5-1-2019

Examining the Capacity of Nebraska Rangelands for Cattle

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AGRICULTURAL ECONOMICS

May 1, 2019

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Cornhusker Economics

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Market Report	Year Ago	4 Wks Ago	4-27-19
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	124.37	*	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	188.56	180.00	183.34
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	149.97	195.00	155.53
Choice Boxed Beef, 600-750 lb. Carcass.	218.64	228.95	233.49
Western Corn Belt Base Hog Price Carcass, Negotiated	58.37	68.24	80.53
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	67.61	74.88	84.19
Slaughter Lambs, wooled and shorn, 135-165 lb. National.	148.82	NA	152.78
National Carcass Lamb Cutout FOB.	374.61	377.78	386.15
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	4.56	4.19	3.65
Corn, No. 2, Yellow **Columbus**, bu.	3.71	3.62	3.44
Soybeans, No. 1, Yellow **Columbus,** bu.	9.61	8.01	7.52
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.94	5.80	5.30
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.78	3.18	3.25
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.		*	*
Alfalfa, Large Rounds, Good Platte Valley, ton.	100.00	112.50	115.00
Grass Hay, Large Rounds, Good Nebraska, ton.	100.00	*	87.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	170.00	161.50	123.50
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	53.50	50.00	45.00

*** No Market**

According to the 2017 United States Department of Agriculture National Agriculture Statistics Service report (USDA-NASS 2017), Nebraska is the number one ranked state in the United States for both cattle on feed and for beef slaughtering capacity. It ranks number two in all cattle and calves while ranking number four in the number of beef cows. Beef production has a $12.1 billion impact annually to the Nebraska economy including $6.5 billion in direct sales (Nebraska Beef Cattle Facts 2016).

Given the above information, a research question was motivated to evaluate the forage production of Nebraska's perennial grazing land systems and its potential to increase cow/calf production in Nebraska. Until now, this type of research to perform a gap analysis of the forage supply and demand from perennial grazing lands on a statewide basis had not been conducted.

The 2012 Census of Agriculture (USDA-NASS 2014) provided the cattle numbers on a county-by-county basis for this study. An assumption was made that only beef cattle were grazing the perennial grasslands in each county. Replacement heifers were assumed equal to 20% of the beef cow numbers with 80% expected to get bred as yearlings representing a 16% replacement rate. The number of bulls were assumed equal to 4% of the beef cow numbers representing a 1 to 25 bull to cow ratio. The number of backgrounding calves (stockers) utilizing grazing resources can then be calculated with the following formula.

Stockers = Other Cattle – Bulls – Cattle on Feed – Replacement Heifer Calves - Replacement Heifer Yearlings

To analyze supply and demand, the state of Nebraska was separated into eight regions to account for different grazing practices throughout the state (Figure 1). Nebraska Extension educators were interviewed to determine the most common practices in each region in regard to the months each year that cattle are on perennial grass pasture and to determine an assumption on the whole state in regard to the average size of the different types of cattle during the different times that they are grazing.

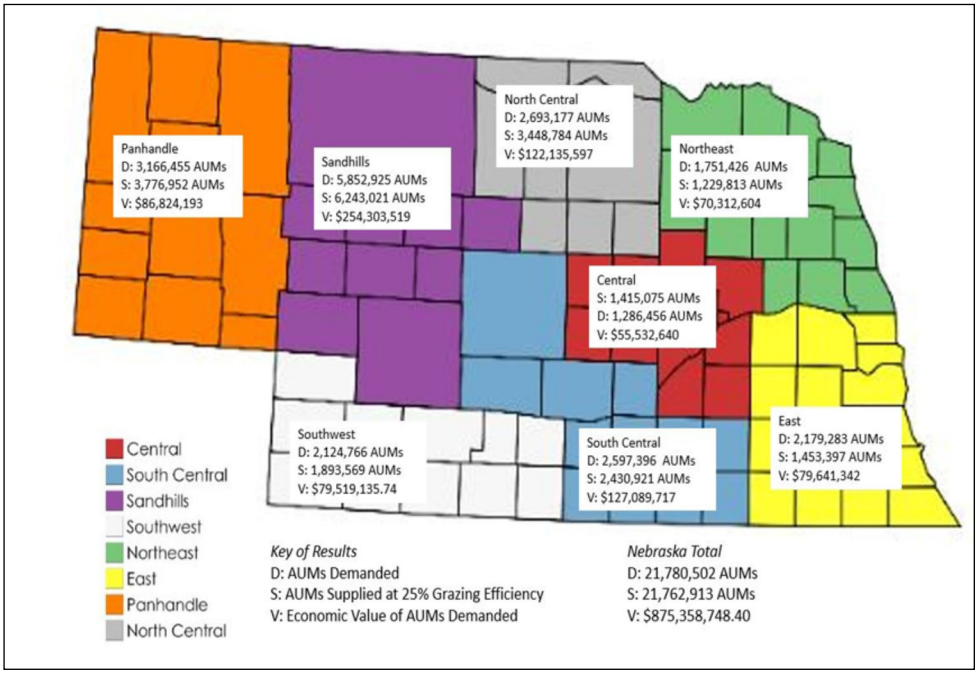

Figure 1: *Regions with AUMs of Forage Supplied and Demanded and Economic Value*

Working with the USDA Natural Resource Conservation Service (NRCS), a GIS mapping system was used to estimate the potential perennial forage production in each county based on the most productive plant community best adapted to each ecological site. Three different perennial forage harvest efficiencies were considered: 25%, 30% and 40%. Harvest efficiency refers to the percentage of total forage production that is consumed by the grazing animal; harvest efficiency is affected by the grazing practices the producer is using. For example, when using the take-half, leave-half principle, 50% of the forage is left, 25% is consumed by the grazing livestock, and 25% is trampled, laid on, and consumed by insects or other animals (Redfearn and Bidwell 2017). This results in a 25% harvest efficiency. The 30% and 40% harvest efficiencies could result from improved grazing distribution by using such management practices as fencing and livestock water development, fencing along ecological site boundaries and increased grazing pressure by implementation of management-intensive grazing systems.

Figure 1 shows the AUMs supplied annually by perennial grazing lands in each region under the assumption of 25% harvest efficiency and average precipitation conditions. The most productive plant community represents the potential for each ecological site and the potential for each region to produce forage from perennial grazing lands. Of course, this assumption provides a liberal estimate of AUM supply (carrying capacity) for this analysis. For example, in eastern Nebraska a majority of pasture acres are predominantly smooth bromegrass and Kentucky bluegrass, which is less productive than the most productive plant community for most eastern Nebraska soil map units.

The results indicate that, as a whole, the state of Nebraska was operating at about 100% of carrying capacity if we assume 25% harvest efficiency. The central, east, southwest, northeast, and south-central regions were above their carrying capacity while the Panhandle, Sandhills, and north central regions were below their carrying capacity (Table 1). Some of these regional differences can be explained by animal movements during the production year. For example, cattle from the southwest, central, and northeast regions commonly are transported into the Panhandle, Sandhills, and north-central regions to graze during the summer but are returned to their home region in the fall/early winter. Although the cattle spend much of the year outside their home region, they are counted as being in their home region for the entire year. These grazing season movements were even more apparent when this data was analyzed at the county level and helped prompt the shift to a regional analysis for the state that coincided with identifying differences in the most common grazing practices.

In the far-right column of Table 1, the harvest efficiency for each region and the state under the assumption of 100% capacity is calculated. These numbers ranged from 20% in the north-central region to 37% in the east with a statewide harvest efficiency of 25%. Using regional grazing rates on a per AUM basis, an estimated value of the AUMs demanded by the 2012 Nebraska cattle inventory is $875 million (in 2017 dollars). A move from 25% harvest efficiency to 30% harvest efficiency on a statewide basis represents a potential 20% increase in carrying capacity. Matched with an equivalent increase in cattle demand for that capacity, this

Table 1: Results Comparing Nebraska Grazing Demand to Supply

Region	25% Harvest Efficiency	30% Harvest Efficiency	40% Harvest Efficiency	Harvest Efficiency Assuming 100% Capacity
	%	%	%	%
Central	110	92	69	28
East	150	125	93	37
Southwest	112	93	70	28
Panhandle	84	70	52	21
Northeast	142	119	89	36
South Central	107	89	67	27
North Central	78	65	49	20
Sandhills	94	78	59	23
Nebraska	100	83	63	25

could mean a $175 million direct impact on the state in annual use of perennial grasslands. There is still a lot to be learned from these results. The next stages of this research will include focus group meetings in each region to examine the potential to increase cow/calf production from perennial grasslands and the profit potential associated with it.

This article is a summary of:

Cumming, K., Parsons, J., Schacht, W., and Baskerville, B. (2019). Examining the Capacity of Nebraska Rangelands for Cattle Production. *Western Economics Forum*, 17 (1):46-61.

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