

Big Game Meat Consumption in Utah and Its Relation to Consumption of Meat From Commercial Livestock

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In Utah, as in most of the West, hunting big game animals is a very popular sport. In terms of the total number of hunters in relation to total population and in terms of percent of successful hunters, Utah is considered to have the most deer hunters and the best deer hunting in the United States (Stoddart and Rasmussen, 1945). The Utah State Fish and Game Commission (1955) has estimated that during the 1954 hunting season there were in Utah 123,231 people hunting mule deer (*Odocoileus hemionus*), 1,350 people hunting elk (*Cervus canadensis*), and 75 people hunting antelope (*Antilocapra americana*). Thus a total of about 124,656¹ big game hunters spent various amounts of time and money hunting in Utah in 1954. An average of 75.8 percent of the deer hunters were successful, and elk and antelope hunters were 63.7 per cent and 85 percent successful respectively. It may be assumed that an appreciable amount of meat from big game animals reaches the dinner tables of Utah citizens. Just how much edible meat from big game animals is consumed in Utah? What is the relationship between big game consumption and the consumption of meat from domestic livestock? This study is an attempt to answer these questions.

¹ Due to persons hunting on special permits and those hunting more than one species of big game, this figure contains some duplication and is an over-estimate.

Methods

Live Weights of Harvested Animals

In making estimates of the live weights of big game animals killed in Utah and resulting per capita consumption of big game meats, figures for elk and deer only have been taken into consideration. Utah has no mountain goats (*Oreamnos americanus*), its few big-horn sheep (*Ovis canadensis*) are not legally hunted, and the harvest of antelope is so small (64 animals in 1954) that, for the purposes of this study, the amount of antelope meat consumed can be considered negligible.

The total numbers of elk and deer harvested in the State of Utah

from 1939 to 1954 were obtained from statistics published by the Utah State Fish and Game Commission (1952, 1954, 1955). Live weights of harvested animals were estimated by sex class and totaled for species, and a grand total obtained for the live weights of both elk and deer for each year (Table 1). Live weights were computed by multiplying the number of animals harvested in each sex class by a value selected to represent the average live weight in pounds of animals in that sex class. Buck deer were given a value of 170 pounds; does and fawns, 100 pounds; bull elk, 800 pounds (Wing, 1951); and cows and calves, 500 pounds (Wing, 1951). The factor of 100 pounds used in computing live weights of harvested does and fawns is an attempt to compromise among various estimates and allow for the effect of killing fawns.

Although elk average much heavier weights per animal than deer, they actually contributed a much smaller proportion of the total live weight of game harvested each year. This is due to the much smaller number of elk harvested from Utah's limited elk herds.

Table 1. Live weight harvest and estimated annual per capita consumption of deer and elk in Utah from 1939 to 1954.

Year	Total live weight of deer and elk harvest	Edible meat of deer and elk harvest	Human population of Utah	Per capita consumption of deer and elk
	lbs.	lbs.	thousands	lbs./capita
1939	6,197,440	3,450,196	543	6
1940	7,216,500	4,017,519	550	7
1941	7,919,700	4,416,830	557	8
1942	9,428,690	5,249,073	578	9
1943	8,752,300	4,872,519	634	8
1944	8,311,410	4,726,070	606	8
1945	7,970,120	4,437,069	617	7
1946	8,808,900	4,904,029	638	8
1947	10,050,200	5,595,077	636	9
1948	11,122,420	6,191,996	653	9
1949	9,695,520	5,397,622	671	8
1950	11,760,930	6,547,462	691	10
1951	16,273,330	9,059,574	706	13
1952	14,507,920	8,076,748	737	11
1953	14,932,540	8,313,143	750	11
1954	16,795,900	9,350,496	765*	12

* 1954 population estimated by author; other data from U. S. Dept. of Commerce, Bureau of the Census.

Yield of Edible Meat

The live weights of combined deer and elk harvest were used as a basis for estimating the weight of edible meat derived from the big game harvest and the per capita consumption of these meats in Utah (Table 1). Field-dressed weights were computed from live weights by multiplying by the factor of 0.79 (Wing, 1951). Meat-carass weights were computed by multiplying field-dressed weights by 0.81 (Whitaker, 1939). Weights of edible meat (meat-carass weight minus inedible scraps and meat spoiled by gunshot, bruising and general careless handling) were computed by using the factor $0.87 \times$ meat-carass weights (Whitaker, 1939). Thus the proportion of edible meat is 56 percent of the live weight of mule deer or elk (based on the factors 87 percent of 81 percent of 79 percent).

Utah's Per Capita Consumption

Human population of the State of Utah (column 4, Table 1) was taken from publications by the U. S. Department of Commerce, Bureau of the Census (1946, 1950, 1954) publications. 1954 population is an estimate by the author.

Estimated per-capita consumption of elk and deer in Utah from 1939 to 1954 inclusive was computed by dividing the total weight of edible meat by the human population.

Big Game in Utah's Meat Diet

Information concerning per capita consumption of meats from domestic livestock in Utah being unavailable, national per-capita consumption of beef, pork, veal, and lamb and mutton from 1939 to 1952 inclusive is used as a basis of comparison. These figures are taken from the U. S. Department of Commerce, Bureau of the Census (1946, 1954). It is assumed that national consumption figures are fairly representative of and applicable to the population of Utah.

The effect of consumption of big game meats upon purchase and

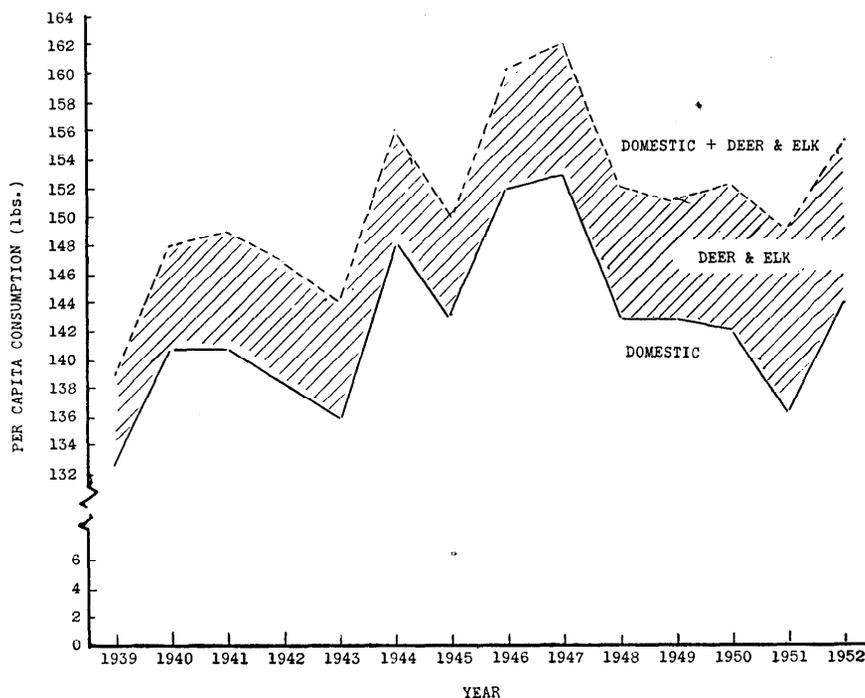


FIGURE 1. Elk and deer meat as an addition to the per capita meat diet in Utah from 1939 to 1952. *Domestic* represents per capita consumption in the U. S. of pork, beef, veal and lamb and mutton; *deer and elk* represent per capita consumption in Utah of meat from deer and elk.

consumption of domestic meats varies among families. In some cases, deer and elk meats replace domestic meats in the home; in other cases, big game meats serve as an addition to the usual diet of commercial meats. Most commonly, big game meats are alternate to domestic meats in the average Utah home and reduce the purchase of meats from domestic livestock. This is especially true among families of middle and lower income brackets. A reduction in harvest of big game meats would not necessarily bring about a proportionate increase in purchase of domestic meats. Figure 1 shows the curve of national per-capita consumption of domestic meats (pork, beef, veal, lamb and mutton) from 1939 to 1952 with the per-capita consumption of deer and elk in Utah added. The area between the curves represents big game meat consumed in part as an addition to and in part as a substitute for domestic meats. The curve of national consumption of meats from domestic livestock is determined by many factors be-

yond the scope of this study. Dowell and Bjorka (1941) list the following as some of the most important determinants of per-capita meat consumption: variations in income; price of meat; family size, age composition, and occupational composition; race; and religion.

The per-capita consumption curve for deer and elk in Utah is compared with individual curves for pork, beef, veal, and lamb and mutton in Figure 2. The curves for lamb and mutton, veal, and deer and elk are relatively stable when compared with those for pork and beef. With the exception of 1939 deer and elk consumption has equaled or exceeded that of lamb and mutton. Consumption of big game has exceeded that of veal since 1949. Thus it is seen that meats from big game in Utah contribute an appreciable amount to the meat diet.

Factors Affecting Consumption of Big Game

Consumption of big game is determined by the numbers of elk

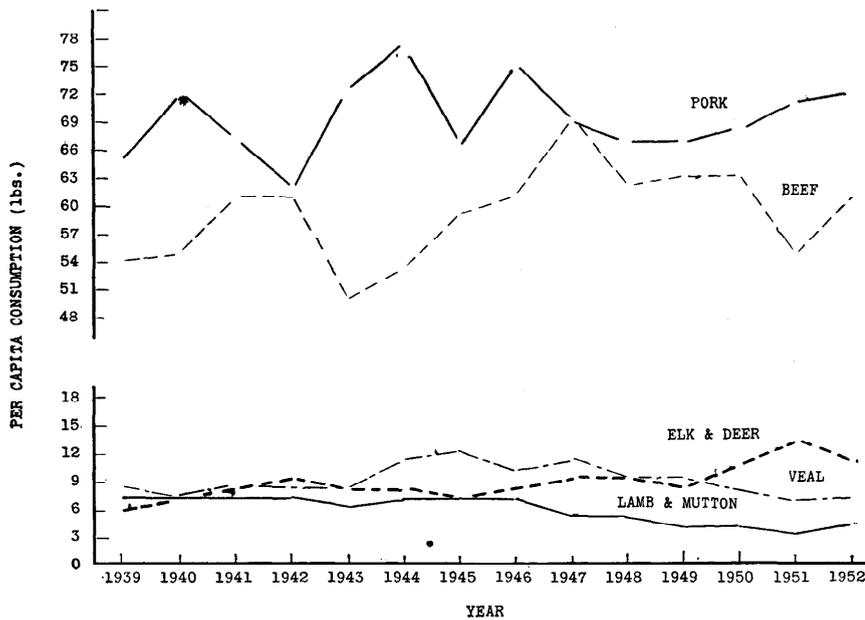


FIGURE 2. Per capita consumption of elk and deer in Utah compared with per capita consumption of meat from domestic livestock in the United States.

and deer harvested and the human population of the state. Between 1939 and 1954 the population of the state increased by less than half while the number of animals increased almost three times; consumption of big game doubled. Except for fluctuations during World War II the population of Utah has had a rather uniform upward trend.

Size of elk and deer harvest are determined by: (1) the number of hunters and (2) the percent hunter success. These are affected by factors such as the weather, the length of the seasons, and the policies of the State Fish and Game Commission. The state of the general economy undoubtedly exerts an influence. Increasing prosperity since 1939 has made possible more hunting by more people through increased income and leisure. The harvest of elk is limited by the size of Utah's elk herds. Elk range is definitely limited by natural and economic factors. There are many applicants for each elk permit available in Utah. In the future, as Utah's human population grows, deer harvest may also be determined primarily by the amount of range available for producing deer rather than by the

number of people who wish to hunt. Some hunters obtain big game meat at a cost per pound lower than the prevailing price of commercial meats—many pay a very much higher cost per pound. The value of big game meat must be allocated between recreation and the meat as such. Hunters today seldom hunt for the sole purpose of obtaining meat, and it may be assumed that the majority of hunters are seeking recreation primarily and meat secondarily.

Distribution of Meat from Big Game

Per-capita consumption figures do not give a true picture of the actual distribution of a product or commodity among families and individuals.

Some big game animals are harvested and consumed illegally each year. Some of the edible meat may be wasted rather than consumed due to prejudice against the flavor some wild meats have. Some hunters distribute their meat rather widely among friends and relatives—others keep it all for themselves. Some families consume great quantities of big game meat—almost to the exclusion of other meat—while many more families consume no deer or elk at all. The number of big game hunters in

1954 equaled about 16 percent of the state population. Allowing for less than 100 percent hunter success, this means that less than 16 percent of the total population harvested over nine million pounds of edible meat from elk and deer. The extent to which this meat was distributed has not been determined.

Some of the meat harvested in Utah is consumed by residents of other states attracted to Utah by its excellent hunting. In 1948 out-of-state deer hunters totaled 5 percent in Utah; in 1949, 6 percent; in 1950, 8 percent; and in 1951, 4 percent. Many of these hunters took more than a proportionate amount of meat out of the state since they hunted successfully on special hunt permits in addition to regular out-of-state permits. Some of this removal of meat was counterbalanced by big game meat brought into Utah by those residents who hunted in other states.

Probable Future Trends

The consumption of big game meats in Utah is more likely to decrease than increase in importance. Though the harvest of big game may continue at about the present rates—or may even increase a little, the amount of range land suitable and available for production of deer and elk is definitely limited, and the human population of Utah will continue to increase. Over the long-run, per capita consumption will decline, and the proportion of the population harvesting and consuming big game will decline.

Summary

From published statistics of Utah's big game harvest the total live weight harvest of elk and deer was computed for the years 1939 to 1954 inclusive. Total weights of edible meat yielded and the per capita consumption of big game meats were computed. These consumption figures, which varied from 6 pounds per person in 1939 to 13 pounds per person in 1951, were compared with national per capita consumption of beef, pork,

veal, and lamb and mutton from 1939 to 1952 inclusive. Factors affecting the harvest, distribution, and consumption of big game were discussed briefly. It is estimated that, over the long-run, per capita consumption of big game in Utah will decline due to limited game herds and growing human population.

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A STUDY OF PHOTOSENSITIZATION OF CATTLE IN SOUTHEAST TEXAS DURING 1954

Abstract of thesis submitted in partial fulfillment of the requirements for the degree of Master of Science, Department of Range and Forestry, Texas A. and M. College, January, 1955.

During 1954 ranches in certain areas of Texas suffered substantial losses from sporadic outbreaks of photosensitization in cattle, a malady that has been a constant menace in Texas for over 40 years. The present study was a continuation of work initiated in 1952 with emphasis placed on investigating grasses in Southeast Texas as the possible cause of photosensitization.

Four conditions are necessary before manifestations of photosensitization occur: (1) sunlight, (2) animals with light colored or unpigmented skin, (3) grazing of responsible plants that supply the photodynamic principle, and (4) rainfall and a period of rising temperature following an unusually dry period.

In this study climatic conditions were found to be intimately related to the periodicity of the disease. Photosensitization has been observed on many soil

types, ranging from deep highly leached sands, to loams and fine textured alluvials.

Grazing observations combined with plant composition studies were made to determine the diet of animals subject to the disease. Experimental feeding of southern sandbur produced mild preliminary symptoms. A mixture of annual grasses fed in Wharton County gave negative results.

The causative plant or plants were not finally determined, but both observations and reactions obtained from feeding strongly indicate that grasses have a definite role in the outbreaks. In general the ability of the vegetation to produce rejuvenated growth after a period of drouth-induced dormancy appears to be more important than a particular species.

Since pastures with photosensitized cattle were in a relatively low stage of ecological succession, a range improvement program employing correct animal numbers, proper grazing distribution, weed and brush control, and proper season of utilization could be of measurable value in eliminating photosensitization.—FRANK B. STROUD.

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RELATIONSHIP OF CRESTED WHEATGRASS STANDS TO FORAGE PRODUCTION AND SAGEBRUSH RE-ESTABLISHMENT ON BURNED SAGEBRUSH RANGE

Abstract of thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Range Management, Colorado A. and M. College, 1955.

Re-invasion by sagebrush has been quite general on reseeded ranges and has frequently lessened or nullified efforts at range improvements. Knowledge of rates of seeding and row spacings which will produce stands of crested wheatgrass controlling sagebrush re-establishment would aid in range improvement. This study attempted to determine the effects of density and dispersion of crested wheatgrass stands upon forage production and re-establishment of sagebrush.

Data were obtained on the Great Divide Experimental Range in northwestern Colorado from an area in dense sagebrush cleared by controlled burning in 1946 and seeded to crested wheatgrass at rates of 5 and 10 pounds per acre at 6-, 8-, 12- and 16-inch row spacings.

Rates of seeding and row spacings had no significant effect upon numbers and vigor of re-invading

sagebrush, or on basal density and forage production of crested wheatgrass, as determined by observations in 1947, 1949 and 1954. Row spacings had no significant effect upon numbers of crested wheatgrass plants established; however, areas seeded at the 10-pound rate had a significantly higher number of plants in 1947 and 1949. Dispersion of crested wheatgrass plants was generally not affected by rate of seeding.

An economic analysis showed that the 10-pound seeding rate increased the cost of seeding over that of the 5-pound rate by about 50 percent. Under conditions of this study, it appears that it would require 4.5 to 7 years of use to repay the cost of seeding at the 5-pound rate and 6.5 to 10 years to repay costs at the 10-pound rate.

Reseeded stands of crested wheatgrass appeared most susceptible to re-establishment of sagebrush during early life. Once sagebrush is past the seedling stage, crested wheatgrass does not offer sufficient competition to reduce the number of sagebrush plants.—FRANCIS E. NOLL.