

DISTRIBUTION OF BEAVER IN OKLAHOMA

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The relative distribution of beaver was compared to the distribution of impounded potential beaver habitat and the types of depredation they cause were investigated. The population has increased from an estimated 485 beaver restricted to west-central Oklahoma in 1952 to a population of thousands distributed statewide. The reported fur harvest was 1,941 beaver during the 1974-75 trapping season, when the average beaver pelt sold for below ten dollars. The highest density populations were found in areas with the most potential habitat ($P < 0.05$). SCS impoundments did not provide enough habitat to greatly influence the statewide distribution of beaver. Almost every county reported some type of depredation caused by beaver.

INTRODUCTION

When the Washita River Watershed plan was authorized under the Flood Control Act of 1944 (1) beaver (*Castor canadensis*) were absent from many parts of Oklahoma. This Act and Public Law 566 provided for the construction of flood control impoundments in the state. Prior to 1944 the bulk of the beaver population was found in western Oklahoma especially along the Washita and North Canadian rivers (2, 3) and by 1952 the statewide population was still estimated to be only 485 (4). At that time no Soil Conservation Service flood control impoundments were completed.

By 1976, 1,692 floodwater-retarding impoundments had been constructed in Oklahoma by the United States Department of Agriculture, SCS (1). Most of these structures are permanent impoundments and they range in surface area from a few hectares to 887 ha. However, most impoundments are smaller than 35 ha. One result of the construction program has been a substantial increase in beaver habitat in some parts of the state.

Much of this impounded habitat is now occupied by beaver. Oklahoma's beaver population appears to have increased, as evidenced by an increase in depredation complaints reported to the Wildlife Services Division, U. S. Fish and Wildlife Service, and a harvest of 1,941 beaver, as reported in the Oklahoma Fur Season Report for the 1974-75 season. During this season the average beaver pelt sold for below ten dollars. The increase in beaver populations is presumably a result of the construction of lakes and reservoirs, as well as the occupation of previously unoccupied stream habitat.

Surveys were conducted to see if beaver were distributed statewide and determine their relative abundance levels in various areas of the state. Another objective was to determine the types and distribution of depredation problems caused by beaver.

METHODS

Survey questionnaires were sent to each SCS district field office, to rangers of the Oklahoma Department of Wildlife Conservation (ODWC), and to Wildlife Services personnel of the U. S. Fish and Wildlife Service (FWS) in Oklahoma. The questionnaire recipients were asked to rate the beaver population, of the county(ies) where they worked, as rare, common, or abundant. This rating was determined by considering a combination of observations of beaver, beaver cuttings, tracks, lodges and dens, and depredation complaints that involved beaver. The author recognizes that this rating system is subjective and for this reason attempts to determine a relative beaver distribution only, for the counties in the state.

Participants also were asked to indicate what percent of streams, ponds, and lakes in their counties have abundant woody vegetation near the edge. This estimate of woody vegetation available for food and construction materials was used to aid in determining an index to potential beaver habitat. The types of depredation problems that were caused by beaver were also determined from the survey questionnaires.

The survey's objective was to acquire responses from three individuals in each county in the state. However, in a few counties only one or two respondents completed questionnaires and in two counties no questionnaires were returned. The questionnaire responses were pooled by county. A rating of beaver populations and a figure for the percentage of shoreline vegetation was derived for each county. Counties from which only two questionnaire responses were received, and where the respondents did not agree on ratings, were given population and vegetation ratings similar to the majority of the surrounding counties. The two counties from which no questionnaire responses were received were treated in a similar manner. For the 13 counties with conflicting ratings the final population rating was always the same as that reported by one of the respondents.

An index for impounded potential beaver habitat in each county was derived as follows: HI (habitat index) = $(I \times r) \div (A \times 0.001)$ where I = the total area of all impoundments smaller than 364 ha in the county, r = the average percentage of streams, lakes, and ponds bordered by abundant woody vegetation in the county, and A = the area of the county. Information regarding impounded water in the counties was obtained from the Oklahoma Water Resources Board.

Data on potential beaver habitat along streams, and on reservoirs larger than 364 ha surface area, were not included in the estimate of potential beaver habitat. Information about miles of various stream categories in each county is not available. Large reservoirs, arbitrarily defined as those with over 364 surface hectares, have a large surface area to shoreline ratio. Consequently, the surface area of large reservoirs provides a poor measure of the potential beaver habitat they provide. The 364 ha cut-off was chosen because it includes all small ponds and SCS impoundments designed primarily for flood control, but excludes large multi-purpose reservoirs.

The Mann-Whitney U test (5) was used to test the null hypothesis that there is no difference in the amount of impounded potential beaver habitat between counties containing abundant beaver populations and those counties with beaver populations rated as common or rare.

RESULTS AND DISCUSSION

Questionnaire respondents indicate that beaver are now distributed statewide in contrast to their limited distribution of 25 years ago. The respondent's estimates indicate that the highest beaver populations are found in south central and southeastern Oklahoma (Figure 1). The lowest populations are in the northeastern and northwestern counties of the state.

The Mann-Whitney U test rejects the null hypothesis in which indices to impounded potential beaver habitat in areas containing

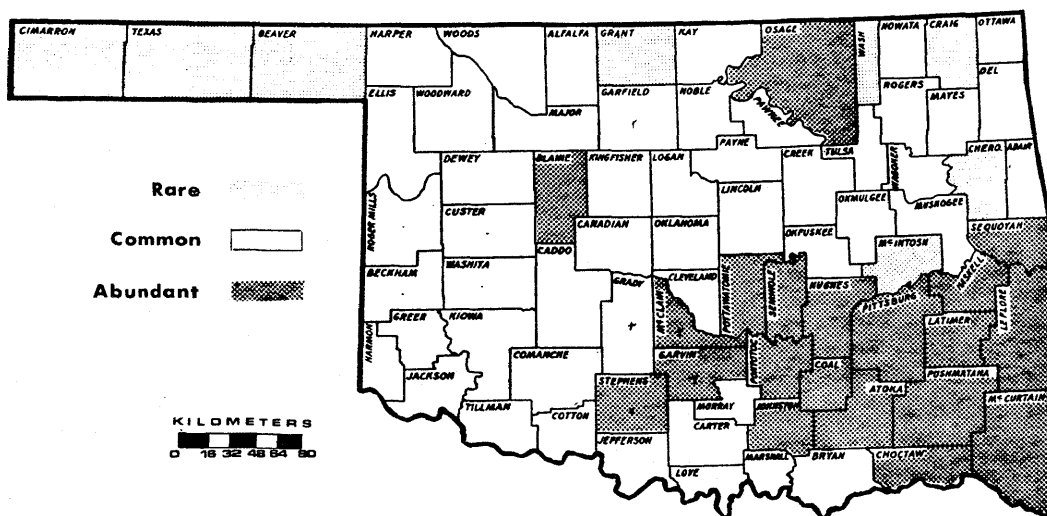


FIGURE 1. Relative population distribution of beaver in Oklahoma.

TABLE 1. *Percentage of counties reporting various kinds of depredation by beaver in areas of Oklahoma.*

Type of depredation	Areas and percentage of counties containing problem									Total
	Pan-handle	West central	South-west	North central	Central	South central	North-east	East central	South-east	
Flooding (cropland, timber, roads, urban areas)	80	100	63	75	92	75	45	56	80	73
Nuisance digging (canals, dens, pond dams)	60	83	63	50	85	92	73	89	80	77
Cutting of grain crops	20	50	25	25	31	0	9	10	20	19
Cutting of trees (shade or ornamental, commercial, orchards, other)	100	100	88	63	100	92	100	89	100	92
Total percentage of counties reporting some kind of problem	100	100	100	75	100	92	100	89	100	

abundant beaver were compared with habitat indices in areas where beaver were rated as common or rare ($P < 0.05$). As would be expected, the highest beaver populations are found in areas with the most potential beaver habitat. The amount of suitable habitat for beaver is probably also influenced by the amount of precipitation received in an area. Annual rainfall is higher in southeastern Oklahoma (6) where beaver are rated as abundant.

It appears, then, that beaver are now distributed statewide in proportion to available habitat. Thus, beaver populations can now be expected to stabilize following the past quarter century of increase.

SCS impoundments made up 5,350 ha or 15 percent of the impounded area of small lakes, in the counties with abundant beaver population ratings. SCS impoundments also provided a total of 15.5 percent (10,865 ha) of the impounded area of small lakes, in the counties where beaver were rated "common", and 1 percent of the area in counties where beaver were rare. The area of SCS impoundments was a much smaller percentage of all impounded water and of all potential beaver habitat in the respective counties.

However, in nine counties SCS impoundments provide more than 30 percent of the impounded water in small lakes and in these counties SCS impoundments presumably are significantly influencing the total number of beaver. These counties are in west central (Beckham, Custer, Roger Mills, and Washita counties), central (Grady and McClain counties), south central (Garvin and Stephens counties), and north central (Garfield) Oklahoma.

Several types of depredation were reported caused by beaver in Oklahoma (Table 1) (7). Cutting of trees was reported in 71 counties (92%) and was the most common depredation complaint. Digging of dens, canals, and into pond dams was reported in 59 counties (77%). Beaver often dig dens into steep pond banks and pond dams, but some of the reported digging of pond dams may be a result of muskrats digging similar dens. Seventy-three counties reported some type of depredation caused by beaver.

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