THE DEVELOPMENT OF AN EFFICIENT SQUIRREL TRAPPING AND MARKING TECHNIQUE IN LOUISIANA

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One of the most widely used tools of wildlife agencies for managing the squirrel is the manipulation of hunting seasons and bag limits in an effort to control hunter harvest. If kill is to be adjusted to harvest the species properly on a sustained yield basis, it is important that more research data be gathered to determine the effect of regulation changes on harvest. One of the techniques employed to gather this hunter harvest information is the trapping and marking of a large sample of representative individuals of the total population. In its efforts to better manage the resource the Louisiana Wild Life and Fisheries Commission initiated a squirrel trapping and marking program in 1952 which has continued until the present time. During this period it is believed that an efficient trapping and marking technique has evolved that will benefit wildlife technicians in marking relatively large numbers of squirrels during a short time period. The following will discuss the history and development of this technique.

HISTORY OF TRAPPING

1952-1959

The early squirrel trapping and marking program in Louisiana had no clearly defined objectives. Initial efforts were concentrated on learning to trap, handle and mark squirrels efficiently with little regard for trap site selection. In most cases traps were erected along accessible roads and trails, thus seemingly exposing squirrels marked at these sites to heavier than normal gun pressure, some areas where squirrels were trapped and marked were not opened to hunting until several years after marking took place. As a result, early trapping and tagging programs have provided little usable data, but did, however, indicate that squirrels could be attracted to bait and a technique for trapping, handling, and marking with metal ear tags was learned.

In 1957, for the first time, a planned trapping and marking program with trained technicians was initiated on Grant-Rapides Game Management Area, an area of high fox squirrel population located in central Louisiana. During 1957, 1958 and 1959, 404 squirrels were trapped and marked immediately prior to the October hunting season. Tag returns indicated that 15 percent of the squirrel population was harvested by hunters.

In an effort to obtain unbiased hunter returns during the 1959 season, trap lines were selected by two methods—some traps were erected along jeep roads as in the past and others along unmarked compass lines through the area. The surprising result was that squirrels trapped and marked along accessible jeep roads were harvested to a lesser degree than were those marked in traps located along unmarked compass lines.

One of the important contributions of the Grant-Rapides trapping operation was the use and improvement of a cone shaped cotton mesh bag for quickly and safely handling squirrels for tagging. This bag has been found to be by far the most satisfactory method of handling squirrels.

For the first time data concerning tag loss was obtained as reported by Dennett and Kidd in the Proceedings of the Fourteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, 1960. Raccoon predation of trapped squirrels which was later to plague the study was also encountered here.

The combined squirrel trapping program in Louisiana from 1952 through 1959 resulted in the capture and tagging of 1478 squirrels involving 9 different localities in the state. This information is summarized in the following table.

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TOTAL NUMBER OF SQUIRRELS TAGGED IN LOUISIANA
1952-1959

Areas	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*
West Bay G. M. A.	...	...	342	4	9	...	...	...
Catahoula G. M. A.	...	52	172	29	...	...	...	...
Evangeline G. M. A.	22	32	56	5	...	...	...	...
Caldwell G. M. A.	...	...	47	16	...	...	...	...
Concordia Parish	...	...	36	...	...	...	...	...
Union G. M. A.	...	51	64	17	25	...	7	...
Monroe Fish Hatchery	...	...	...	...	...	...	3	...
Jackson-Bienville G. M. A.	...	12	51	22	...	...	...	...
Grant-Rapides G. M. A.	...	...	...	...	...	98	102	204

THE PRESENT METHODS
1961-1962

When the lease on the Grant-Rapides Game Management Area expired and was not renewed, squirrel research was shifted to Thistlethwaite Game Management Area. Since this type of study requires that each animal killed be examined for tags, research has been restricted to game management areas where this inspection is possible.

The Thistlethwaite Game Management Area in St. Landry Parish, located in south central Louisiana, is a pure hardwood area approximately 10,000 acres in size lying at the western extremity of the old Mississippi River flood plain. The forest is composed mainly of bottomland species with some upland types also present. The more abundant species found on the area are willow oak (*Quercus phellos*), nuttal oak (*Quercus nuttallii*), water oak (*Quercus nigra*), cow oak (*Quercus primus*), post oak (*Quercus stellata*), overcup oak (*Quercus lyrata*), shumard oak (*Quercus shumardii*), hackberry (*Celtis laevigata*), sweet gum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), tupelo gum (*Nyssa aquatica*), persimmon (*Diospyros virginiana*), mockernut (*Carya tomentasa*), bitternut hickory (*Carya cordiformis*), bitter pecan (*Carya aquatica*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), cypress (*Taxodium distichum*), and blue beech (*Carpinus caroliniana*).

The area is inhabited by both gray (*Sciurus carolinensis*) and fox squirrels (*Sciurus niger suburatus*). Four years of hunter bag checks have revealed a kill composed of 90 percent gray and 10 percent fox squirrels.

During the 1961 trapping period, 194 traps were erected in 3 groups adjacent to main roads on the area. One of the groups consisted of 144 traps erected 110 yards apart to form a grid, while the 2 other groups of traps were placed so as to form crosses of 25 traps each with a 55 yard interval between traps (Figure 1). The trap patterns were designed to provide not only hunter harvest information, but also home range data. The grid and cross patterns were established by the use of a compass and chain; the path between traps was marked by cutting brush and dense undergrowth.

The traps used were a commercial type purchased from the National Live Trap Company of Tomahawk, Wisconsin. They are 6 x 6 x 19 inches in size constructed of 1 inch square welded wire mesh. Since the 1 inch mesh trap-floor was too large to hold the pecans which were used as bait, small pans constructed of ⅛ inch hardware cloth were placed in the rear of each trap. All traps were secured with wire to sapling scaffolds nailed to the side of the tree approximately 4½ feet off ground. Off the ground sets eliminated damage to traps by feral hogs and cattle.

Trapped squirrels were tagged with number 1, monel fingerling tags purchased from the National Band and Tag Company of Newport, Kentucky. Numbered tags were placed in both ears of each squirrel and the next to outermost toe of the right foot was severed at the first joint with sharp scissors for permanent identification.

Although trapping during daylight hours only had been planned, inadequate manpower made it necessary for traps to remain set overnight. Consequently, squirrels caught in late afternoon remained in the trap overnight and were, therefore, exposed to raccoon predation. Twenty-three squirrels were lost in this manner—the raccoons devouring the squirrels by pulling their limbs

SQUIRREL TRAPPING DESIGN

Thistlethwaite Game Management Area

1961

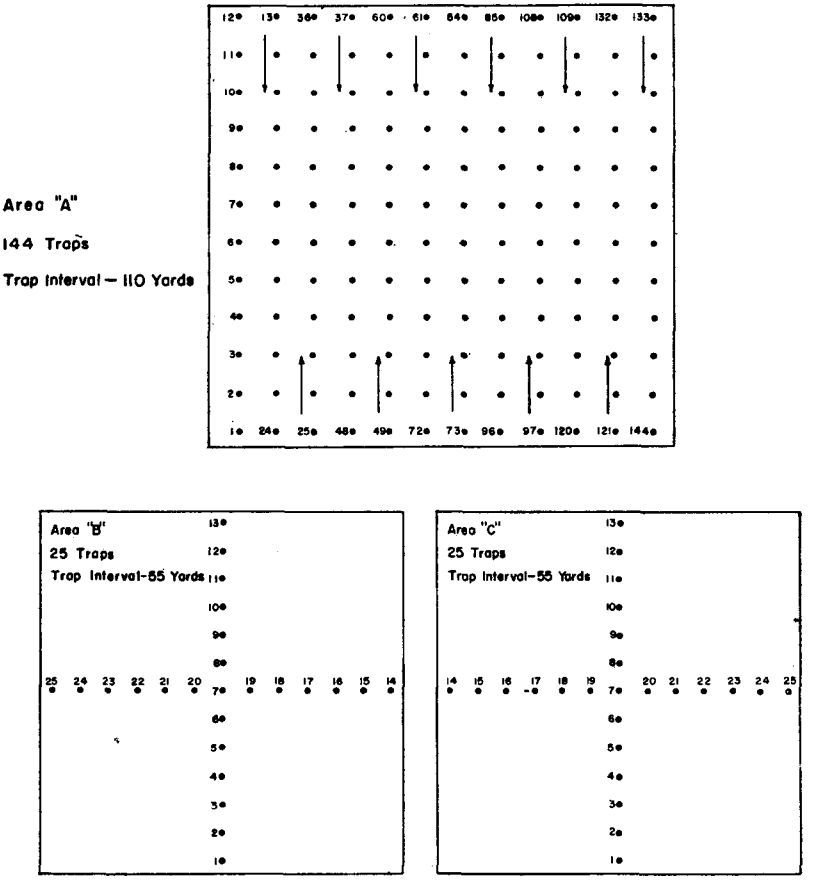


Fig. 1

through the trap mesh. Raccoon damage had been experienced in the past, but not to this extent. The problem was further complicated by the fact that some squirrels were consumed to a point where it was impossible to determine if the animal had been previously tagged. In an effort to eliminate raccoon predation, 48 traps were wrapped with ½ inch hardware cloth, but these traps were modified at the end of the trapping period after most of the loss had occurred.

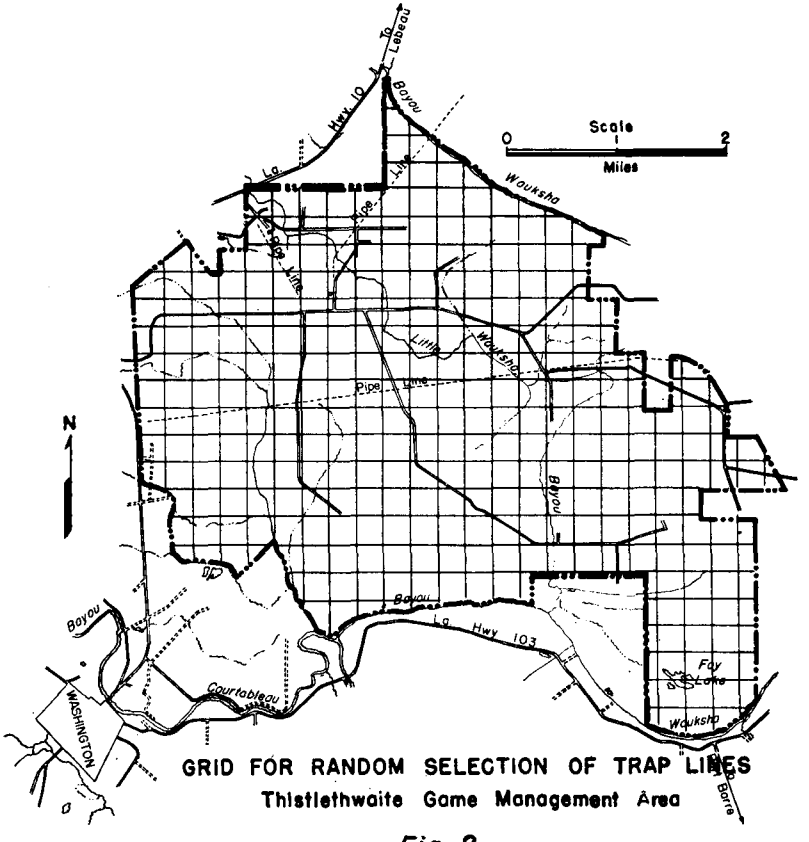
The wood rat (*Neotoma (floridana)*, which is nocturnal in its habits, was another constant pest. Besides consuming large quantities of bait, each wood rat caught reduced the number of traps available for catching squirrels. A total of 346 rats were caught and destroyed during the trapping operation. Metal shields, 24 inches wide, were wrapped around 5 trap trees in an effort to prevent bait loss and capture of woods rats. The shields had little effect in repelling the rats because interlocking canopies from adjacent trees and overhanging vines provided new approaches to the "trap tree".

At the end of the trapping period a total of 110 squirrels had been marked between August 1 and October 4, 1961. Mortality by raccoons and exposure reduced this number by at least 13. The carcasses of 7 trapped squirrels were so badly mutilated by raccoons that it was impossible to determine whether the animals had been previously marked. Eight additional squirrels found dead in the traps had not been marked.

Prior to the hunting season all traps and scaffolds were removed in an effort to erase evidence of the trapping operation. Since trapping in the same area the following year was anticipated, the small metal tags marking the base of the "trap tree" were not removed. A 16 half-day season of 1819 hunting efforts resulted in a kill of 4376 squirrels. Every squirrel killed during the hunt was carefully examined to assure that all marked animals would be recorded. This examination revealed a kill of 35 marked squirrels which had retained both ear tags. The amputated toes of all these animals had healed completely.

Conversations with hunters indicated that the trapping areas had been located and identified by the presence of brushed out trap lines. Because of the trapping operations, the squirrels population was erroneously believed by hunters to be higher on the trapping area than elsewhere. Hunters, consequently, concentrated their efforts on these areas using the brushed out trap lines as hunting paths.

After reviewing results of 1961 trapping operation, a new plan was drawn up which included the following changes: (1.) trap lines would be selected



GRID FOR RANDOM SELECTION OF TRAP LINES
Thistlethwaite Game Management Area

Fig. 2

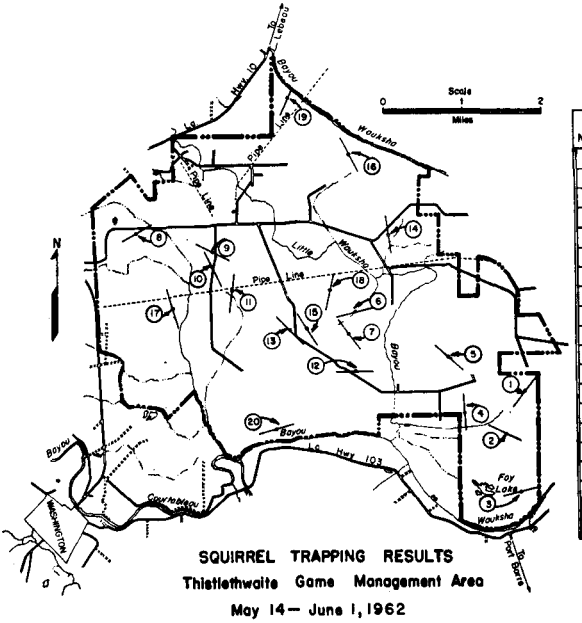
on a random basis, (2.) all trapping would be done during daylight hours, (3.) prebaiting of erected traps would begin well in advance of the trapping period and (4.) trap lines would be established with marking tape to prevent permanent trails.

In executing the first step of the above plan, the following method was used to locate 20 trap lines randomly with 10 traps in each line.

A map of the entire area was gridded at ¼ mile intervals (Figure 2). The intersections of these grid lines were numbered consecutively and used to determine the midpoint of each trap line. Twenty of these points were selected randomly to determine trap line centers. The direction of the trap line was determined by randomly selecting an azimuth (at 1 degree intervals) from 0 to 360 degrees. From the center point 5 traps were placed along the selected azimuth in opposite directions from the midpoint. Trap intervals were 100 yards. In the event the trap line intersected the boundary and did not allow the setting of 10 traps, the line was considered complete with the number of traps that could be erected in the distance allowable.

In January 1962, 195 traps were erected on 20 randomly selected lines (Figure 3). Erection of traps at this time of year when foliage was at a minimum allowed speedy and accurate compass sighting with a minimum of cutting and brushing out activities. Flagging tape was used to mark all lines. Traps were tied securely to the tree trunk with 16 guage wire in contrast to scaffolds used previously (Figure 4). This method of erection proved to be quicker and easier and eliminated nail damage to the tree. The bottoms of all traps were covered with ½ inch hardware cloth to prevent pecans from falling through the mesh floor.

Prebaiting on alternate days was begun in March and continued for 7 weeks until May 14 when trapping began. On April 9 one trap line of 10 traps was set to determine if squirrels had begun eating the bait; 3 squirrels were caught. This same trap line was again set approximately a month later on May 11 with a resulting catch of 8 squirrels.



Line Number	Number of Traps	Number Caught		
		Fox	Gray	Total
1	10	2	15	17
2	10	5	11	16
3	9	8	9	17
4	10	0	17	17
5	10	0	20	20
6	10	0	13	13
7	10	0	13	13
8	9	12	0	12
9	10	0	17	17
10	10	2	11	13
11	10	4	11	15
12	10	0	16	16
13	10	0	14	14
14	10	2	16	18
15	10	0	14	14
16	10	3	12	15
17	10	2	11	13
18	10	0	20	20
19	7	2	9	11
20	10	3	8	11

SQUIRREL TRAPPING RESULTS
Thistlethwaite Game Management Area
May 14— June 1, 1962

TRAPS SET AT WEEKLY INTERVALS DURING THE THREE WEEK TRAPPING PERIOD. TOTAL SQUIRRELS MARKED IN ALL TRAPS — 302.

Fig. 3

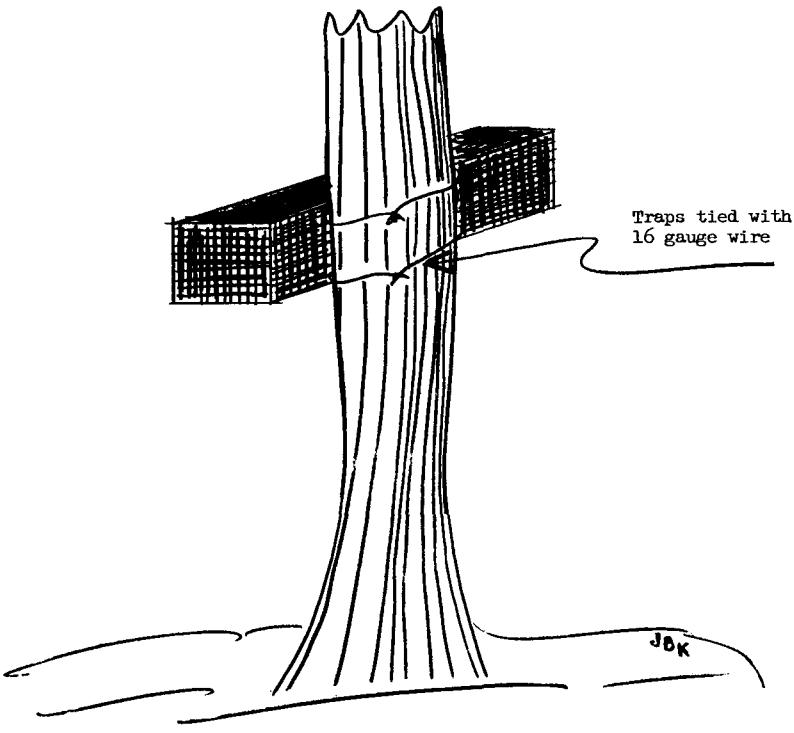


Figure 4

Method of Trap Erection

Trapping was planned for consecutive weeks beginning May 14 and continuing until retraps made up 75 percent of the total catch. The schedule called for the setting of 4 new trap lines each day by 4 crews. This schedule was followed through a 5 day work-week thus allowing each of the 20 lines to be set for one trap-day per week. The trapping operation was terminated on June 1 after 3 weeks of trapping. Each trap was, therefore, exposed to 3 trap-days during this 3 week period.

Traps were set at 5:30 A. M. and run twice daily at 11:00 A. M. and 4:00 P. M. after which the trap doors were locked open. All squirrels were marked with 2 ear tags in the same manner as during the 1961 operation with the exception of the toe being amputated on the opposite foot.

The first week of trapping which began May 14, 1962 resulted in the capture of 175 new squirrels; the second week produced 76; and the third week, 31 squirrels. In addition to these tagged animals, 11 squirrels which had been marked during the 1961 operation were recaptured. The May trapping operation, therefore, resulted in a sample of 302 marked squirrels. An average of 1.55 new squirrels was caught per trap with each trap line resulting in the capture of at least 11 new squirrels with 20 being the maximum number caught per line.

Upon termination of trapping activities on June 1, the traps were left in place for another trapping effort during the week September 10-14. Prebaiting of these traps for this operation was begun 4 weeks prior to trapping. During this effort 4 lines were set and run each day using the same schedule followed during the previous operation.

However, during the week of actual trapping, traps were moved so as to provide 2 traps per site. This additional trap was tied below and opposite to

the trap already in place. It was anticipated that a large number of squirrels previously marked in May would be recaptured during the September trapping operation. It was hoped that the "double trap" system would capture a marked squirrel leaving the second trap free to capture an unmarked one.

The September trapping effort produced a total catch of 249 squirrels with 72 of these being new animals. Since no "single trap" efforts were conducted during this period, the effect of the "double trap" system on increasing the catch of unmarked squirrels was impossible to determine. Of the 302 May marked squirrels, 58 percent were retrapped during the September trapping effort.

During the combined May and September, 1962 trapping operation a total of 374 squirrels were marked. Squirrels were trapped and handled on 794 occasions without loss or injury to a single animal. No wood rats were caught. The only trapping problem encountered during daylight hours was the occasional capture of a small bird or opossum.

The results of the Thistlethwaite Game Management Area trapping and marking operation are presented in the following table.

1962 Squirrel Trapping Thistlethwaite Game Management Area

Date	*No. Traps Used*	*New Sq. Marked*	*Retraps Marked 1961*	*Total Sample Marked*	*Retraps Marked 1962*	*Total Catch*
April 9 & May 11	20	9	0	9	2	11
May 14-May 18	194	175	6	181	4	185
May 21-May 25	194	76	4	80	104	184
May 28-June 1	194	31	1	32	133	165
Sept. 10—Sept. 14	388	71	1	72	177	249
Total		362	12	374	420	794

SUMMARY AND CONCLUSIONS

1. From 1952 through 1959, 1478 squirrels were trapped and tagged in 9 different localities in Louisiana.
2. A planned trapping effort was initiated in 1957 on the Grant-Rapides Game Management Area. Trapping continued on this area through 1959 when the lease on the area expired and was not renewed. During this period 404 fox squirrels were marked with 15 percent being recovered by hunters.
3. Squirrel trapping was shifted to the Thistlethwaite Game Management Area in 1961. During that summer 110 squirrels were trapped and marked on 3 selected areas. Thirty-five marked squirrels were killed by hunters during the hunt immediately following trapping. No tag loss was encountered in this sample.
4. All squirrels were removed from the traps and handled for marking in a cone-shaped cotton mesh handling bag.
5. Squirrels were marked with a metal tag in each ear. The first joint of one toe was amputated for permanent identification.
6. The 1962 trapping effort was conducted along 20 randomly selected lines of 10 traps each. The traps were placed at 100 yard intervals.
7. During the May 1962 trapping operation 302 squirrels were marked. Prebaiting for this operation began 7 weeks prior to trapping.
8. During the September 1962 operation 72 squirrels were marked. Two traps per site were used during this effort with prebaiting beginning 4 weeks prior to trapping.
9. Catch consisted of 14 percent fox and 86 percent gray squirrels. Four years hunter bag checks from the area have revealed a kill consisting of 10 percent fox and 90 percent gray squirrels.
10. Squirrels were trapped and handled on 794 occasions during the 1962 trapping operations without loss or injury to a single animal. No wood rats were caught during daylight trapping.