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ANALYSIS OF ARKANSAS FUR HARVEST RECORDS - 1942-1984: II. SPECIES ACCOUNTS

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ABSTRACT

Fur harvest records were maintained by the Arkansas Game and Fish Commission on the following 16 furbearers: badger, beaver, bobcat, eastern spotted skunk (civet), coyote, gray fox, long-tailed weasel, mink, muskrat, nutria, opossum, raccoon, red fox, red wolf, river otter, and striped skunk. These harvest records were analyzed for each species in terms of mean pelt price and numbers of pelt sold by region (Ozark Mountains, Ouachita Mountains, Gulf Coastal Plain, and Mississippi Delta) per year. Historical or biological influences important in interpreting species accounts are presented.

INTRODUCTION

Furbearer management problems have increased in number, scope, and intensity during the past decade in response to 1) rapidly growing demands for furbearers and their products, 2) enactment of certain endangered species regulations and treaties, 3) a major decline in upland wildlife hunting opportunities, and 4) growing antihunting and antitrapping sentiment (Hubert, 1982). Thus, harvesting management programs, now and in the future, require a greater understanding of the variables which ultimately determine the size of furbearer populations and of subsequent expected harvests (Erickson, 1981, 1982; Hubert, 1982).

Arkansas and other Midsouth states have traditionally used fur harvest data as a primary source of information for estimating the condition of furbearer populations and subsequent management schemes (McArdle, 1979; Tumblison et al., 1981; Erickson, 1982; Hubert, 1982; Heidt et al., 1984). However, in the case of Arkansas, as in many states, fur harvest data still exist in either raw, unsummarized form or is scattered in various unpublished reports and Game and Fish Commission internal memos. Wildlife biologists are thus required to sort out and extract that information needed for management decisions. It is the purpose of this series of papers to summarize and interpret the raw fur harvest data that has been compiled by personnel of the Arkansas Game and Fish Commission since 1942 and present it in a form that can be easily used for further analyses. The present paper summarizes the fur harvest data for each of the sixteen species of Arkansas furbearers harvested since 1942.

METHODS AND MATERIALS

Fur harvest records used in this study were compiled since 1942 by the Arkansas Game and Fish Commission. Mean annual pelt value, total numbers of each species harvested, and regional contribution of each species harvested were available for all but a few years. For purposes of analyses, years with missing data were generally omitted from consideration. For the mean annual pelt values during 1979-80, which were unavailable, a value was extrapolated for each Arkansas species based on relative pelt value in Missouri. No correction factors were applied to the data to correct for out-of-state sales of Arkansas fur. In addition, there is no way to determine how many pelts were actually harvested but not sold (P. Dozier, Chairman, American Fur Resources Institute, pers. comm.). Following the method of Erickson and Sampson (1978), dollar values were uncorrected for inflation.

Table 1. Arkansas fur harvest size (# pelts sold) by decade for each species. Data reflect six seasons in 1940s, nine seasons in 1960s, and four seasons in 1980s; 1950s and 1970s reflect ten full seasons.

Species	1940s	1950s	1960s	1970s	1980s	Total
1. Opossum	1,268,619	516,198	201,148	467,508	211,861	2,665,334
2. Raccoon	498,401	644,266	460,029	635,961	421,472	2,660,129
3. Muskrat	36,671	132,142	183,006	209,089	131,384	692,292
4. Mink	208,235	243,879	85,284	86,679	66,839	690,916
5. Striped Skunk	139,146	54,224	116,101	168,582	2,415	480,468
6. Gray Fox	56,416	11,538	7,345	42,616	20,716	138,631
7. Beaver	0	285	7,535	31,133	23,844	62,797
8. Bobcat	1,144	424	1,363	16,102	7,086	26,119
9. Coyote	0	14	559	14,162	7,467	22,202
10. Spotted Skunk	7,859	3,795	2,843	4,013	702	19,212
11. Red Fox	5,341	2,896	2,639	1,424	0	12,300
12. Nutria	0	0	603	4,599	5,200	10,402
13. River Otter	0	87	1,088	2,266	2,690	6,131
14. Long-tailed Weasel	2,056	984	250	101	43	3,434
15. Red Wolf	79	12	0	0	0	91
16. Badger	0	0	0	1	2	3
Totals	2,223,967	1,610,744	1,069,793	1,684,236	901,721	7,490,461

SPECIES ACCOUNTS

The following listing of species accounts is arranged in descending order of the number of pelts harvested since 1942. The data are organized by harvest size and harvest value per decade (Tables 1 and 2) and per region (Tables 3 and 4).

Virginia Opossum - *Didelphis virginiana*

In terms of the total harvest in Arkansas since 1942, the opossum ranks first. This is misleading, however, due to the fact that the opossum only ranked first during the 1940's, when it accounted for 57% of the total fur harvest. Since the 1940's, raccoon has ranked first in each decade and opossum second. Overall, opossum has accounted for 36% of all furbearers harvested in Arkansas since 1942 (Table 1). Regionally, the Ozark Mountains (35%) have produced the greatest number of opossum, followed by the Mississippi Delta (32%), Gulf Coastal Plain (15%), and Ouachita Mountains (13%). An additional 5% of the harvest listed in Table 3 cannot be assigned to any particular region.

Even though more opossum were trapped in the 1940's, the greatest value of opossum harvests occurred during the 1970's (Table 2), due

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Table 2. Arkansas fur harvest value (\$) per decade for each species. Data reflect six seasons in 1940s, nine seasons in 1960s, and four seasons in 1980s; 1950s and 1970s reflect ten full seasons.

Species	1940s	1950s	1960s	1970s	1980s	Total
1. Raccoon	792,050	459,557	683,769	7,724,535	5,923,753	15,583,664
2. Mink	2,871,972	2,715,572	761,782	1,062,385	963,115	8,374,826
3. Gray Fox	61,635	2,408	9,929	1,260,141	623,035	1,957,148
4. Opossum	441,189	123,715	88,993	1,044,856	251,610	1,950,363
5. Muskrat	53,344	96,325	149,124	738,285	434,878	1,471,956
6. Bobcat	629	180	2,258	657,256	341,157	1,001,480
7. Striped Skunk	103,573	35,741	101,223	583,379	3,694	827,610
8. Beaver	0	806	36,149	215,439	126,798	379,192
9. Coyote	0	14	800	195,301	99,931	296,246
10. River Otter	0	1,070	16,439	59,982	67,632	145,123
11. Red Fox	14,219	1,108	4,425	24,948	0	44,700
12. Spotted Skunk	4,104	1,917	3,570	26,893	2,847	39,331
13. Nutria	0	0	579	8,443	16,106	25,128
14. Long-tailed Weasel	1,184	419	188	59	31	1,881
15. Red Wolf	131	1	0	0	0	132
16. Badger	0	0	0	8	13	21
Total	4,344,030	3,438,833	1,859,228	13,602,110	8,854,600	32,098,801

to the generally high pelt prices during that decade. With respect to regions, the value of opossum harvests followed a similar trend (Table 4).

The fact that opossum has been harvested in extremely large numbers should be of no surprise considering its ubiquitous nature, abundance, high biotic potential, and ease of harvest. Compared to other species of furbearers and the relatively low prices of opossum in the last decade, opossum fur harvest data (based on the number of pelts actually sold) probably reflects a very conservative estimate of the number of animals actually trapped.

Raccoon - *Procyon lotor*

The raccoon is the most important furbearer in Arkansas from both a recreational and economical standpoint. Since the 1940's raccoon have been harvested in greater numbers than any other species. Overall, this species has accounted for 36% of the total state harvest (Table 1). Regionally, the Mississippi Delta has produced the highest number of raccoon (42%), followed by the Gulf Coast Plain (23%), Ozark Mountains (20%), and the Ouachita Mountains (12%). An additional 3% of the harvest listed in Table 3 cannot be assigned to any particular region.

In terms of total value of the harvest (Table 2), raccoon have ranked first (49% of all furbearers harvested). Table 2 also shows raccoon harvests led the state only in the 1970's and 1980's, probably reflecting the relatively high pelt prices for long-haired fur (P. Dozhier, pers. comm.). Regionally, the value of the raccoon harvests followed that of the number of pelts taken (Table 4).

In addition to the fact that raccoons are ubiquitous, abundant, have relatively high reproductive potential, and are easily caught, several other factors contributed to the harvest dynamics of the species. Raccoons are considered a prime species for both sport hunting and trapping (a large number of hunted raccoons are sold). Raccoons have high quality fur and are highly sought by fur dealers, but they only occur in North America. Additionally, attempts to ranch raccoons have been unsuccessful to date, thus supply is restricted to wild populations (P. Dozhier, pers. comm.).

Muskrat - *Ondatra zibethicus*

The muskrat has long been one of the most important furbearers in the Southeastern United States (Deems and Pursely, 1978). The muskrat has traditionally been one of the mainstays of the Arkansas fur trade, ranking third in total number of pelts sold (Table 1). The general trend of muskrat harvests has been of increasing harvest sizes. This is expected, as the major limiting factor on muskrat populations is available habitat. As agricultural practices have changed in Arkansas to include large acreages of rice, particularly in the Mississippi Delta, prime

Table 3. Arkansas fur harvest size (# pelts sold) from 1942-1984 by major physiographic region for each species.

Species	Ozark	Ouachita	G. C. P.	Delta	State
1. Opossum	935,084	340,469	407,572	860,436	2,665,334
2. Raccoon	527,323	317,903	613,288	1,113,064	2,660,129
3. Muskrat	130,079	45,583	7,408	496,080	692,292
4. Mink	93,662	64,188	130,791	357,513	690,916
5. Striped Skunk	151,892	40,161	17,136	259,559	480,468
6. Gray Fox	76,167	17,301	20,772	21,906	138,631
7. Beaver	14,106	11,990	13,574	23,127	62,797
8. Bobcat	7,960	5,552	5,185	7,375	26,119
9. Coyote	8,165	4,121	3,930	5,986	22,202
10. Spotted Skunk	13,909	3,749	400	695	19,212
11. Red Fox	7,600	586	766	2,861	12,300
12. Nutria	383	630	6,037	3,352	10,402
13. River Otter	247	862	3,125	1,897	6,131
14. Long-tailed Weasel	1,432	155	203	1,469	3,434
15. Red Wolf	60	6	8	10	91
16. Badger	2	1	0	0	3
Totals	1,968,071	853,257	1,230,195	3,155,330	7,490,461

muskrat habitat has increased proportionately. Thus, the Mississippi Delta leads in muskrat production (72%), followed by the Ozarks (19%), Ouachitas (7%), and Gulf Coast Plain (1%) (Table 3). It might also be expected that the Gulf Coast Plain, with abundant waterways, should also produce a greater percentage of the total harvest. However, nutria seem to be firmly established in that region (Bailey and Heidt, 1978); some data suggest that nutria may displace muskrat in marginal habitats such as are found in the Gulf Coast Plain (Sealander, 1979).

Regional harvest of muskrat follows the trends evident in the general state harvest (Tables 3 and 4). The 1970's alone accounted for 50% of the total value of muskrat harvested since 1942. This trend seems to be continuing into the 1980's, perhaps reflecting their ease of capture and increased numbers due to the aforementioned changes in agricultural practices. Furthermore, land owners cooperate in muskrat harvesting because the animal is considered a nuisance and does a great deal of damage to rice plants and retention structures.

Mink - *Mustela vison*

Mink has long been the major species used in the fur industry (P. Dozhier, pers. comm.) and until mink ranching became a major industry in the 1950's and 1960's, pelts were primarily obtained from harvested animals. In spite of the millions of pelts harvested annually from commercial mink ranches, mink still represents a major furbearer, ranking fourth in total pelts harvested and second in total value in Arkansas (Tables 1 and 2). Examination of Tables 1 and 2, however, reveals the influence of commercial ranching on the harvest because the 1940's and 1950's account for 66% of the total mink harvested in the state.

Regionally (Table 3), mink are primarily harvested from the Mississippi Delta (52%) and Gulf Coastal Plain (19%). This is not unexpected as mink are primarily semi-aquatic and feed heavily on prey common to these areas (Lowery, 1974). The upland areas of the state (Table 3) contribute less in terms of total percentage (Ozark - 14%, Ouachita - 9%).

Striped Skunk - *Mephitis mephitis*

Until the late 1970's, striped skunk represented one of the major furbearers in Arkansas. Despite a tremendous decline in harvest since 1979, skunk still represents the fifth harvested furbearer, but ranks seventh in value (Tables 1 and 2). Examination of Tables 1 and 2 reveal that because of past strengths in skunk harvest, skunk will probably maintain their overall position in terms of total numbers and value

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Table 4. Arkansas fur harvest value (\$) by major physiographic region for each species.

Species	Ozark	Ouachita	G.C.P.	Delta	Total
1. Raccoon	3,874,840	2,563,243	3,787,077	5,358,504	15,583,664
2. Mink	1,616,463	788,621	1,667,373	4,302,369	8,374,826
3. Gray Fox	1,072,206	381,234	330,747	172,961	1,957,148
4. Opossum	660,488	320,455	323,004	646,416	1,950,363
5. Muskrat	248,171	210,050	14,071	999,664	1,471,956
6. Bobcat	295,805	263,814	231,888	209,973	1,001,480
7. Striped Skunk	213,191	63,705	15,051	535,663	827,610
8. Beaver	88,992	78,298	72,233	139,669	379,192
9. Coyote	99,691	55,797	55,312	85,446	296,246
10. River Otter	6,247	23,825	72,116	42,935	145,123
11. Red Fox	28,535	1,850	1,638	12,677	44,700
12. Spotted Skunk	29,486	7,975	826	1,044	39,331
13. Nutria	949	1,716	13,972	8,491	25,128
14. Long-tailed Weasel	801	108	125	847	1,881
15. Red Wolf	98	12	15	7	132
16. Badger	14	7	0	0	21
Totals	8,235,977	4,760,710	6,585,448	12,516,666	32,098,801

throughout the 1980's. In terms of year to year harvest the skunk will probably rank toward the bottom of harvested species for the 1980's.

Two major decreases occurred in Arkansas skunk harvest (Table 1): one during the 1950's and a second, major decrease, from 1979 to the present. Historically, the striped skunk was marketed under the label of 'American Sable' and, with passage of "Truth in Labeling" regulations by the United States in 1951, domestic use of the striped skunk decreased dramatically. Because foreign garment makers were not under such laws the demand for striped skunks recovered in the 1960's and 1970's. As foreign countries began to pass laws concerning labeling, demand for skunks has again decreased with concomitant decreases in the value of the fur. In Arkansas, the second decrease, beginning in 1979 (from 33,359 in 1978-79 to 2,468 in 1979-80), was much more dramatic than decreases seen in other parts of the country (e.g. Texas trappers harvested 100,000 skunks in the 1979-80 season; P. Dozhier, *pers. comm.*, 1984). We feel that this major decrease can be correlated to a skunk rabies epizootic in Arkansas, which reached its peak in 1979 (Heidt et al., 1982; Heidt, 1982). During 1979 there were numerous published warnings concerning the epizootic, both to the public and specifically to Arkansas trappers. We thus feel that trappers began to cease pelting skunks due to rabies and have continued this practice because of concerns about rabies and low prices.

Regionally (Table 3), the Mississippi Delta has accounted for 54% of the total harvest size, followed by the Ozark Mountains (32%), Ouachita Mountains (8%), and the Gulf Coastal Plain (4%). At present, there is no explanation for this unequal distribution.

Gray Fox - *Urocyon cinereoargenteus*

Detailed analyses of gray fox fur harvests have been reported previously (Heidt and Peck, 1983; Heidt et al., 1984). Gray fox ranks sixth in numbers of total pelts harvested and third in value (Tables 1 and 2). The importance of the gray fox as an Arkansas furbearer can be accounted for by harvests during the 1970's when 29% of the total gray fox pelts were sold, representing 64% of the total value of gray fox (Table 2). Regionally (Table 3), the Ozark Mountains have produced 55%, followed by the Mississippi Delta (16%), Gulf Coastal Plain (15%), and Ouachita Mountains (13%). The similarity of the total harvest in the last three regions is notable.

Beaver - *Castor canadensis*

Historically, beavers have been the mainstay of the fur industry. In Arkansas, partly because of unregulated trapping pressure, they essentially became extirpated early in this century (Holder, 1951). Beginning in 1926, efforts were begun by the Arkansas Game and Fish Com-

mission to reintroduce beaver into the state. Efforts to restock beavers were largely unsuccessful until the mid-1940's when some populations seemed to begin expanding their ranges (Holder, 1951). From these early stocking efforts the beaver population has rapidly expanded until it now is accorded nuisance status by the Arkansas Game and Fish Commission and is the only furbearer that can be trapped throughout the year.

Harvesting of beaver in Arkansas since 1942 (Table 1) reflects their re-establishment: no animals were trapped in the 1940's, 1% of the total beaver harvest occurred during the 1950's, 11% occurred in the 1960's, 50% occurred in the 1970's, and 38% occurred in the four seasons of the 1980's. Regionally, the Mississippi Delta accounted for 37%, the Ozark Mountains 22%, Gulf Coastal Plain 21%, and the Ouachita Mountains 20% (Table 3). The harvest levels of beaver would probably be much higher except for the depressed price in relation to trapper effort to bring the pelt to market. In spite of the low price and the fact that beaver were not trapped in any volume until the 1960's, beaver ranks eighth in terms of total value of Arkansas furbearers (Tables 2 and 4).

Bobcat - *Felis rufus*

Historically, the bobcat in Arkansas was considered a predator with no closed season. In 1968, bobcat (together with the coyote and red wolf) were classified as furbearers, although there was still no closed season. This was modified in 1973, when bobcats could be taken during hunting seasons (October-February). Beginning in 1978 bobcat could only be taken during the regular furbearer season.

The total value and number of bobcat pelts sold has varied considerably during the period from 1942 to the present (Table 1 and 2). However, 89% of the total pelts have been harvested since 1970, reflecting the increased value of bobcat in markets influenced by the international trade in felids (P. Dozhier, *pers. comm.*). Regionally (Table 3), bobcat harvests have been slightly higher in the Ozark Mountains and Mississippi Delta (31% and 28% respectively) and evenly balanced in the Ouachita Mountains and Gulf Coastal Plain (21% and 20% respectively).

Coyote - *Canis latrans*

Coyotes are a species which has only recently expanded its range into Arkansas. It is estimated that the coyote began movement into the state in the late 1940's to early 1950's and was firmly established by the early 1960's (Sealander, 1979). As would be expected, no coyotes were harvested in the 1940's and only 14 in the 1950's. Thus, 98% of the total coyote harvest has been taken in the 1970's and 1980's (Table 1). The coyote ranks ninth in both size and value of the total furbearer harvests (Tables 1 and 2). Regionally, 37% of the coyotes have been harvested in the Ozark Mountains, 27% in the Mississippi Delta, 19% in the Ouachita Mountains, and 17% in the Gulf Coastal Plain (Table 3). Coyotes are generalists and, in Arkansas, are often found associated with chicken producing farms, which may account for the high percent taken in the Ozarks (the center of the poultry industry). A further explanation for higher numbers in the Ozarks may be that this area represents the initial point of invasion by expanding populations of coyotes.

Eastern Spotted Skunk (Civet) - *Spilogale putorius*

Spotted skunks are thought to occur statewide with the possible exception of the eastern-most portion of the Mississippi Delta. They are most common in the upland areas of the Ozarks and Ouachitas where they prefer rocky outcrops and ledges (Sealander, 1979). Ninety-two percent of the spotted skunk harvest (Table 3) has occurred in the mountainous regions of the state (72% Ozark Mountains and 22% Ouachita Mountains). The vast majority of spotted skunks were trapped in the 1940's (41%), with the remainder following the same general trends seen in the striped skunk, possibly for the same reasons (i.e., rabies).

Red Fox - *Vulpes vulpes*

Red foxes have apparently never been extremely numerous in Arkansas. It is a species which generally prefers upland woods and farmlands with meadows and has been most common in the northwestern and northeastern part of the state (Sealander, 1979). The vast majority of

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the red fox harvest was during the 1940's (43%). Since 1975 the species has received protected status by the Arkansas Game and Fish Commission. Of those harvested, most were taken in the Ozark Mountains (62%) and Mississippi Delta (23%).

There has been a great deal of controversy concerning possible competition between the red fox and coyote. Evidence suggests that where the two species are sympatric the coyote will displace the red fox. King (1981), however, conducted a study on competition for winter food between the coyote, red fox, and gray fox in northeastern Arkansas and found little dietary overlap. Because of the low populations of red fox, further research into coyote-red fox interactions is warranted.

Nutria - *Myocastor coypus*

The nutria is another species which has only recently invaded Arkansas. Originally from South America, the nutria was brought into Louisiana in the 1930's for fur ranching. Nutria subsequently escaped or were released and expanded its range northward (Lowery, 1974). It is estimated that they entered southern Arkansas about 1950 and have expanded their range throughout the Gulf Coastal Plain, Mississippi Delta, and Arkansas River Valley. In addition, there may be one or two isolated populations in the southern Ozark Mountains (Bailey and Heidt, 1978).

Nutria are becoming more important as a furbearer in Arkansas (Table 1), with 94% of the total harvest occurring during the 1970's and 1980's (50% of the total harvest was during the four seasons of the 1980's). From Table 3, it can be seen that 90% were taken in the Gulf Coastal Plain and Mississippi Delta (58% and 32% respectively). In spite of increases in harvests, it should be noted that nutria do not yet represent a very important fur resource (Tables 1 and 2).

River Otter - *Lutra canadensis*

Unregulated trapping and habitat deterioration during the last century greatly reduced otter populations in the state (Holder, 1951). With increases in populations of beaver, otter populations are beginning to recover and, except for extreme northcentral Arkansas, are found throughout the state (Tumilson et al., 1981; Tumilson et al., 1982). Increased fur harvests since 1975 may possibly be explained by increases in fur prices as well as increased otter populations. The majority of otter are harvested from the Gulf Coast Plain (52%) and Mississippi Delta (31%). The high value of river otter is indicated by the fact that they are 13th in pelts harvested and 10th in total value (Tables 1 and 2).

Long-tailed Weasel - *Mustela frenata*

The long-tailed weasel is relatively rare in Arkansas (Sealander, 1979) and the numbers harvested (never large) have steadily declined over the last 40 years (Table 1). The value of weasel has also remained about the same over this time period (Table 2). Of those harvested, 43% have come from the Mississippi Delta and 42% from the Ozark Mountains (Table 3).

Red Wolf - *Canis niger*

The red wolf was trapped in small numbers during the 1940's and 1950's (Table 1), but is now thought to be extinct in Arkansas (Gipson et al., 1974). It was thought that red wolves were extirpated from the Gulf Coastal Plain in the early part of this century, but persisted in the interior highlands until the 1940's (Gipson et al., 1974). Of those red wolves harvested, 66% were taken from the Ozark Mountain region, supporting that opinion. It should be noted that red wolves have apparently hybridized with feral dogs and possibly coyotes, thus a part of the red wolf gene pool remains in the state (Sealander, 1979). In addition, because of this hybridization some of the pelts reported during the 1950's may actually have been hybrids.

Badger - *Taxidea taxus*

The badger is extremely rare in Arkansas, occurring only in the prairie regions of the extreme northwestern part of the state (Sealander, 1979). Only three have been reported in the fur harvest since 1942 and those were taken since 1979.

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