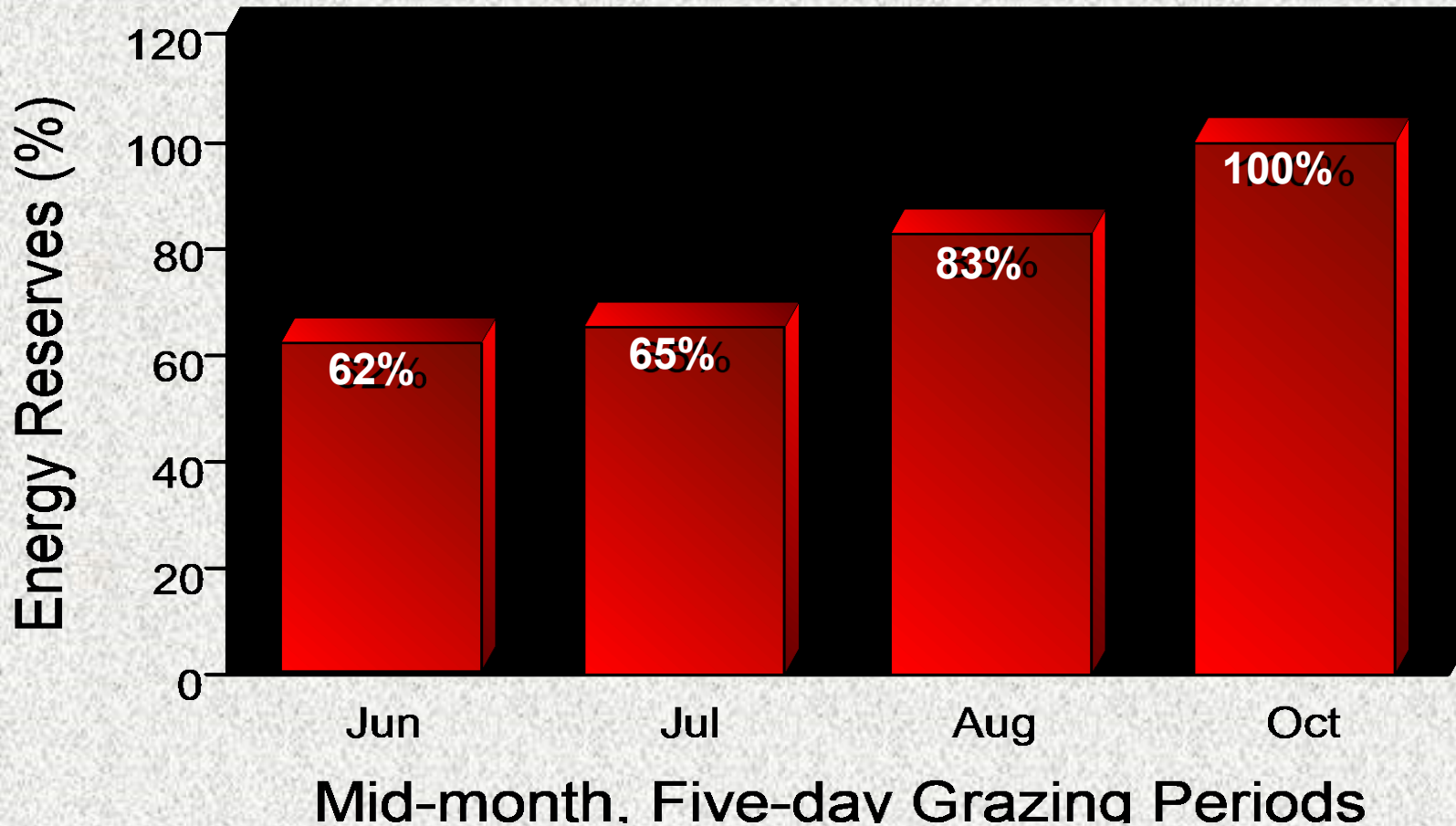
Season of Defoliation <i>(Includes grazing, hail, fire, and grasshoppers)</i>	Index
<u>March-April</u> : sedges green-up & grow (CS grass green-up)	+ 2
<u>May</u> : rapid growth of cool-season grasses	+ 1
<u>June</u> : early growth of warm-season tall grasses	- 1
<u>July</u> : rapid growth of warm-season tall grasses	- 2
<u>Multiple events</u> during <u>June-August</u>	- 3
<u>August</u> : warm-season grasses have flowered	0
<u>September</u> : nearly full growing season deferment	+ 2
<u>October-February</u> : dormant season	+ 4

Growth of important Sandhills forage grasses

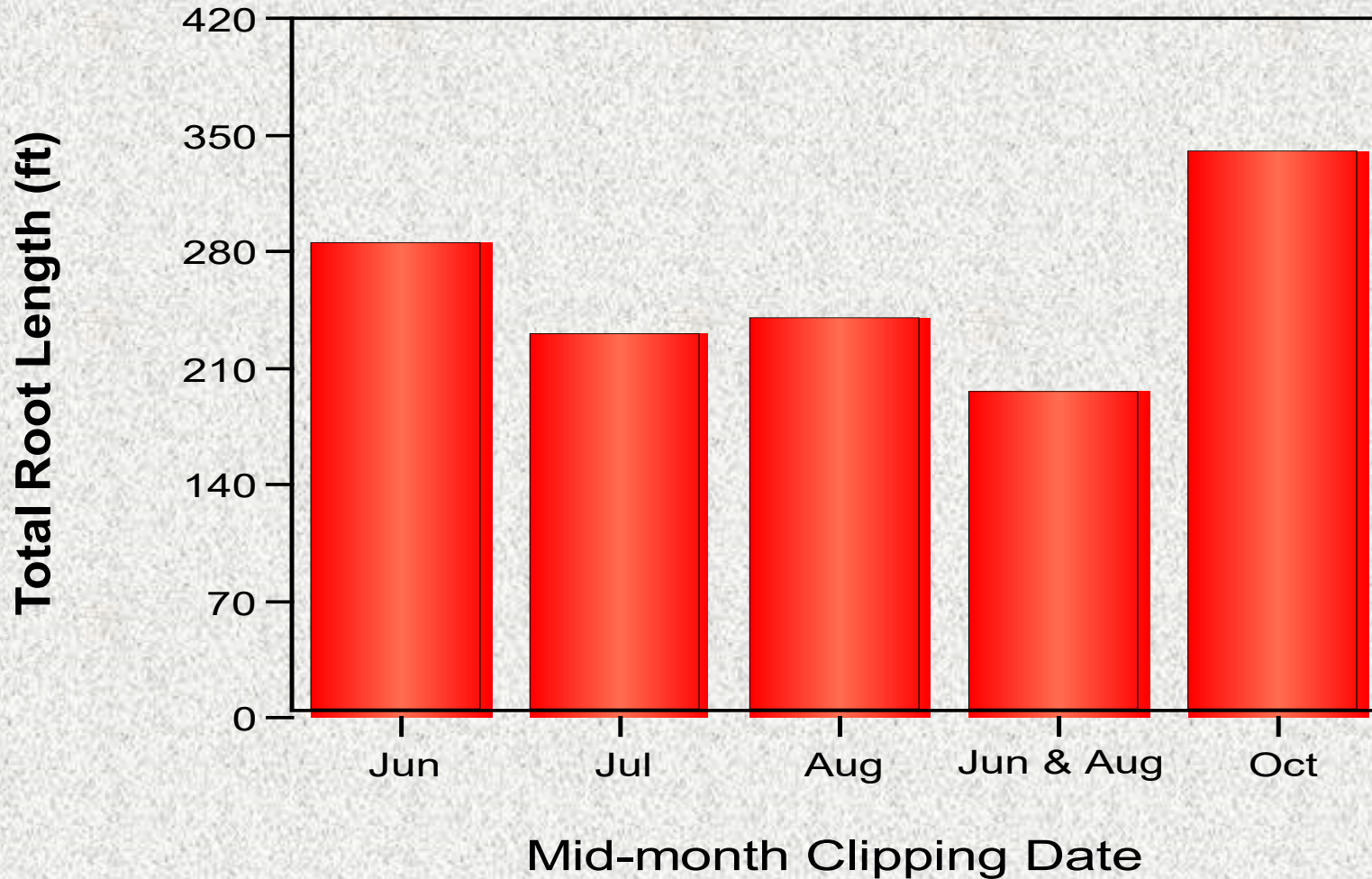


(modified from Reece et al 2007)

Effect of time of grazing on energy reserves of prairie sandreed.



Effect of time of clipping on root length of sand bluestem plants.



From: Engel et al. 1998

Sandhills Defoliation Response Index System

Precipitation Regime <i>(October through December forage year)</i>	Index
<u>Well above average</u>: 5-6 feet of moist soil by April 30 <u>and</u> abundant precipitation during May - July.	+ 2
<u>Near average</u>: 3-4 feet of moist soil by April 30 <u>and</u> abundant precipitation during June - July.	0
<u>Drought</u>: little or no dormant-season precipitation during October – April <u>and / or</u> well below average precipitation during June - July.	- 2

Nebraska Ranch Practicum: Precipitation Records: 2018

GSL Precipitation (inches)

Month	Average	2016-2017	2017-2018	2017-2018 Cumulative
Oct. – Mar.	3.36	5.80	5.52	5.52
April	2.14	1.65	2.45	7.97
May	3.04	3.86	6.67	14.64
June	3.66	0.34	4.15	18.79
July	2.95	4.72	4.51	23.30
August	2.15	3.21	0.50	23.80
September	1.76	2.45		
Total	19.06	22.03		

Sandhills Defoliation Response Index System

End-of-Season Residual Herbage <i>(Hydrologic condition)</i>	Index
<u>Excellent</u> : residual herbage of palatable species is common; standing herbage (> 1500 lb/acre) and litter are abundant throughout.	+ 2
<u>Adequate</u> : standing herbage (700 – 900 lb/acre) and litter uniformly distributed.	0
<u>Poor</u> : standing herbage absent, litter uncommon, characteristic of fire or severe overgrazing.	- 2

- 2



Effect of long-term grazing intensity on yield, litter, and water infiltration, Cottonwood, S. Dak.

Grazing intensity	Total herbage	Litter	Water intake rate
	<i>(lb/acre)</i>	<i>(lb/acre)</i>	<i>(inches/hr)</i>
Heavy	900	456	1.05
Moderate	1345	399	1.69
Light	1869	1100	2.95

Sandhills Defoliation Response Index System

Season of Defoliation <i>(Includes grazing, hail, fire, and grasshoppers)</i>	Index
<u>March-April</u> : sedges green-up & grow (CS grass green-up)	+ 2
<u>May</u> : rapid growth of cool-season grasses	+ 1
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<u>Multiple events</u> during <u>June-August</u>	- 3
<u>August</u> : warm-season grasses have flowered	0
<u>September</u> : nearly full growing season deferment	+ 2
<u>October-February</u> : dormant season	+ 4

Scoring Multiple Season (month) Grazing

1. Part growing season (GS) and part dormant season (GS).
 - ❖ **When GS stocking rate is > 40% of the traditional summer stocking rate; score solely on the grazing during the GS.**

Example:

July grazing removed:	0.40 AUM/ac (12 AUD/ac)
December grazing removed:	<u>0.20 AUM/ac (6 AUD/ac)</u>
Total:	0.60 AUM/ac (18 AUD/ac)

$0.40 \div 0.60 = 67\%$ removed in growing season (July)

Score = - 2

Scoring Multiple Season (month) Grazing

2. Part growing season (GS) and part dormant season (DS).
- ❖ **When GS stocking rate is < 40% of the total stocking rate; multiply the DS score (+4) by the percentage of total stocking rate from the DS.**

Example:

July grazing removed: 0.16 AUM/ac (5 AUD/ac).
December grazing removed: 0.44 AUM/ac (13 AUD/ac).
Score = 4 x (0.44 ÷ 0.60) [73% removed in DS]
Score = 4 x 0.73

Score = 3

Scoring Multiple Season (month) Grazing

3. Multiple months within the growing season (GS).

- ❖ Place emphasis or heavily weight grazing that occurs during June, July, and August.

Example:

May grazing removed: 0.30 AUM/ac (9 AUD/ac) (50%)

June grazing removed: 0.30 AUM/ac (9 AUD/ac) (50%)

Score = - 1

Example:

April grazing removed: 0.10 AUM/ac (3 AUD/ac) (17%)

July grazing removed: 0.50 AUM/ac (15 AUD/ac) (83%)

Score = - 2

Scoring Multiple Season (month) Grazing

3. Multiple months within the growing season (GS). (cont.)
- ❖ Place emphasis or heavily weight grazing that occurs during June, July, and August.

Example:

July grazing removed: 0.38 AUM/ac (11 AUD/ac) (63%)
Sept. grazing removed: 0.22 AUM/ac (7 AUD/ac) (37%)

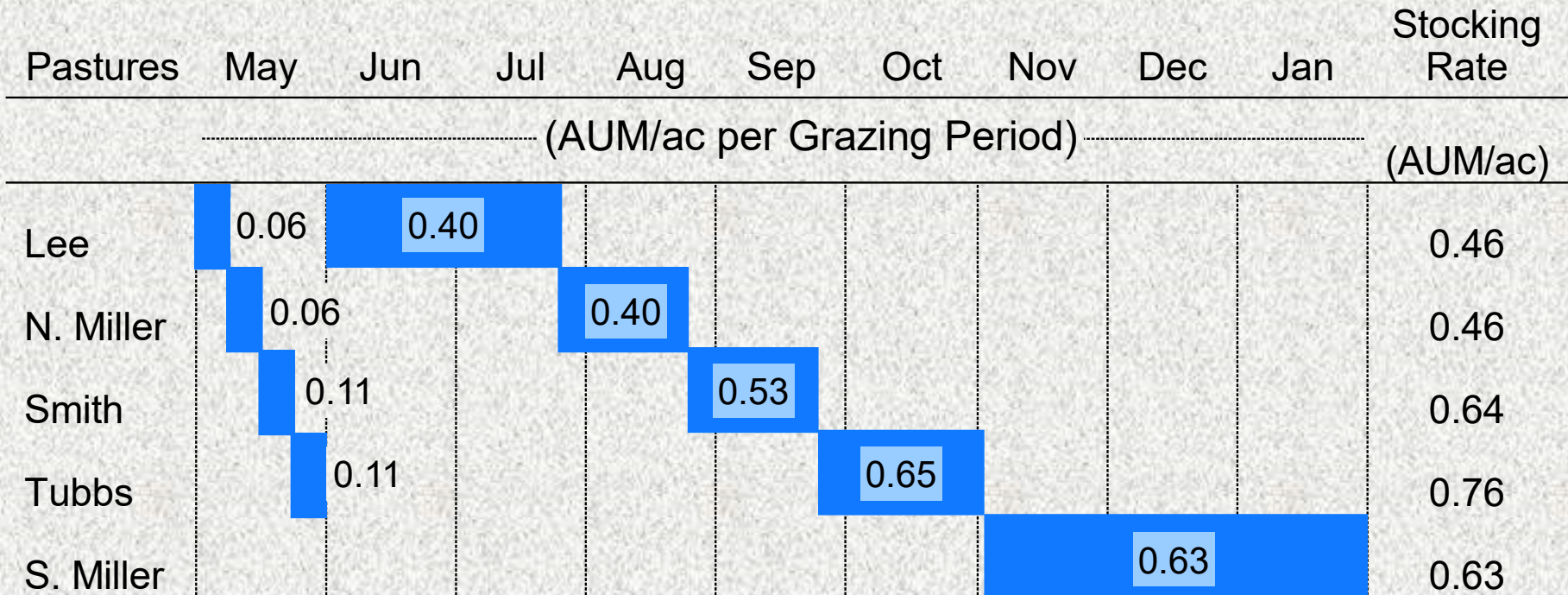
Score = - 2

Example:

Aug. grazing removed: 0.40 AUM/ac (12 AUD/ac) (67%)
Sept. grazing removed: 0.20 AUM/ac (6 AUD/ac) (33%)

Score = 0

2017: Grazing sequence and stocking

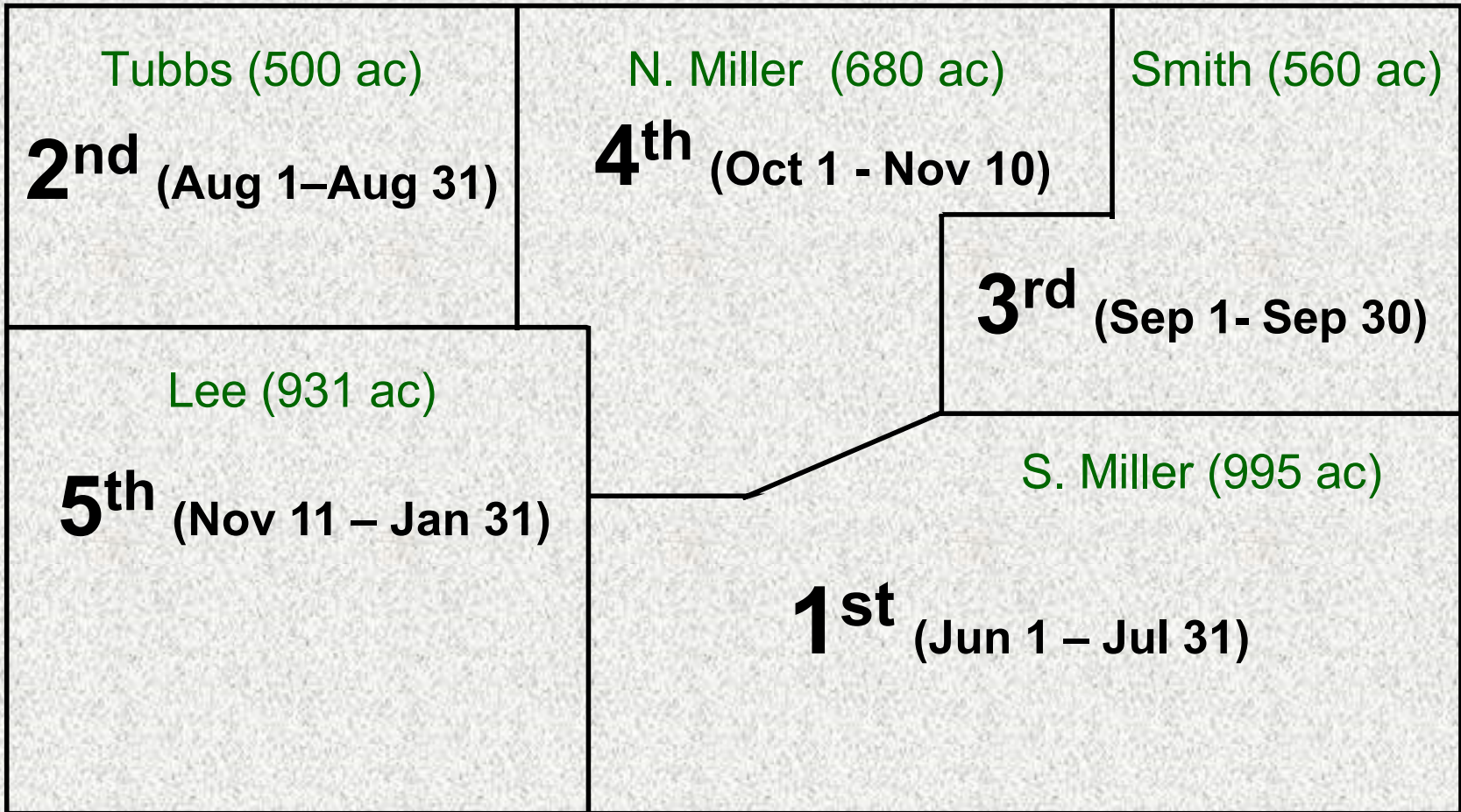


2017: SanDRIS Scores

Pasture	Primary Grazing	Season of Defoliation	Precipitation Regime	Residual Herbage	Total Score
Lee	Jun 1 - Jul 24	- 2	0	0	- 2
N. Miller	Jul 25 - Aug 24	0 (-1)	0	0	0
Smith	Aug 25 - Sep 24	+ 2 (+1)	0	- 1	+ 1
Tubbs	Sep 25 - Oct 31	+ 4 (+3)	0	- 1	+ 3
S. Miller	Nov 1 - Jan 31	+ 4	0	- 1	+ 3

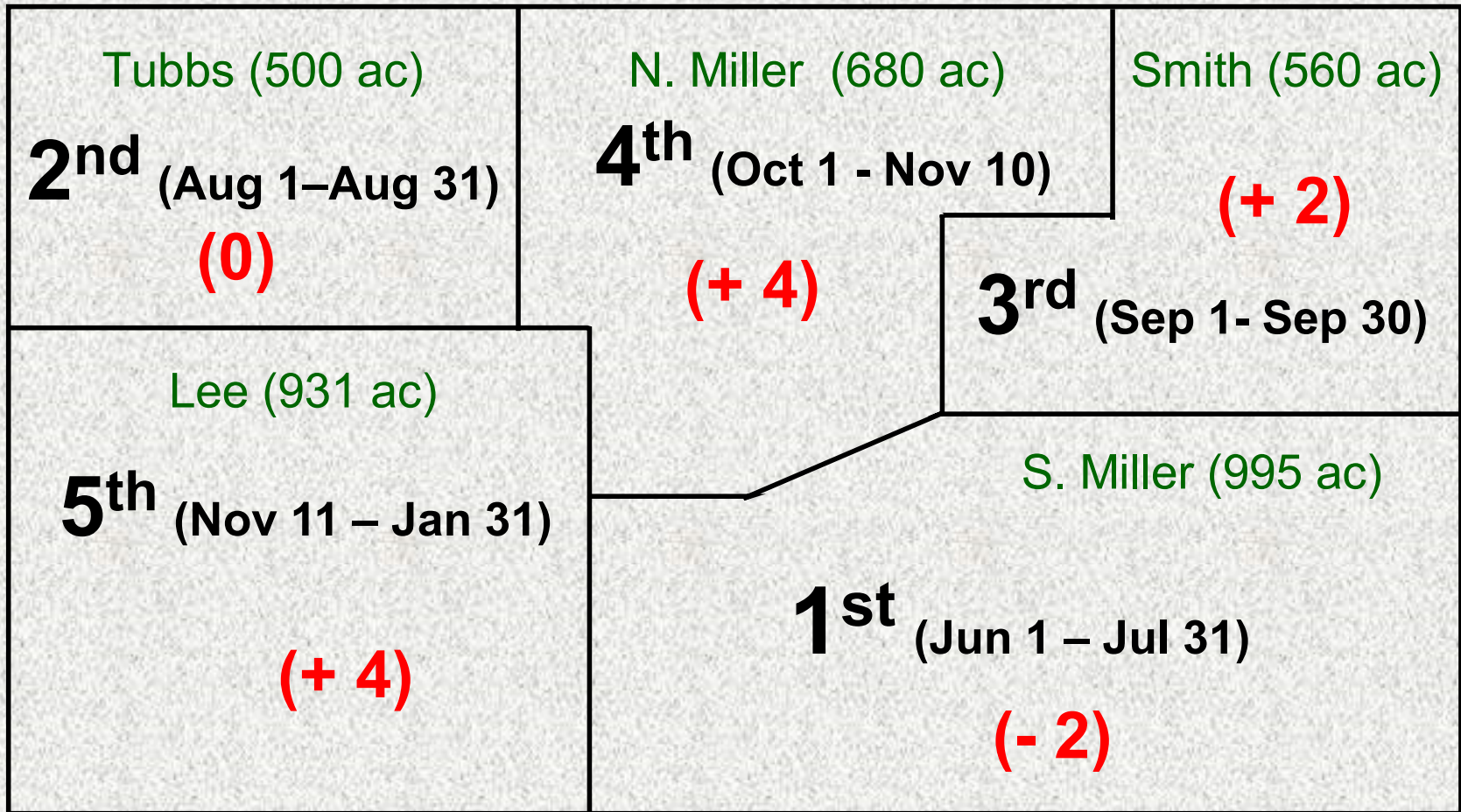
Planned 2018 Grazing Sequence

(Primary grazing period of June 1 – January 31)



Planned 2018 Grazing Sequence

(Primary grazing period of June 1 – January 31)



(Season of defoliation score in 2017)

Combined 2017 & 2018 SanDRIS Scores

Pasture	2017 Total Score	2018 Total Score*	2-yr running Score
Lee	- 2	+ 4	+ 2
N. Miller	0	+ 4	+ 4
Smith	+ 1	+ 2	+ 3
Tubbs	+ 3	0	+ 3
S. Miller	+ 3	- 2	+ 1

* Planned 2018 season of defoliation score

SanDRIS Guidelines

- Avoid negative **Season of Defoliation** scores in consecutive years.
 - Use forage year **Precipitation** (October - September).
 - Score **Residual Herbage** after killing frost.
 - Running 2-year sum of SanDRIS scores should be ≥ 0 .
-