

REFERENCES

- Christian, J. J., Lloyd, J. A. and Davis, D. E. 1965. The role of endocrines in the self-regulation of mammalian populations. *Recent Progress in Hormone Research* 21: 501-578.
- Christian, J. J., Flyger, V. and Davis, D. E. 1960. Factors in mass mortality of a herd of Sika deer. *Chesapeake Science* 1: 79-95.
- Knox, W. E. 1964. Substrate-type induction of tyrosine transaminase, illustrating a general adaptive mechanism in animals. In *Advances in Enzyme Regulation* 2: 311-318.
- Knox, W. E. 1963. The adaptive control of tryptophan and tyrosine metabolism in animals. *Transactions of New York Academy of Sciences* 25: 503-512.
- Kenny, F. T. and Flora, R. M. 1961. Induction of tyrosine-alpha-ketoglutarate transaminase in rat liver. *Journal of Biological Chemistry* 236: 2699-2707.
- Nukada, G., Natsuoka, P. and Smaizumi, R. 1962. The effect of long-term administration of pyrogallon on the metabolism of catecholamines. *Japanese Journal of Pharmacology* 12: 57-61.
- Rosen, F., Harding, H. R., Miholland, R. J. and Nichol, C. A. 1963. Glucocorticoids and transaminase activity. VI Comparison of adaptive increases of alanine and tyrosine-alpha ketoglutarate transaminase. *Journal of Biological Chemistry* 238: 3725-3729.
- Welch, B. L. 1965. Psychophysiological responses to the mean level of environmental stimulation: A theory of environmental integration. In D. McK. Rioch (editor) *medical Aspects of stress in the military climate*. U. S. Government Printing Office, Washington, D. C.
- Welch, B. L. 1962. Adrenals of deer as indicators of population conditions. *Proceedings of First National White-tailed deer disease symposium, Athens, Georgia*. University of Georgia Center for Continuing Education, Athens. pp 94-108.
- Wurtman, R. J. and Axelrod, J. 1963. Sex steroids, cardiac 3H norepinephrine, and tissue momamine oxidase levels in the rat. *Biochemical Pharmacology* 12: 1417-1419.

TEN YEARS' CONTROLLED HUNTING ON LOUISIANA'S WILDLIFE MANAGEMENT AREAS

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INTRODUCTION

The Fish and Game Division of the Louisiana Wildlife and Fisheries Commission manages the wildlife on 739,491 acres for public hunting. This acreage is in 28 different hunting areas varying in size from 1,200 to 105,000 acres. The topography varies from the pine-hardwood hills, to Mississippi delta hardwood bottom lands, to coastal marsh near the Gulf of Mexico. Every vegetative type of Louisiana is represented on some of the Management Areas except the southwest prairies and the coastal cypress swamp.

Whitetail deer is the major game animal, with squirrel, water fowl, quail, mourning doves, rabbits, and turkey, in order of importance. The oldest management areas were set up in the late forties primarily for deer. All hunting was prohibited to aid in a speedy build up of the deer herd. This was the beginning and the backbone of Louisiana's deer herd rehabilitation program. From the beginning the objective was to establish, through restocking, a deer herd, build it up to huntable numbers, manage and control these herds through public hunting. The general public from the beginning thought of these areas as refuges where deer herds would build up and overflow on the

surrounding woods like an artesian well. Areas established later were never closed to small game hunting during the regular season and if there were sufficient deer on the area for stocking, the deer season was never closed. Louisiana law wisely prohibits the use of dogs to hunt deer on Management Areas. In fact the law prohibits the use of dogs for hunting any game quadruped. Unfortunately, this also prevents the use of dogs to hunt squirrels or rabbits. But at the present time there is little demand for a place to hunt squirrels and rabbits with dogs, so the loss is insignificant.

Louisiana regulates or permits public hunting on these Management Areas under three different systems.

- (1) Hunting allowed by daily permit only, the hunters are required to check in and out at a check station daily.
- (2) Hunting allowed by season permit, this permit is obtained at the District Offices and is valid for the entire specified season.
- (3) No permit of any kind is required.

All permits are free, there is no charge for hunting on any Louisiana Management Area. The number of hunters per day or per season is not restricted with the exception of the Zemurray Park Area.

Land ownership of wildlife areas is varied. The Wildlife and Fisheries Commission owns the land on two Management Areas totaling 75,000 acres; other landowners are the U. S. Forest Service, U. S. Corps of Engineers, timber companies, and private individuals. With the exception of a coastal marsh area where the state pays the annual land taxes, the Wildlife and Fisheries leases the wildlife rights at no cost or fee.

MANAGED HUNTS

This paper will include only the areas where daily permits are required and data on deer hunting only. Management Areas where season permits or no permit is required have no backlog of hunter data.

At the present time there are 15 areas totaling 431,740 acres that require daily hunting permits, seven areas totaling 204,676 acres requiring season permits, and six areas totaling 103,075 acres that require no permit. Of the 15 areas requiring daily permits there are nine which have a sufficient backlog of hunter data for analysis. The following is a brief description of the nine areas.

RED DIRT

Red Dirt Game Management Area is on Kisatchie National Forest (Kisatchie Division). It contains 38,000 acres in Natchitoches Parish. The topography is steep rolling hills with a few rocky outcrops. The timber is longleaf pine with the associated hardwoods. This area is under intense commercial pine production with cattle grazing on 8,000 acres. Red Dirt was an old Forest Service Refuge converted to a Management Area in the late forties. The Area was opened to deer hunting for the first time in 1955. At this time range studies indicated the deer herd was at or above long-range carrying capacity. A five day, or 100 deer, whichever come first, bucks-only hunting season was carried out with 1966 efforts harvesting 90 bucks, Table No. 1. A legal buck in Louisiana is a deer having 3" antlers, except in 1958 when only visible antlers were required. The storm of public opinion opposed to opening the "refuge" prevented the Commission from opening the season in 1956.

A five-day bucks-only season with a 100-buck limit was set and carried out on Red Dirt in 1957 and 1958. The first either-sex hunt was carried out in 1959. That year the managed hunt was in two sections of three days each with either-sex deer legal on the last day of the last hunt. As Table 1 will indicate the 1959 season provided the greatest hunter participation and the largest kill for any one year. There were three opening days that year, a two-way split hunting season and an either-sex deer hunt on the last day of the last season. It will be shown later that the opening day provides the greater por-

tion of hunter use. The 1960 and 1961 hunts were for five days with the first four for bucks only and the last day for either sex. The either-sex hunt was cut in 1962 and with this hunter participation went down. Either-sex hunting was started on the first day of the 1963 season. A 150-deer limit was set, when this number was reached the hunt would convert to bucks only for a total of five days' hunting. The first day 234 deer were killed, of which 121 were does. The limit of 250 deer was set for the 1964 season and either-sex hunting killed this number in two days. The hunt went on for three more days for bucks only.

Table 1. Red Dirt

Year	No. Days	No. Hunters	Deer Kill
1955	5	1,996	90
1957	5	2,765	86
1958	5	2,090	47
1959	6	7,616	337*
1960	5	4,898	177*
1961	5	3,545	140*
1962	6	2,059	42
1963	5	2,650	250*
1964	5	3,121	290**

* One day either sex

** Two days either sex

CATAHOULA GAME MANAGEMENT AREA

Catahoula Game Management Area is another old Forest Service Refuge converted to a Management Area at the same time as Red Dirt. It is on the Catahoula Division of Kisatchie National Forest located in Winn and Grant Parishes and contains 40,000 acres. The topography is gentle rolling hills with some flatwoods areas. Timber is of the loblolly shortleaf pine hardwood type. Free ranging cattle and hogs graze the entire area with the exception of a 3,000 acre fenced area where they are excluded. Range surveys in the early fifties indicated over-browsing of the preferred deer food plants. The deer season (bucks only) was opened for the first time in 1957, Table 2, once again public opposition to opening the refuge caused the Commission to close the deer season in 1958.

The 1959 hunt was the same as Red Dirt, six days split into two periods with either-sex deer legal on the last day of the last hunt. Here again this type season provided the greater number of hunter days and deer kill. Another thing that accounted for this large hunter participation in 1959 was the fact that opening day on the Management Areas around the state was staggered. Red Dirt and Catahoula opened on November 14 and 21; Jackson-Bienville and Union opened on November 23; Chicago Mills opened on December 1. This method of split seasons and staggered opening dates made a bonanza for hunters and provided a good harvest of deer; but it raised a storm of local

Table 2. Catahoula

Year	No. Days	No. Hunters	Deer Kill
1957	5	1,301	26
1959	6	6,390	355*
1960	3	1,541	69
1961	5	3,218	177*
1962	6	1,927	53
1963	5	2,688	226*
1964	5	4,206	347**

* One day either sex

** Five days either sex

opposition, local people complained of the outsiders overcrowding "their" areas and killing "their" deer. As you can see by the records that was the only year we were brave enough to try this type of hunting season. Public opinion prevented an either-sex season in 1960. The 1961 season again contained one day of either-sex hunting, but 1962 went back to bucks only again. Hunting success picked up in 1963 when the season was changed back to a one-day either-sex hunt. 1964 had a five-day either-sex hunt, with excellent success.

EVANGELINE

The Evangeline Area contains 15,000 acres of the Evangeline Division of Kisatchie National Forest in Rapides Parish. This area is the longleaf pine type with moderate rolling hills. Cattle grazing has been heavy, browse surveys indicate over browsing of preferred deer foods. From outward appearances this area is very poor deer range, but it has been a very good deer producer. Hunting started in 1958 and has continued annually up to the present time, Table 3.

The 1958 managed hunt was for three days, bucks only. Either-sex hunting started in 1959 with the last day of the hunt for either sex; this continued until 1962 when the either-sex season was closed again. Evangeline has an open understory with overstory of long leaf pine; heavy grazing by cattle has kept the grasses short. Visibility is very good because of this. It was thought that more than one day of either-sex hunting would over harvest the deer. In 1963 the either-sex hunting began on opening day. To prevent over harvest a 75-deer limit was set for the either-sex hunt. This number was attained the first day and the remaining four days went to bucks only. The next year, 1964, the either-sex limit was upped to 125 deer and the either-sex hunt ran for the full five days with 62 deer harvested. Alexander State Forest, an old refuge, located near Evangeline opened for the first time in 1964; this attracted hunters away from Evangeline and reduced the total number of hunters and kill. The results of the 1964 hunt indicate five days' either-sex hunting with moderate hunting pressure will not over harvest deer.

Table 3. Evangeline

Year	No. Days	No. Hunters	Deer Kill
1958	3	606	22
1959	3	3,132	113*
1960	5	2,226	154*
1961	5	2,425	125*
1962	6	1,218	33
1963	5	1,314	99*
1964	5	1,420	63**

* One day either sex

** Five days either sex

SABINE GAME MANAGEMENT AREA

The Sabine Area contains 11,000 acres located in Sabine Parish, west central Louisiana. The land within the boundaries is in private ownership. Topography is gentle rolling hills, timber with a continuous loblolly shortleaf pine hardwood forest. Free ranging cattle graze the entire area year around. Deer range surveys indicated a fully stocked range, and the season was opened in 1959. Every year except 1962 has had at least one day of either-sex deer hunting. Hunter participation and total harvest have been notoriously low, Table 4. Probably Sabine's location accounts for this low use. Hunters from the urban areas of Louisiana have to pass through good deer hunting country to get to Sabine. Yet with a low total harvest the kill per 100 hunters, for the last two years, is about average for the state.

Table 4. Sabine

Year	No. Days	No. Hunters	Deer Kill
1959	3	898	21*
1960	5	409	8*
1961	5	319	4*
1962	6	140	2
1963	5	251	21**
1964	5	540	26**

* One day either sex

** Five days either sex

JACKSON - BIENVILLE GAME MANAGEMENT AREA

Jackson-Bienville Game Management Area contains 22,000 acres in the corner of Jackson and Bienville Parishes. The topography is gentle rolling hills with loblolly shortleaf pine and hardwood type trees. Land ownership is in private lumber companies who lease the wildlife rights to the state. There is no competition with livestock here for parish regulations prohibit free-ranging livestock. Operation of this area was started in the early fifties and deer were stocked at this time. By 1958 range surveys indicated a fully stocked area, and hunting was begun that fall and has continued annually up to the present time, Table 5.

The 1958 managed hunt was for bucks only, hunting was split into two segments with five days the first part and seven the last. Either-sex deer hunting was permitted the next year, 1959, with a 350 deer limit. There were 325 deer killed the first two days and hunting was closed for the year. The first day of this hunt had the highest hunter density per 100 acres ever recorded for the state, 13.6 hunters per 100 acres.

Jackson-Bienville's undergrowth is very dense, it seems this area requires high hunter density to harvest deer. Either-sex deer hunts have continued annually after the opening year. Local public pressure has not been a problem in the management of this area.

Table 5. Jackson - Bienville

Year	No. Days	No. Hunters	Deer Kill
1958	12	1,938	97
1959	2	4,257	325**
1960	5	2,616	76*
1961	5	2,350	122*
1962	6	2,142	152*
1963	5	3,883	325***
1964	5	2,847	143***

* One day either sex

** Two days either sex

*** Five days either sex

Table 6. Union

Year	No. Days	No. Hunters	Deer Kill
1958	3	1,410	24
1959	3	1,194	20
1960	5	272	5
1961	5	961	45*
1962	5	145	6*
1963	5	511	49**
1964	5	856	76**

* One day either sex

** Five days either sex

CALDWELL

Caldwell Game Management Area, 11,000 acres in size, was set up at the same time as Sabine, Jackson-Bienville and Union and operated in the same way. The land ownership is in private interest with the state leasing the wildlife rights. All of this area is in hardwood river bottoms. It lies just above the junction of the Bouef and Ouachita Rivers in Caldwell Parish. During high water years most of the 11,000 acres are flooded for a brief period. Free-ranging cattle and hogs have overgrazed this area many years.

Study plots put in by the Wildlife and Fisheries indicate the live-stock are keeping the underbrush in this area open and park-like. A landowner fenced 4,000 acres and excluded cattle in order to grow a new stand of timber. Deer numbers seemed to increase noticeably after the 4,000 acres was fenced. This area was opened for hunting in 1961 for the first time.

The first two years were for bucks only, Table 7; then 1963 had a one-day either-sex hunt. This one-day hunt had the second highest kill per 1,000 acres and the highest success per 100 hunters of any managed hunt in the state. Hunter density was not high, probably a high deer density and open woodland with good visibility accounted for the large kill. As usual the public through the deer were killed out after the doe hunt and pressure was brought to bear, as a result the 1964 season was for bucks only.

Table 7. Caldwell

Year	No. Days	No. Hunters	Deer Kill
1961	5	365	21
1962	5	608	44
1963	5	1,268	242*
1964	5	641	39

* One day either sex

CHICAGO - MILLS

Chicago - Mills Game Management Area consists of the old Singer and Ayers Refuge (this was the home of the last known ivory bill woodpecker in Louisiana), with 105,000 acres of Mississippi delta hardwoods in Madison, Tensas and Franklin Parishes. The land is flat and poorly drained river bottoms, with very little overflow. Deer browse surveys since the early fifties (this was when Louisiana started making deer browse surveys) have indicated overbrowsing of deer food plants. Hunter access in this area is poor; there is a lack of roads and the woods are impassable for vehicles after the first fall rains.

The first managed deer hunt was held in 1958, Table 8; at that time the area contained only 29,500 acres. This first managed hunt (5 days) was an odd one, antlerless-deer only were legal. There has probably been more public animosity toward managed hunting and the lack of it on Chicago-Mills than any other area in the state. It is in the heart of old deer hunting territory; herds were built up here by diligent protection after the 1927 flood. Deer crop damage has been heavy on the adjacent farms. As a result hunts have been erratic, data from this area is hardly comparable to the rest of the state. The 1959 season was a ten-day hunt with the first three days for either-sex deer. Hunting pressure was building up each year, the five-day season of 1960 attracted twice as many hunters as the year before. But 1961 went back to bucks only and hunter participation fell back almost one half while that year the area increased 75,000 acres in size. In 1962 either-sex deer were legal the first two days in only the 29,500 acres that lie in Tensas Parish. The entire area was open in 1963 for either-sex deer with a 1,000-deer limit, 1,180 were killed the first day.

The 1964 season was set with a 1,500 either-sex deer limit, but

the day before opening day opposition to doe hunting closed this area to either - sex deer hunting. As you can see from the above information managed deer hunting has been a push and pull affair. The Wildlife and Fisheries Commission has been pushing for good deer management, trying to provide the maximum in hunter recreation and keep the deer within the carrying capacity of its range. Misguided public opinion has been pulling control of the managed hunts from under the Commission.

Table 8. Chicago-Mills

Year	No. Days	No. Hunters	Deer Kill
1958	5	2,105	183*
1959	10	4,410	566**
1960	5	9,359	746***
1961	5	5,172	260
1962	5	8,357	844****
1963	5	11,888	1,360***
1964	5	9,247	256

* Five days antlerless deer

** Three days either sex

*** One day either sex

**** Two days either sex

WEST BAY

West Bay Wildlife Management Area lies in the gulf coastal plain, longleaf - pine - type land of Allen Parish. It originally contained 18,500 acres; in 1960 additional acreage was leased bringing the size up to its present 58,000 acres. All lands within West Bay are privately owned. The topography is flat and poorly drained with fingers and bays of gulf coastal plain hardwoods along the drainage pattern. Establishment, operation and history is about the same as the other areas acquired in the late forties and early fifties. Deer herds were overpopulated when the first managed hunt was held in 1959, Table 9. There has been much adverse public sentiment toward opening this "refuge" to any hunting and especially against shooting does. The 1959 and 1962 hunts were for bucks only, with all other years having one day of either - sex deer hunting. The original 18,500 - acre refuge was closed to all hunting in 1964.

Table 9. West Bay

Year	No. Days	No. Hunters	Deer Kill
1959	3	2,760	72
1960	5	5,769	279*
1961	5	7,643	455*
1962	6	5,522	135
1963	5	8,072	900*
1964	5	5,607	335**

* One day either sex

** One day either sex on 39,500 acres

DISCUSSION

Before Louisiana set up any special management hunts the Fish and Game Division contracted other states throughout the nation. They were asked how they operated their special hunts, plus advice on how to handle ours. Answers to this inquiry advised against lottery type drawings, allowing any special privileges to influential groups and limiting the hunts to a given number of participants. As the result of this Louisiana went into the managed hunt business with no daily or

seasonal limit on the number of hunters and no special privileges to anyone. Later when the 5,000 - acre Zemurray Park was opened to hunting a limit of 100 hunters per day was set and participants were picked by a drawing. This limit and drawing has not worked out for the best management or public relations.

Allowing an unlimited number of hunters into an area on any one day has caused some problems, but these problems are mostly imaginary in people's minds. Complaints are based upon over-crowding, fear of getting shot, etc. Once hunters became accustomed to hunting during managed hunts for deer without dogs, they found that a large number of hunters on a given area usually increased hunter success. In fact, during recent hunts, hunters complained of not enough hunters in the woods to make good hunting. It appears hunters are more safety conscious when they know there is a high density of hunters in the area. In all the managed hunts there has been only one hunting fatality. A man in a tree was mistaken for a bobcat and shot. Two men have been shot in the leg and one shot in the arm, three men were struck by spent buckshot. None of these accidents were associated with a particularly high hunter density. Jackson-Bienville recorded the highest hunter density per 100 acres (13.6) for any one day and the only accident for this area was when a man had a pistol go off in his pocket and the bullet grazed his leg.

Table 10. Total Results of Managed Deer Hunts

Year	Areas Open	Hunting Efforts	Deer killed	Kill/100 Hunts
1955	1	1,996	90	4.50
1957	2	4,066	112	2.75
1958	5	11,149	373	3.34
1959	8	23,457	1,809	7.71
1960	8	27,088	1,514	5.58
1961	9	25,695	1,330	5.17
1962	10	22,245	1,312	5.89
1963	11	35,909	3,661	10.19
1964	13	38,224	2,129	5.56
Total		189,879	12,330	

Checks made in the field after the hunts indicated that the crippling loss of deer is low. Apparently during times of high hunter density, hunters finish off each other's crippled deer. After the first hunt on Red Dirt in 1955, a survey was carried out to determine crippling and illegal kill loss (this was a bucks-only hunt). Observers walked compass lines at regular intervals through the area looking for dead deer; two were found. Using this strip census method it was computed the cripple and illegal kill loss for Red Dirt was 13.

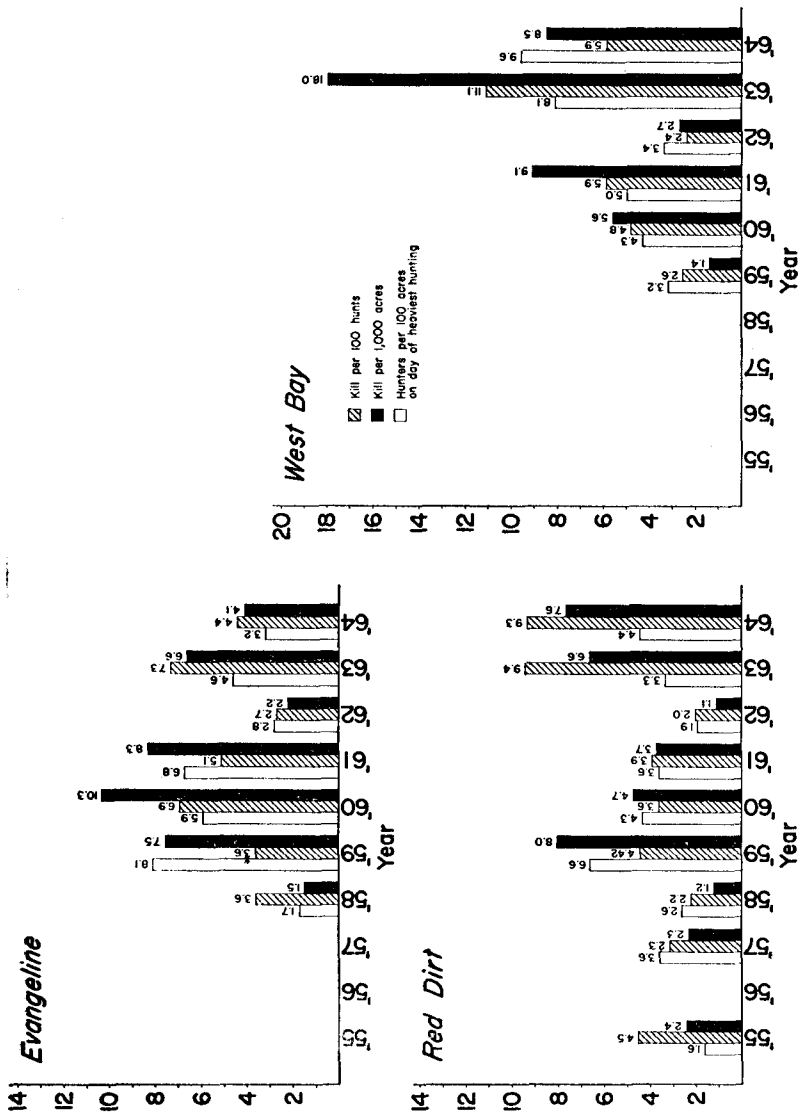


Figure 1

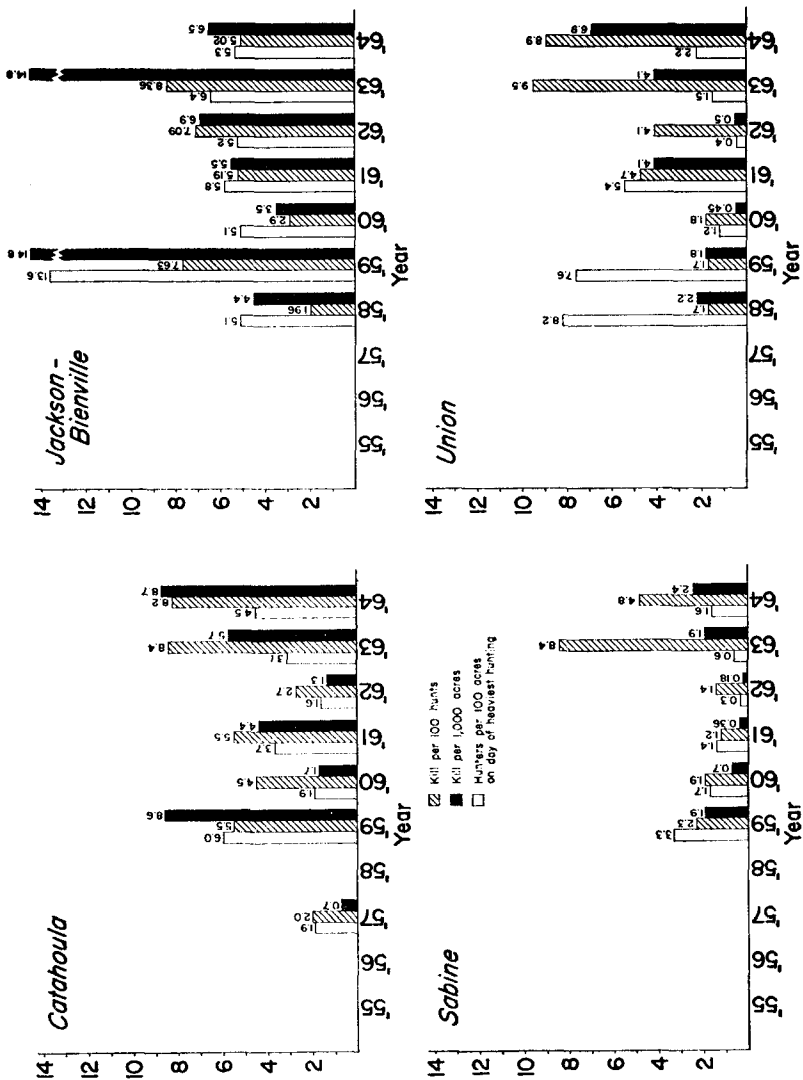


Figure 2

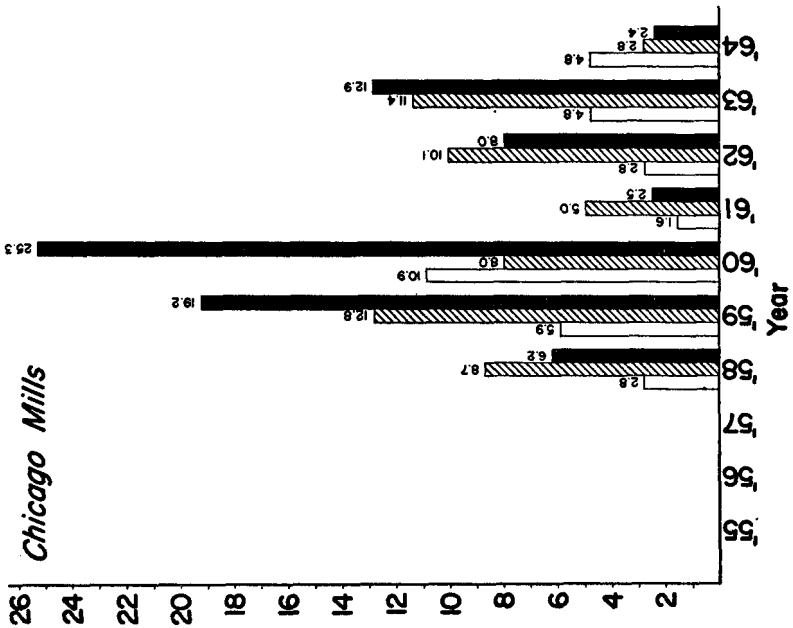
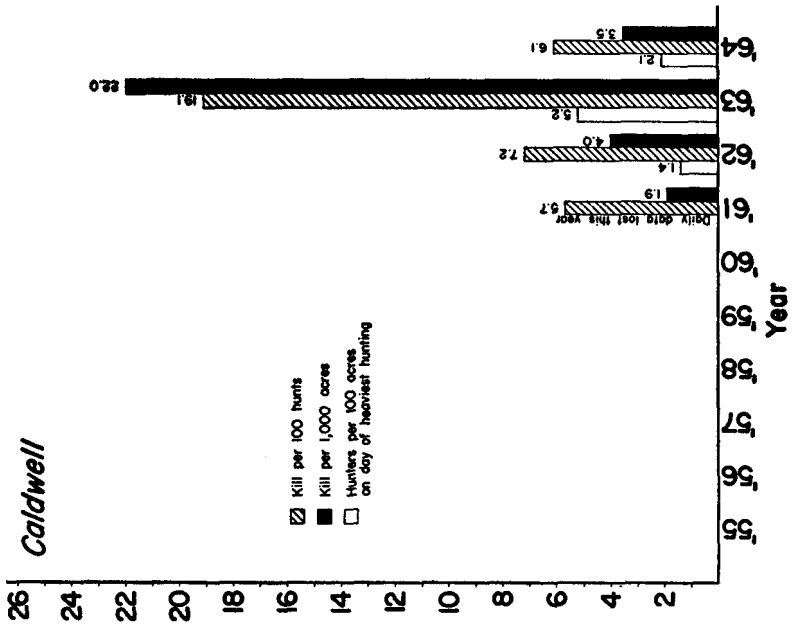


Figure 3