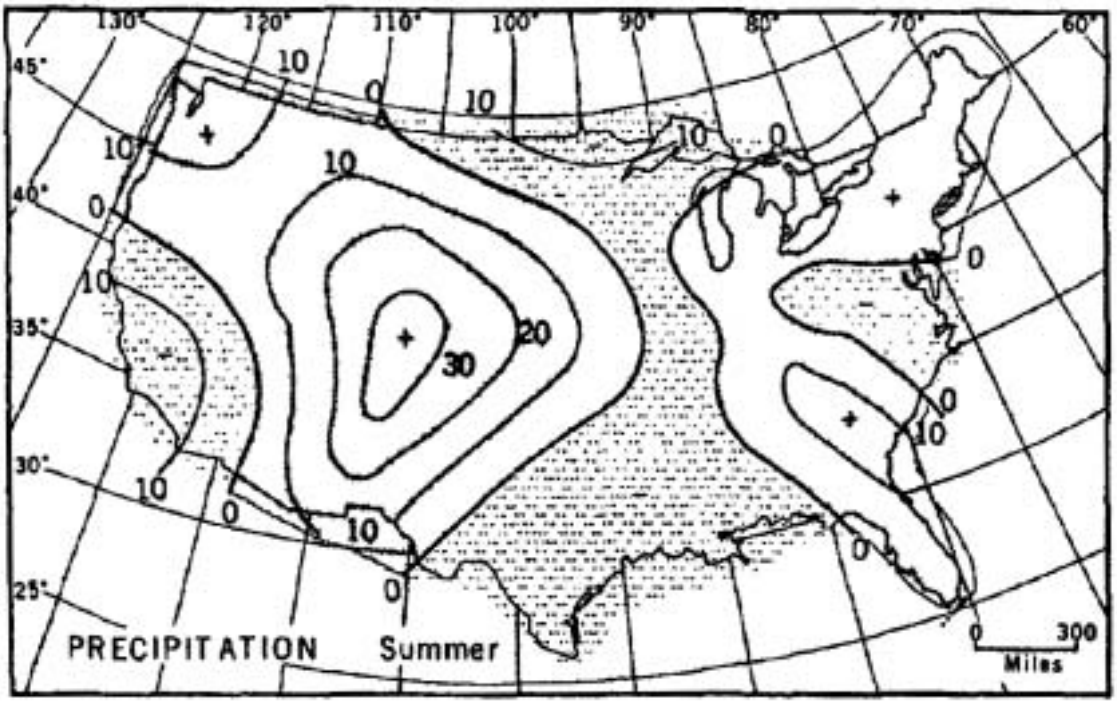
Oklahoma Archeology

Journal of the
Oklahoma Anthropological Society



Difference in precipitation between the 1850-1869 period and the 1931-1960 period.
From "Climate Change and Bison Range Conditions on the 19th Century Great Plains", this issue.

Also in this issue:
Fall Surveys at Lake Murray
Radiocarbon Dates from Bryson-Paddock
Society Spotlight on KC Kraft
Rock Art from Seth Hawkins

Winter 2004
Volume 52, Number 4

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VOLUME 52, NUMBER 4

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FROM THE EDITORS:

We continue to have a shortage of articles for the 2005 Journal year. Whether it's a major article, an interesting find or a book review (book reviewers, please send in your reviews!), we have a place for it in the 2005 Journal.

Climate Change and Bison Range Conditions on the 19th Century Great Plains

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The Measured Rainfall Change

As settlers moved west across the new nation's vast western stretches in the early and middle Nineteenth Century, they were accompanied by the expansion of a network of Army posts. Most of these had a surgeon attached, and one of the duties of the Army Surgeon was to maintain a weather record. Not only was it known that disease was related to weather (malaria, cholera, etc) that affected an army's efficiency, but the Doctrine of Manifest Destiny required a knowledge of how the new lands might be used.

This network of observing stations led Alexander von Humboldt to comment in a talk before the Russian Academy of Science in 1848 that Russia "..ought to establish a network of weather observatories across this great country of yours, like the Americans have." (Blodget 1857). Soviet sources sometimes omitted the last part of this quotation (Bryson 1966).

Wahl and Lawson (1970) utilized the data from this network along with other old records such as those in Blodget to map the difference between the rainfall and temperature of the 1850-1869 period and the 1931-1960 normals. A typical map of the difference, which they mapped by season, is given here as Figure 1. The region of the plains bison has and had mostly summer (July-August) precipitation, so the map for that season is shown. However, the maps for spring (April-June) and early fall (September-October) look similar but do not have the wet area of the plains extending as far south. In winter the extra wetness of the early period is larger and extends farther to the northeast.

Figure 1 also shows that the extra precipitation of the summer extends northwestward to include the Pacific Northwest. This is also true in spring and early fall. Such a pattern is especially significant to the maturation and nutrient value of the C-4 grasses. Wahl and Lawson point out that the end of this moist episode occurred rather abruptly in the 1880s. Our examination of the evidence almost pins down the change to 1883 plus or minus a year or two.

Since the middle of the Nineteenth Century was within the "Little Ice Age", it is appropriate to note that the latest Pleistocene was also wet in most of this same area except for the Cascade and Coast Range section of the Pacific Northwest. This is to be expected because the climatic effect of the Cordilleran ice sheet was absent during the "Little Ice Age" (Stenger and Bryson, 2003).

The climatic maps of the Wahl and Lawson paper should be of great interest to students of the Oregon Trail for they also include temperature maps that show some of the hazards of the Great Basin portion of the Trail.

Impact on the Bison Range

It is commonly said that in the middle of the Nineteenth Century the Great Plains were black with the millions of bison that occupied them. In turn, there are numerous accounts of stirrup-high grass and the very existence of the Llano Estacado attest the lush character of the landscape at the time. What then would be the effect of a rapid 20-30% change in precipitation on the sustenance of the bison herds circa 1880?

Assuming that the carrying capacity of the range for bison is at least proportional to the carrying capacity for cattle, we can make a quantitative estimate of the impact of the late Nineteenth Century rapid climatic change on the bison herds. Fortunately appropriate information is readily available for a period before the advent of extensive modification of the range in the Yearbook of Agriculture for 1941. Figure 2 is constructed from data in the volume (Chapline and Cooperrider 1941).

It is clear from the use of Figures 1 and 2 together that the bison herds were in severe straits by the mid-1880s (Koucky, 1983). The beginning of the catastrophe seems to have come with the severe drought in 1872–1874 in Kansas and its severe impact on the herds (Shaw, 1995).

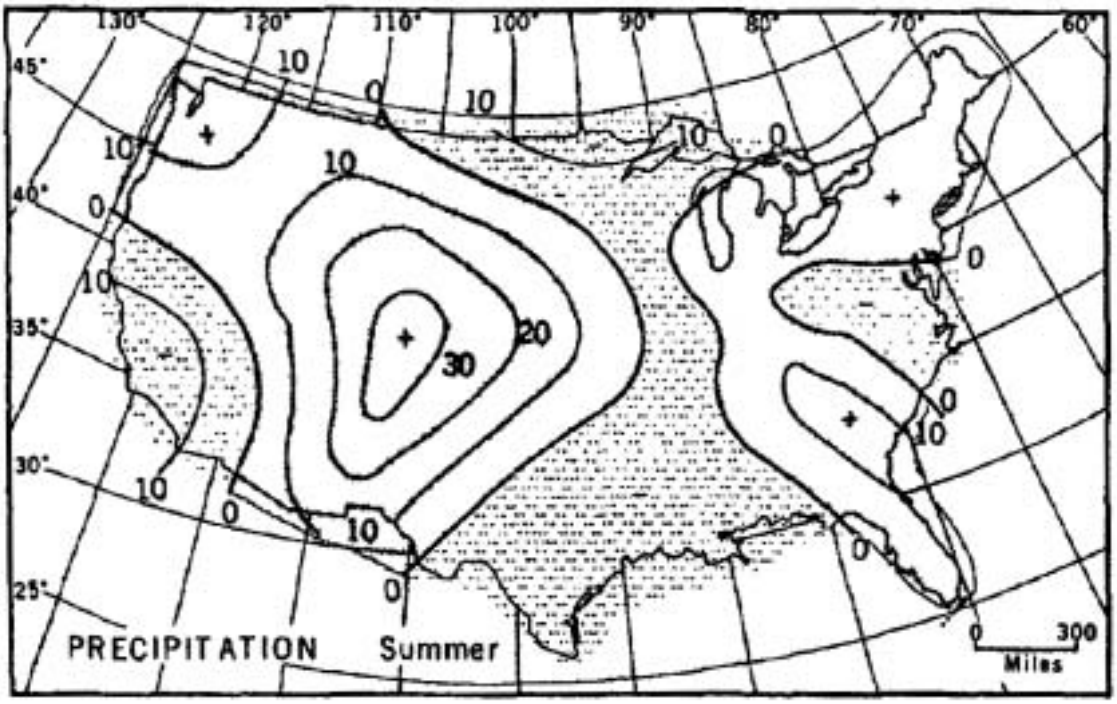

Figure 1. Observed difference in precipitation between the 1850-1869 period and the 1931-1960 period according to Wahl and Lawson (1970).

Consider a portion of the plains with a precipitation of 20 inches per year (about 500 mm) in good condition. Figure 2 suggests that that region could support a number of bison proportional to about 25 head of cattle. With a rapid decrease of 25 percent in precipitation, the carrying capacity for cattle would drop to less than 7 for the range would certainly be in average or poor condition. The change in climate occurring over a shorter period of time than the life span of the bison would mean that the range would be in poor condition and the numbers of grazers would be more than 70% more than appropriate for the climate.

Conclusion

There seems to be but one simple conclusion that can be drawn from these facts. The vast bison herds that occupied the western plains were in deep trouble because of climatic change even without the arrival of the game hunters. These hunters merely applied *the coup de grace.*

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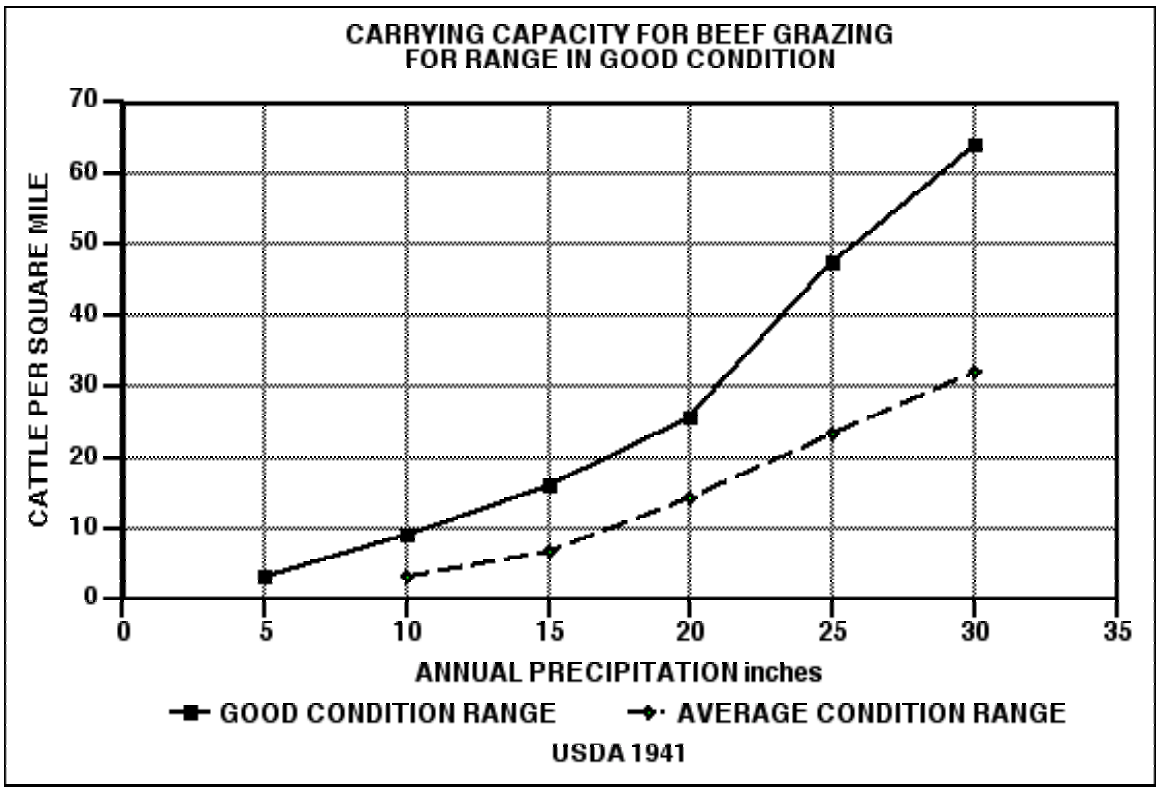

Figure 2. Range land carrying capacity for beef according to USDA. We assume that the carrying capacity for bison is proportional. McHugh (1972) estimated similar numbers for *B. bison*.

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Dalton Points from Washita River

This summer, Robert Hartley and Sarah Coats report finding these two Dalton points on a gravel bar in the Washita River near Dougherty, Oklahoma. The darker point is a Permian chert. It is 8.1 cm long, 2.8 cm wide, and 7.75 mm thick. The stem is ground for 2.4 cm on the right side and 2.6 cm on the left. The basal concavity is 8.2 mm. The second point is an unidentified chert. It is 7.37 cm long, 2.47 cm wide, and 7.2 mm thick. The stem is ground for 2.9 cm on the right and 2.6 cm on the left. The basal concavity is 4.18 mm.