




Monitoring Livestock Forage Use in the Black Hills



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Wildlife use will be up to 106 million pounds of forage per year or approximate population levels of 70,000 deer and 4,500 elk or other combinations that use the same amount of forage.

Forest grazing capacity of 128,000 AUMs
(@26lb/day, 30 days/mo, 128,000 AUM =
99,840,000 lb) available for livestock utilization

Black Hills National Forest Land Management Plan

Bridger-Teton NF				
Elk	Expenditures	Labor Income	Jobs	
Local Hunters	2,513,618			
Other Wyo. Residents	5,433,126	3,529,558	192	
Non-Residents	3,009,619	1,955,159	106	
Total Elk	10,956,363	5,484,717	298	
Mule deer				
Local Hunters	1,629,049			
Other Wyo. Residents	2,676,256	1,502,680	83	
Non-Residents	2,153,825	1,209,342	67	
Total Mule deer	6,459,130	2,712,022	150	
Pronghorn				
Local Hunters	61,240			
Other Wyo. Residents	38,523	20,048	11	
Non-Residents	62,483	32,518	18	
	162,246	52,566	29	
Total Economic Activity Hunting		25,827,044	954	Total Jobs Hunting
Fishing	5,800,000	2,200,000	100	
Total Economic Activity Hunting and Fishing		33,827,044	1054	Total Jobs Hunting and Fishing
	Production			Total Economic Impact
Grazing	\$7,870,210	5,126,747	189	\$16,809,060
		\$12,996,957		\$21,935,807

Source: An Economic Profile of the Bridger-Teton National Forest 2008

David T. Taylor, Roger H. Coupal, Thomas Foulke, Benjamin Rashford and Desiree Olson

University of Wyoming, Department of Agricultural & Applied Economics

2505. Livestock and wild herbivore allowable forage use or residual levels on rangelands by grazing system and range condition are as follows:


Proper Allowable Use Guidelines
(Percent Utilization by Weight Each Year)

SEASON OF USE	SATISFACTORY CONDITION	UNSATISFACTORY CONDITION
Continuous Use Spring/Summer	0-45%	0-40%
Continuous Use Fall/Winter	55-60%	0-55%
Deferred Rotation	0-50%	0-45%
Rest Rotation	0-55%	0-50%




Measuring Utilization

1. Fence out three or more areas.
2. Clip inside the fence every two weeks.
3. Sort out the non-forage plants.
4. Dry and weigh the remaining plants.
5. Sum the weights.
6. Clip outside the fence post-grazing
7. Repeat steps 3 and 4.
8. Calculate utilization




CLASS	RANGE	SPAN	DESCRIPTION
No Use	0-5%	6%	No or negligible use
Slight	6-20%	15%	Key species topped. Culms undisturbed
Light	21-40%	20%	Patchy grazing. 60-80% culms remain
Moderate	41-60%	20%	Uniformly grazed. 15-25% culms remain. No low value species utilized.
Heavy	61-80%	20%	Key species entirely utilized. >10% low value species utilized. <10% culms remain.
Severe	81-100%	20%	Mown appearance.



Another concern about the accuracy and use of utilization data is that often the personnel using the methods are inadequately trained. One of the more common methods, ocular estimate by plot, requires intensive clipping and weighing during the training period and then periodic clipping and weighing in estimated plots to provide a correction factor. It is doubtful that most field personnel using this method conduct the time-consuming training and corrections necessary to accurately estimate utilization.

Utilization Standards: The Quandary Revisited Kenneth D. Sanders. 1998. Annual Meeting Society for Range Science. Rapid City, SD



Some have suggested that it is more important, and more straightforward, to measure the amount of residual vegetation (stubble height or biomass) than the percentage removed (e.g., Hyder 1954). They argue that it is the amount of residual biomass that is important to the plant's ability to recover or to the amount of soil protection provided.

Removal of a certain percentage of annual forage production would result in greatly different amounts of both forage removed and residual vegetation left because production varies greatly from year to year. Emphasis on residual vegetation has increased due to the interest in leaving residual vegetation for wildlife cover, soil cover, and sediment trapping on floodplains.

Seasonal Effects on the Measurement and Interpretation of Utilization. E. Lamar Smith. 1998. Annual Meeting of the Society for Range Management. Rapid City, SD.



Uresk, D.W., D.E. Mergen and T.A. Benzon. 2009.
Monitoring meadows with a modified Robel pole in the
Northern Black Hills, South Dakota. *Prairie Naturalist*
41:121-125

Study funded by Black Hills National Forest, South
Dakota Department of Game, Fish and Parks; and Safari
Club international.



1 m

4 m



2010 Sampling Design

24 randomly selected pastures out of 61 total

4 ungrazed pastures

4 transects per pasture

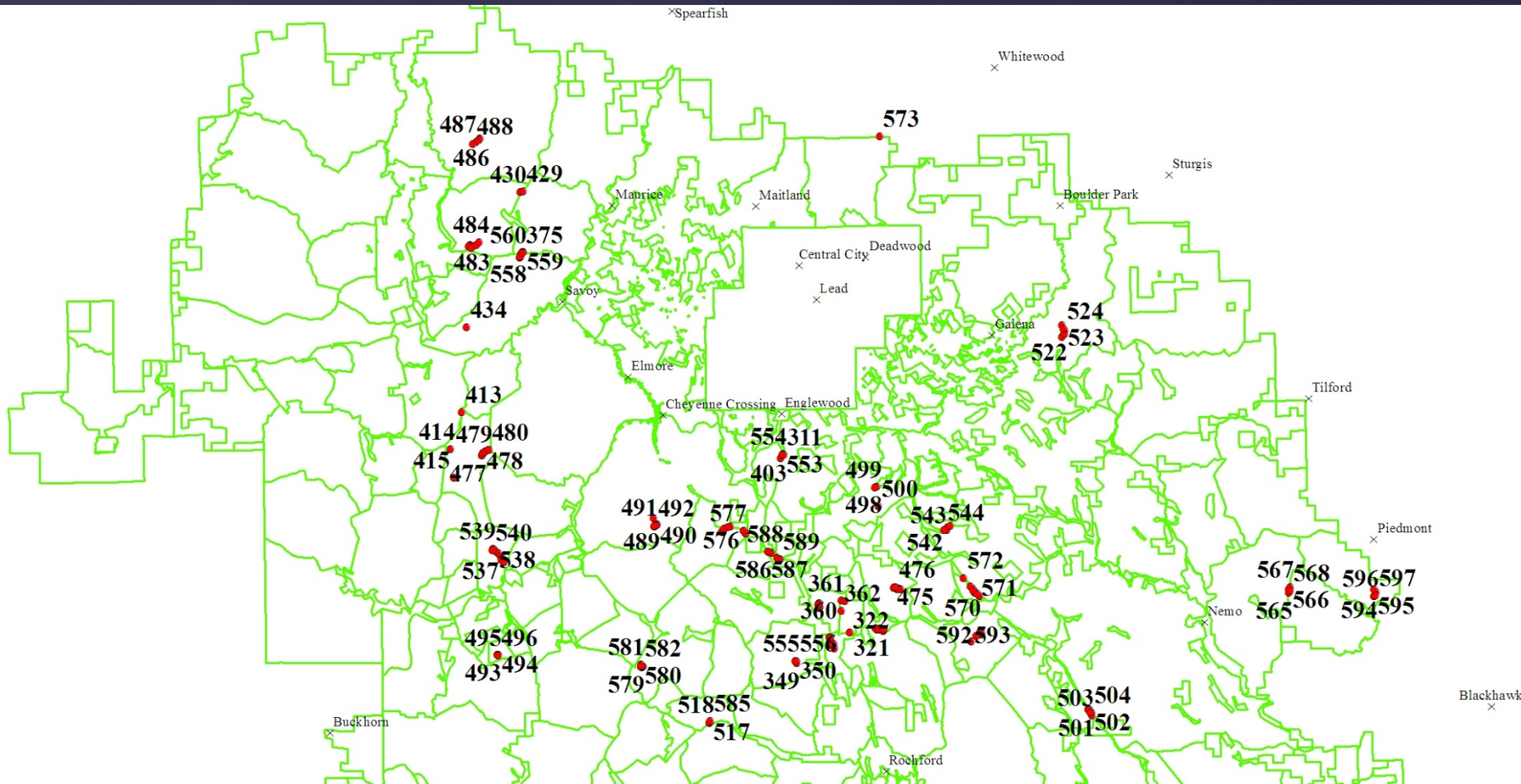
200 m transects

20 reading stations per transect

4 readings at 90° intervals

2011-2013 Add clipping vegetation before and after grazing on a subset of pastures so utilization can be measured more directly.

Transect Locations





Northern Black Hills Precipitation

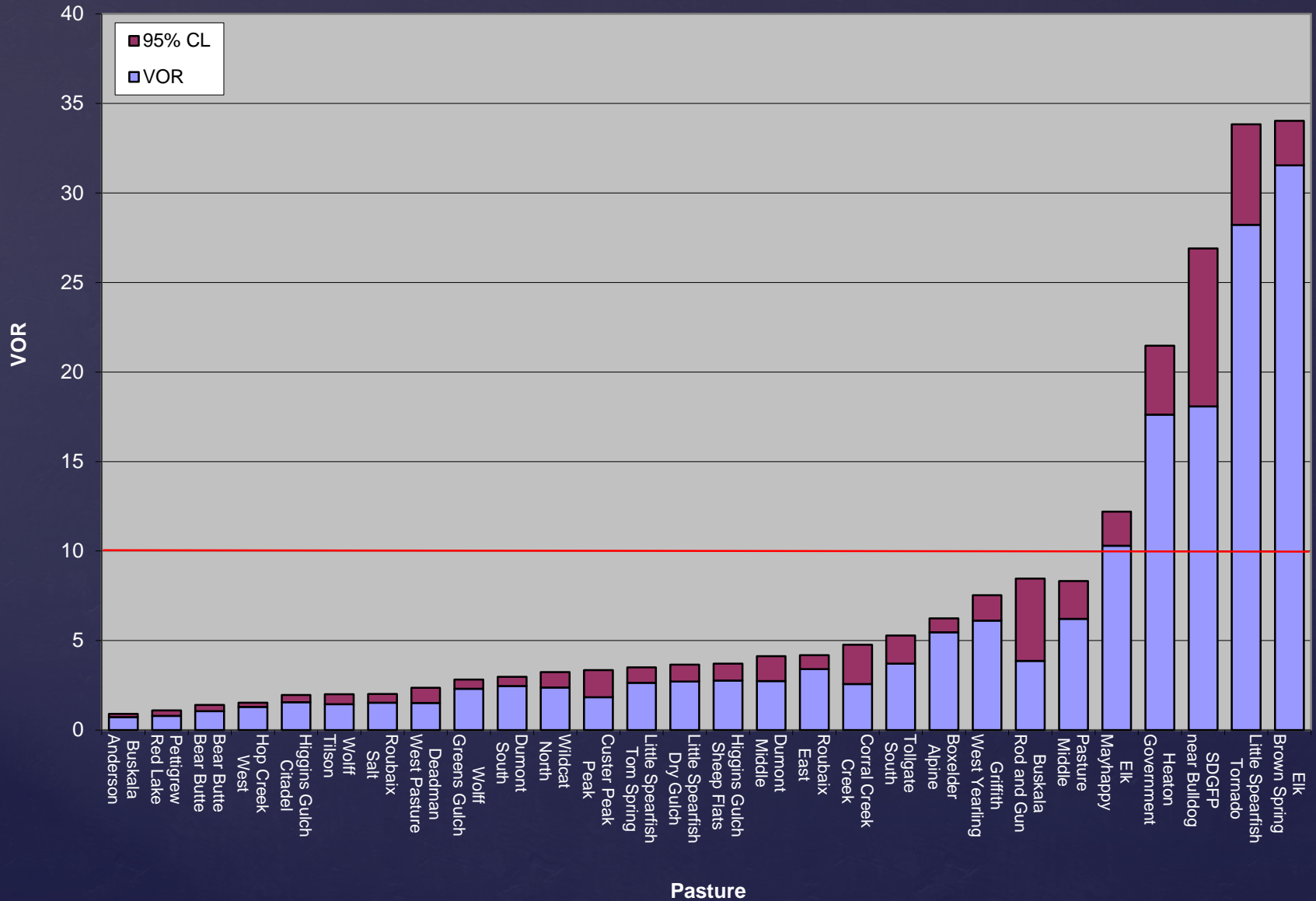
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Total	% LTA
Long-Term Average	1.0	1.0	1.6	2.7	3.6	3.7	2.5	1.9	18.0	100
2008	1.0	1.7	1.5	2.2	*	7.1	2.4	1.8	17.6	98
2009	1.0	1.0	3.8	2.6	1.3	3.7	2.6	3.1	18.9	105
2010	0.6	1.0	0.9	3.7	5.0	3.9	1.3	2.2	18.6	104
2011	1.8	1.6	1.3	2.2	6.3	2.9	2.2	1.8	20.1	112
2012	1.1	1.2	0.3	3.4	2.7	1.3	1.8	1.4	13.0	73

Averages of Lead, Spearfish and Ft Meade stations in inches

Long term average from 1893 to 2010

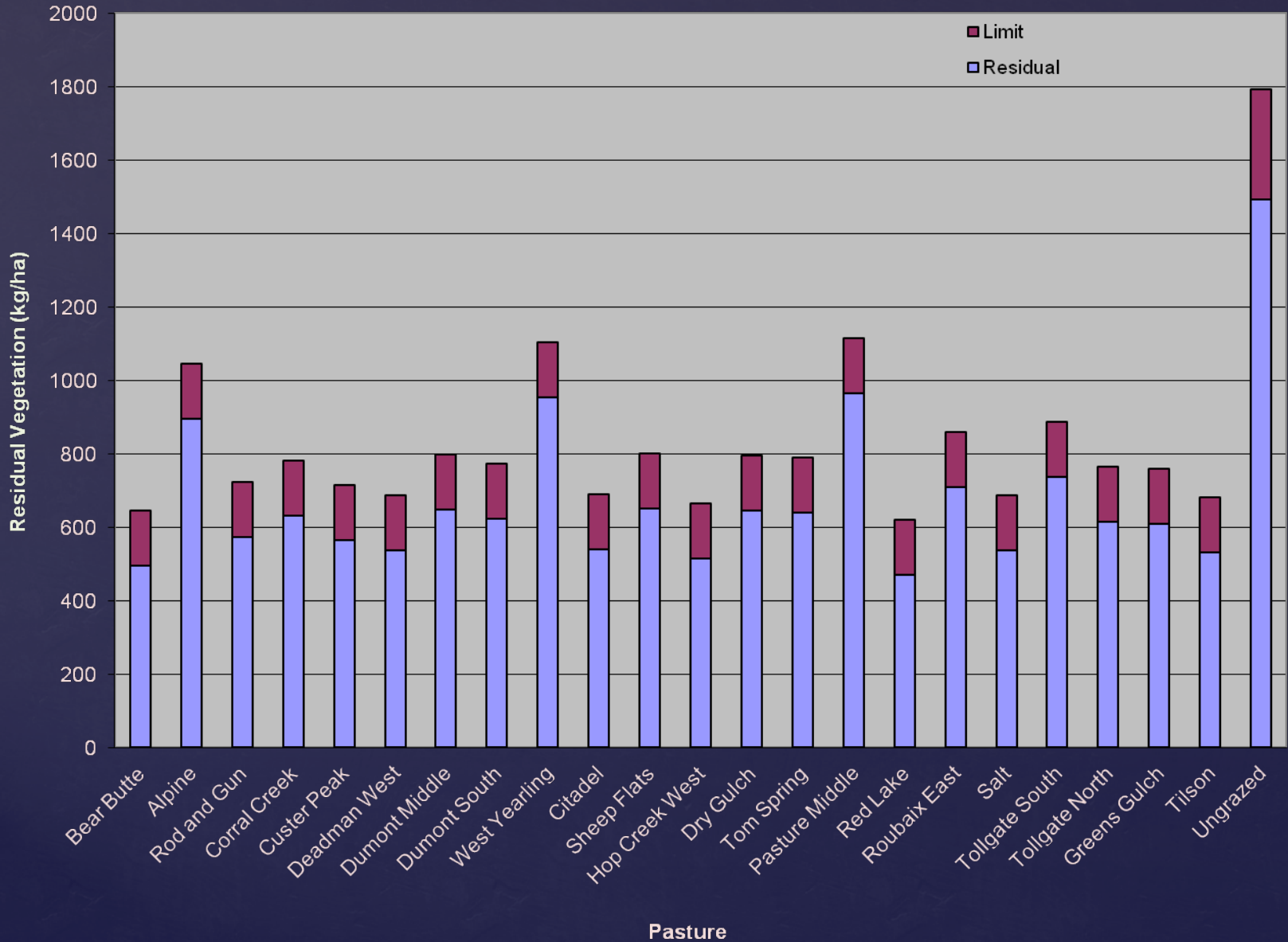
***Not reported**

2010 Northern Black Hills Robel Pole Pasture Summary

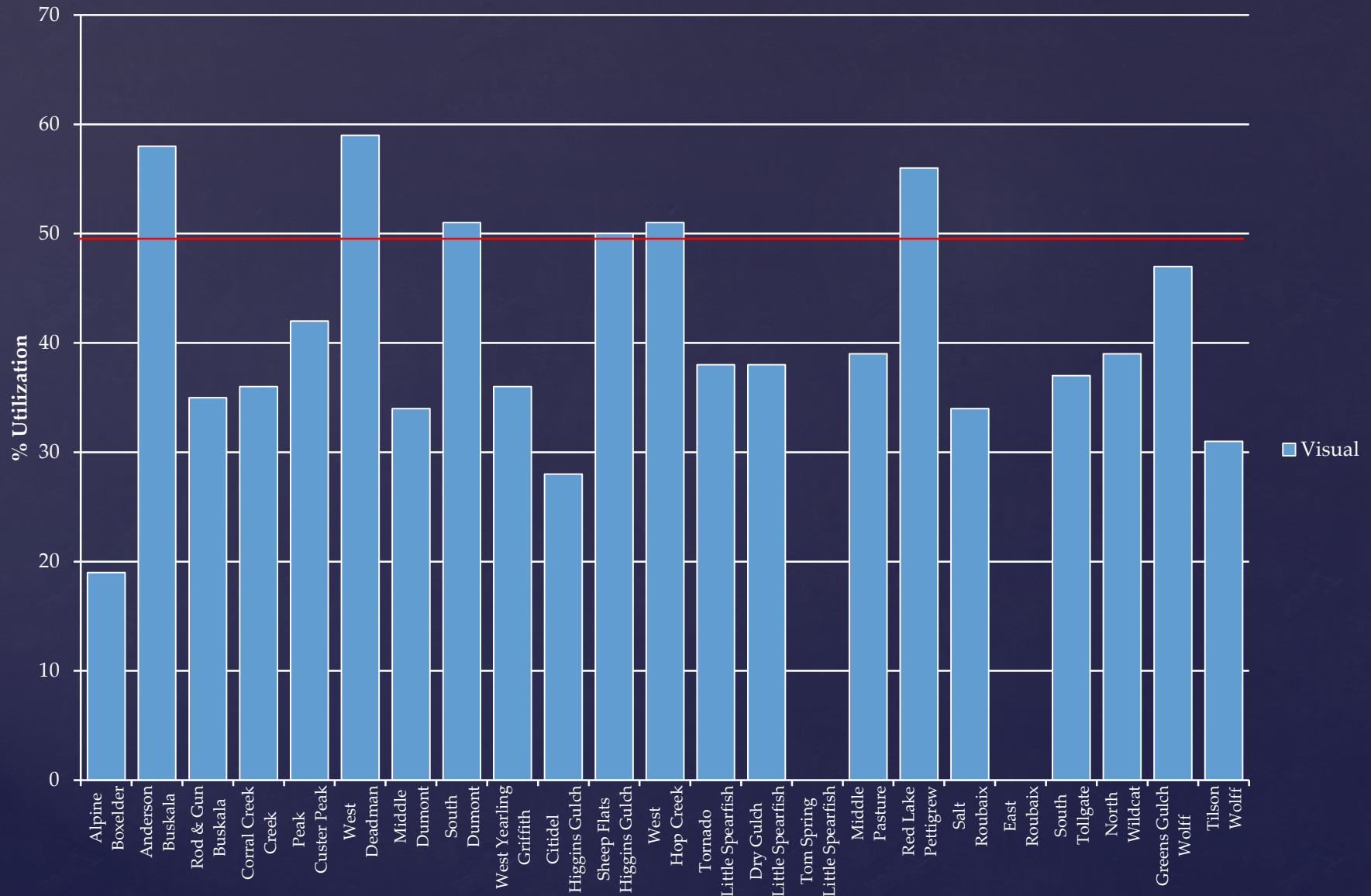




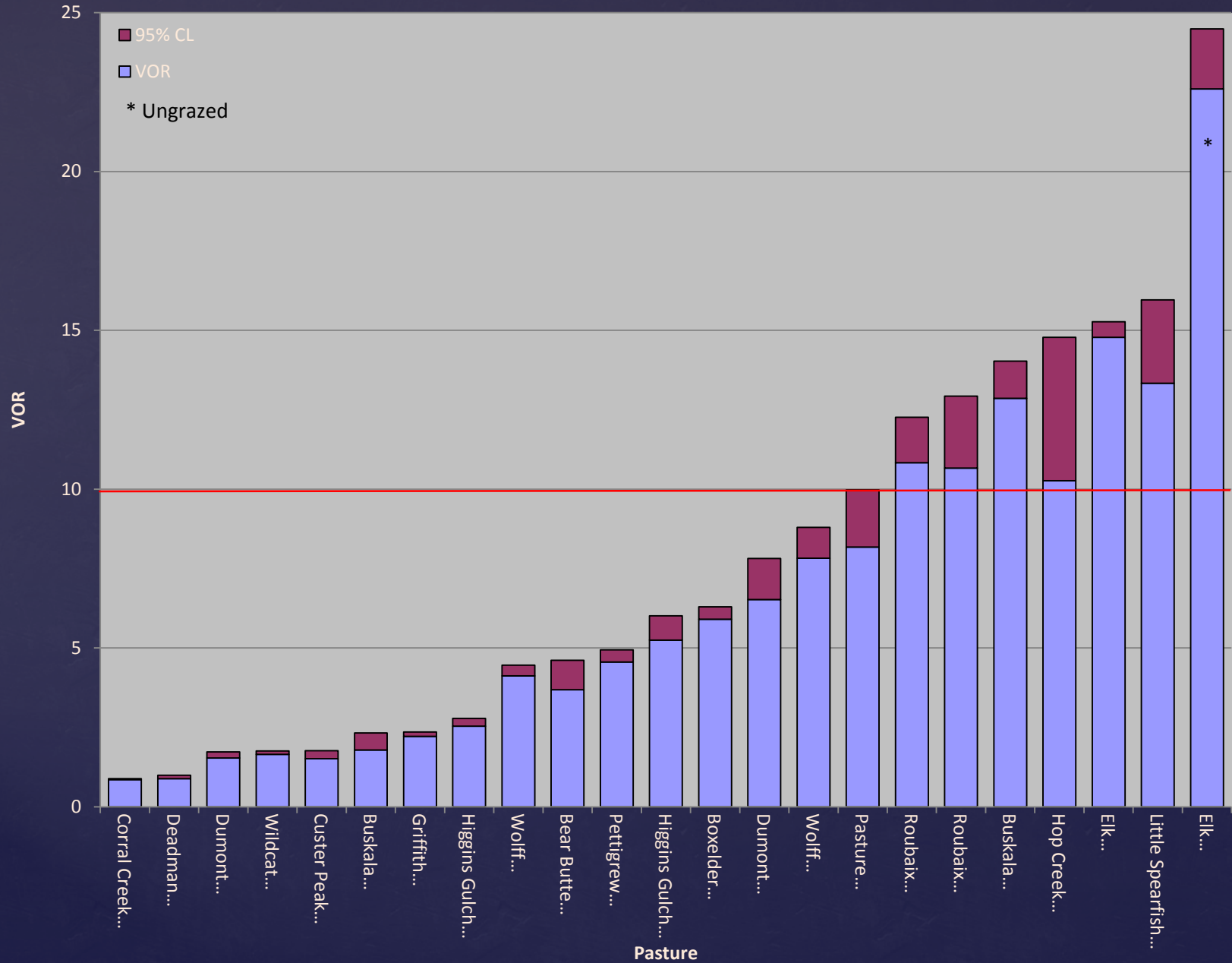
2010 Forage Utilization



Northern Hills Ranger District Monitoring Data, 2010



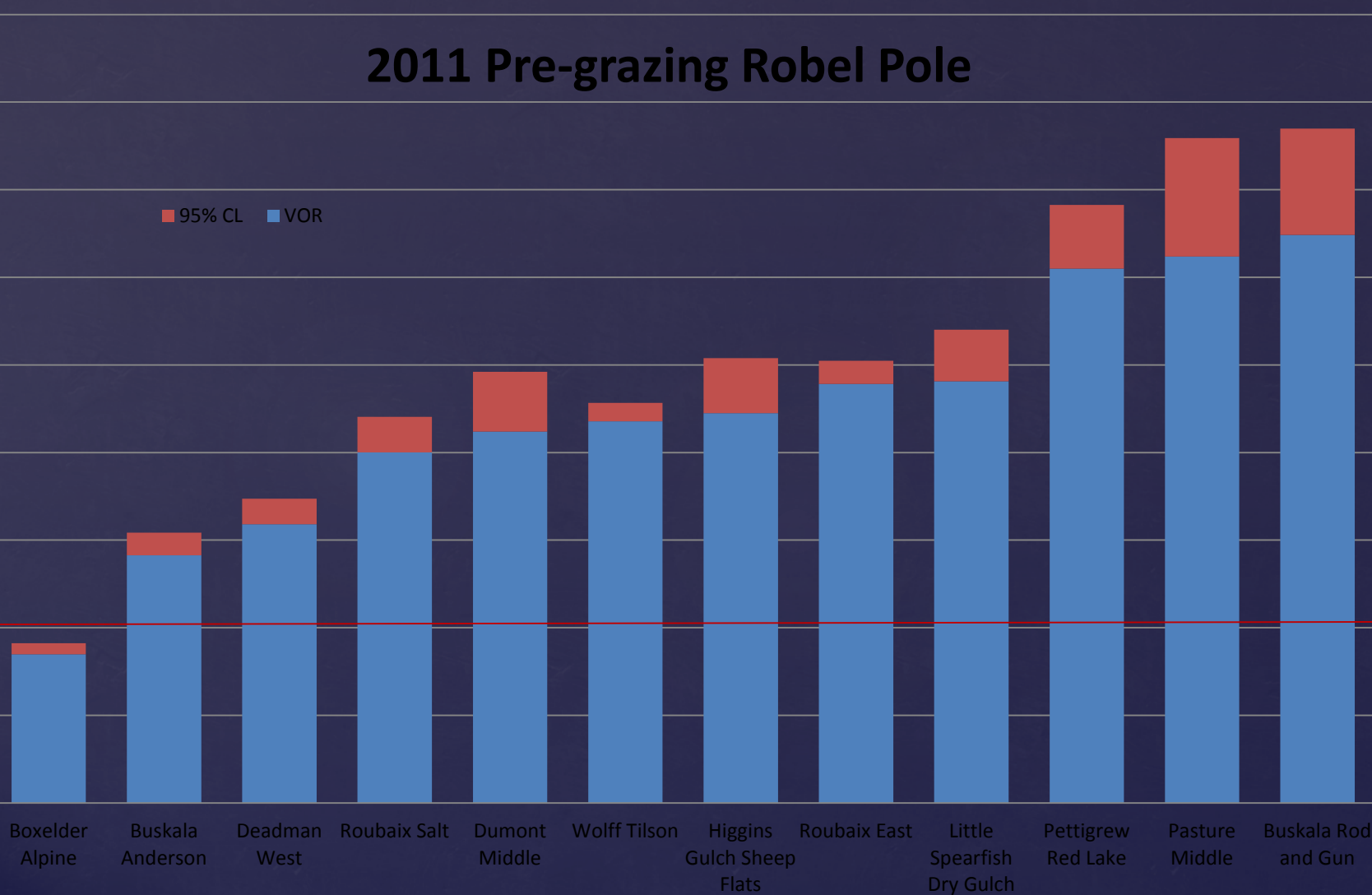
2011 Northern Black Hills Robel Pole Pasture Summary



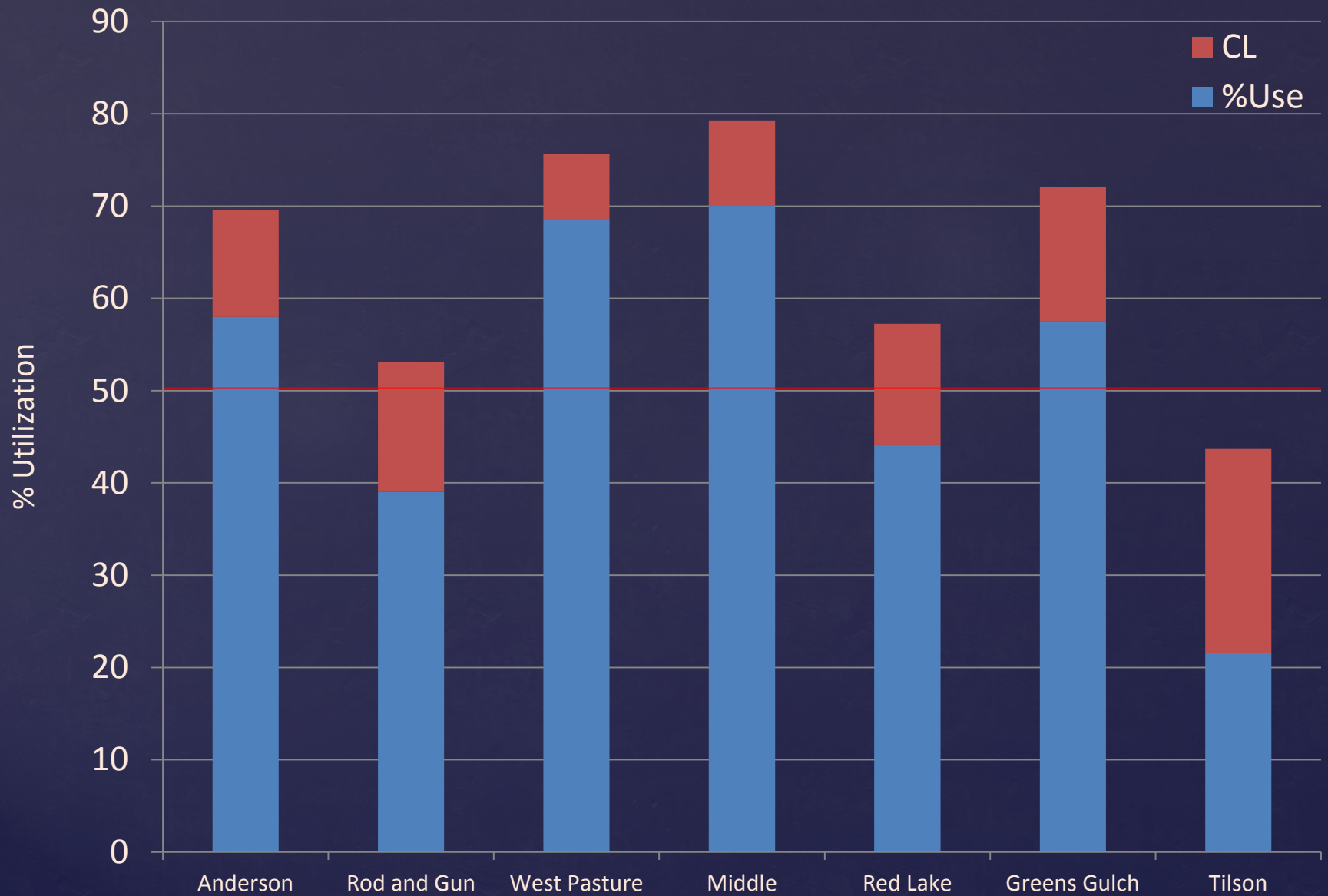


2011 Pre-grazing Robel Pole

95% CL VOR

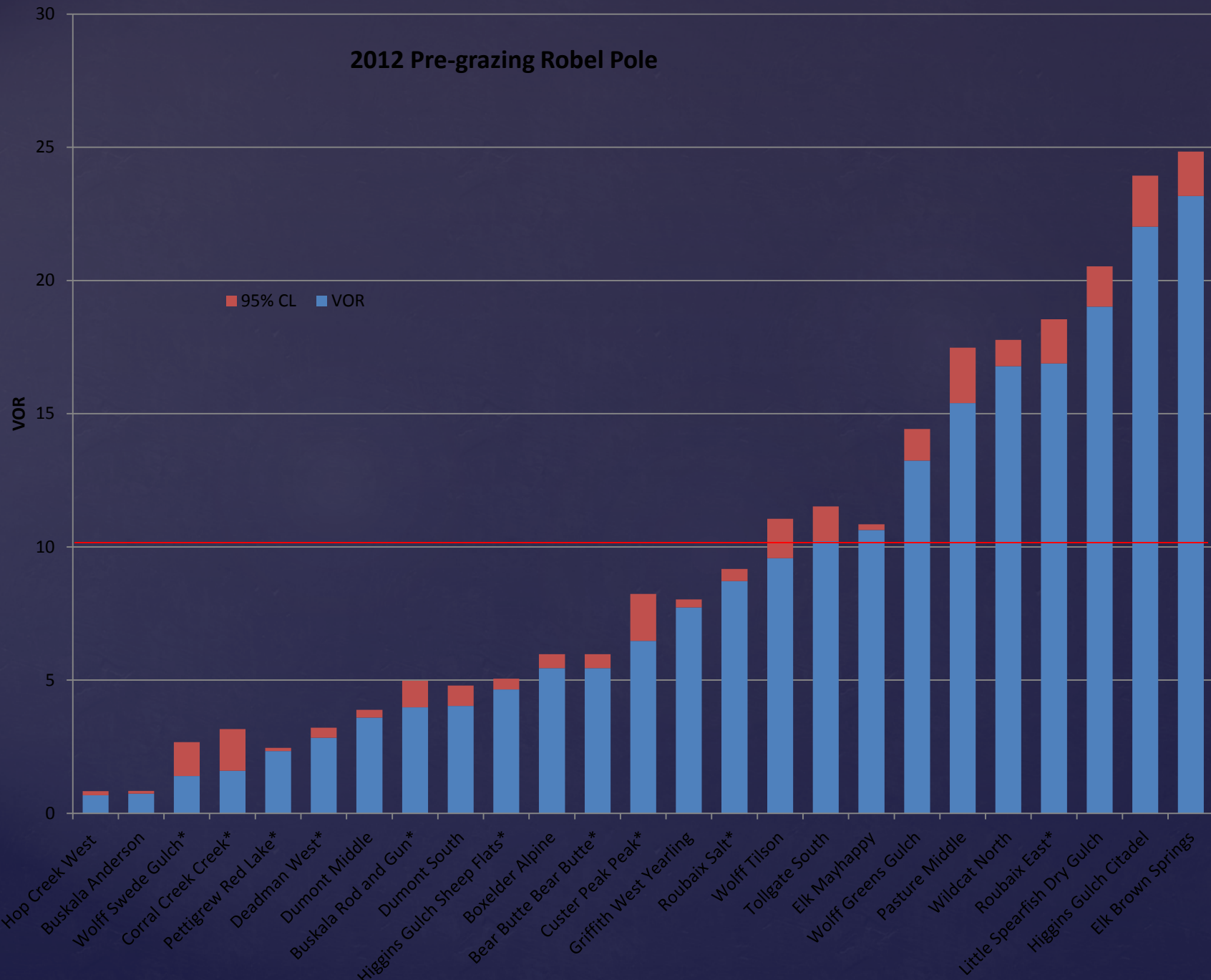


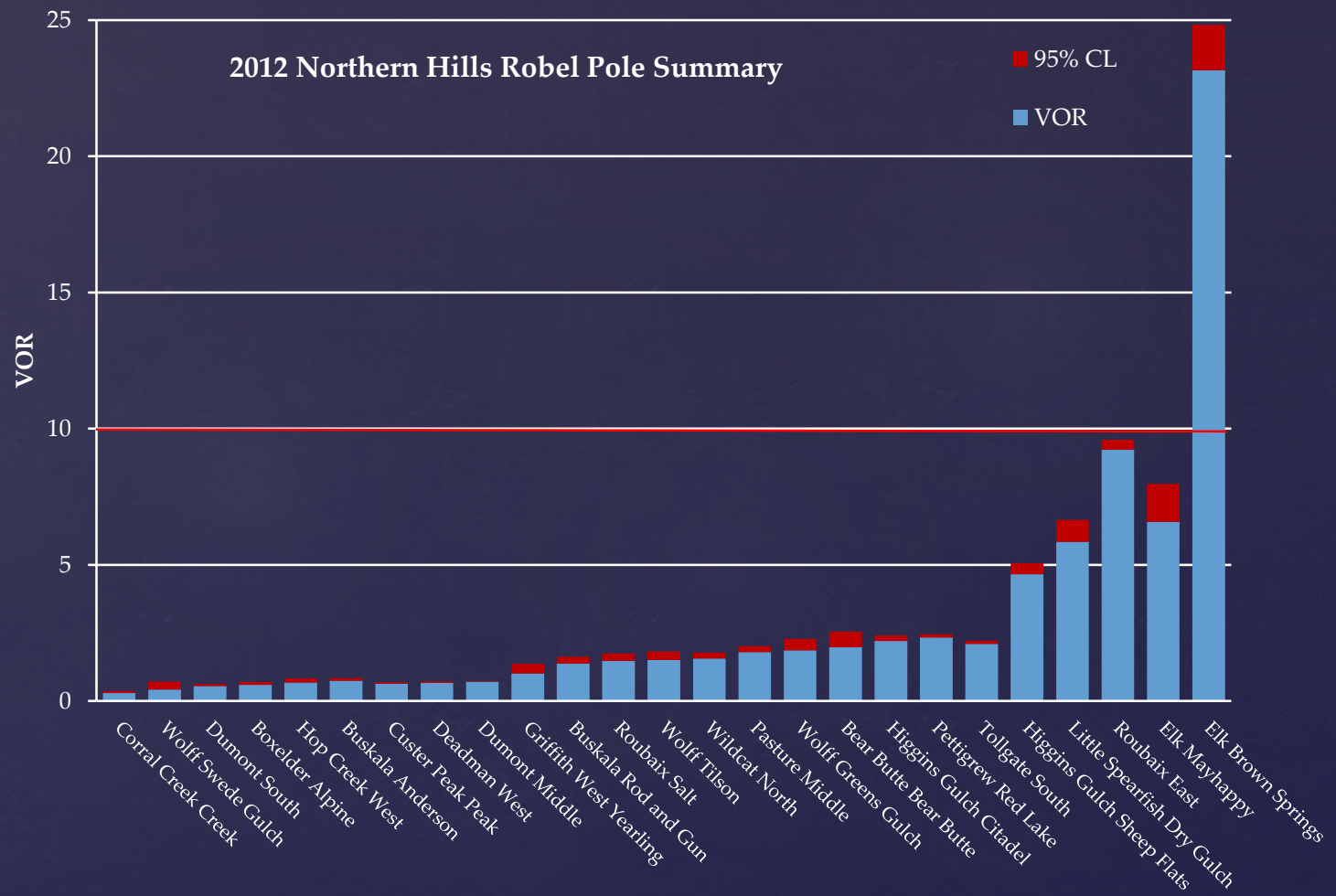
2011 Forage Utilization by Direct Measurement





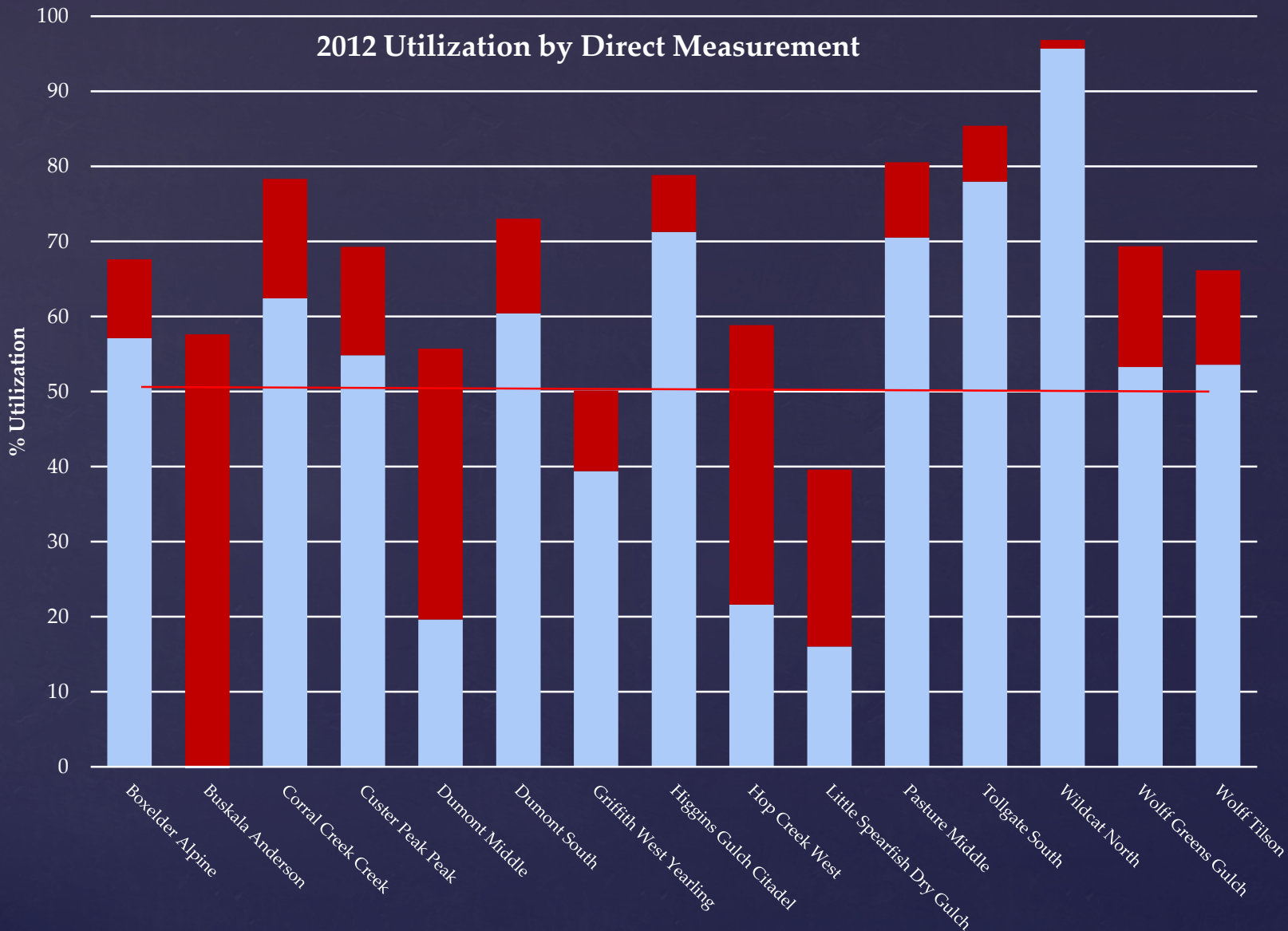
2012 Pre-grazing Robel Pole







2012 Utilization by Direct Measurement





Graminoid Composition Northern Black Hills 1978

Kentucky bluegrass*	timber oatgrass	littleseed ricegrass	inland bluegrass	red top*	carex	crested wheatgrass*	smooth brome*	Fendler's bluegrass	timothy *
14.4	5.1	2.4	1.8	1.0	0.8	0.7	0.5	0.2	0.2

*introduced species

Native	Introduced
10.2	16.8

Uresk, D. W. and W. Paintner. 1985. Cattle diets in a ponderosa pine forest in the Northern Black Hills. *J. Range Mgt.* 38(5):440-442.



Conclusions

Managing annual forage use by maintaining a constant residual results in more conservative management than managing by percent utilization.

Indirect methods are much more efficient than direct measurement by clipping pre- and post-grazing.

The Robel pole produces more precise measurements than clipping and unlike the ocular method is unbiased.

It is likely that inadequate monitoring has contributed to undesirable changes in plant communities and will continue to do so in the future.

Take action!

Write a letter to the editor of your local newspaper, your congressional delegation or the supervisor of the Black Hills National Forest demanding that the Black Hills National Forest abide by its own land management plan.

Remember this forest belongs to all the people, not just livestock producers.