THE SOUTHEASTERN QUAIL RESTORATION PROGRAM

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The bobwhite quail is a major game resource in the southeastern states. In 1950 over half a million gunners in these states sought this bird, the traditional king of upland hunting. In the pursuit of their sport, many of these hunters joined clubs, bought estates, purchased hunting rights, fed and trained expensive dogs, planted food patches, operated quail brooders and feeders, shot hawks, cursed foxes. Many were disappointed with their results afield and, at least some of them, then cursed their various game departments.

The importance of the bobwhite quail as a game bird, and of those who hunt quail, makes worthwhile an occasional survey of the status of the bird and of the various methods employed to manage this resource. This survey was obtained by means of a questionnaire sent to each of the 11 southeastern states and through correspondence with wildlife biologists throughout the region. Ten states returned the questionnaire. The writer is indebted to the following individuals who supplied valuable information: George Allen, Dr. F. S. Barkalow, Jr., Dr. Bryant A. Bateman, Ralph C. Conway, Verne E. Davison, O. E. Frye, Jr., Larry Gale, Phil Goodrum, T. H. Holder, Albert E. Hyder, J. H. Jenkins, Dr. C. M. Kaufman, Al Marsh, Dr. Henry S. Mosby, Chester F. Phelps, Dr. Lyle S. St. Amant, Don Strode, W. H. Turcotte, Harold E. Wallace, James Webb, Charles B. Woodhouse.

POPULATION

Goodrum (1949), in a survey of the status of the bobwhite quail during the period 1939 to 1948, stated that 25 of 39 states reported a decline in their bobwhite population during the period. While he did not name the states which reported a decline in population, it is obvious from his report that all of the southeastern states had reported decreased or stationary quail populations. It is interesting to note, therefore, that of the 10 states which returned this last questionnaire five reported increases in their state's quail population during the past 10 years while five reported a decrease during the same period. Two states reported a steady increase during the past decade, one of those reporting a larger quail population in 1950 than at any time since around 1920. Three states reporting increases stated or implied that such increases had occurred during the last three years. One state, reporting a decline, in its statewide population, indicated that the populations in its remaining areas of good quail habitat had increased in the past year. Information regarding populations trends represents opinions, for the most part, of state game officials or biologists since only three of the ten states reporting made annual statewide surveys or censuses of their quail populations. The most accurate information reported was from Louisiana where the results of censuses made in 1941 - 42 and again in 1947 - 48 - 49 showed that quail densities were about the same on similar type range but that the statewide

population had declined as quail range was being converted into pasture and as clean weedless farming methods increased.

The five states reporting a decline in population all indicated that such decreases were due to a decrease or deterioration in the quail habitat. Increases in grazing and in the extent of improved pastures, clean weedless farming, and the exclusion of fire from woodland, particularly that devoted to the production of pulpwood, were practices specifically mentioned. Three of the states reporting increases attributed a part of the increase to more favorable weather conditions either during the winter or during the breeding season or both, three states credited the expansion of their farm game habitat improvement program with aiding the quail populations, and three attributed part of the increase to better land use. Two states mentioned better law enforcement while the following factors were each mentioned by one state: Reversion of land to fallow phase after war pressure, improved cooperation between farmers and sportsmen, and decreased hunting pressure because of increased interest in deer hunting.

HUNTING

Nine of the states reported that quail hunting had become more difficult during the past decade. One state did not comment on this question. The leasing of hunting rights to individuals or small groups, the control of a considerable portion of the best quail habitat by private hunting estates, and the increased amount of posted land were important factors in some states which made it difficult for many hunters to find a place to hunt. Several states reported that because of the increased land restrictions overshooting occurred on some areas. Poor availability of the birds is an almost universal complaint. A large portion of the birds in some states is found in wooded areas which are developing into impenetrable thickets due to timber removal and fire exclusion. Hunters often complain that quail "have changed their habits" and are no longer found in the fields as formerly but only in the woods and thickets.

MANAGEMENT

One measure of the importance of a game species is the amount of money spent for its maintenance. In 1940, eight states, Mississippi, Florida, Kentucky, Virginia, Louisiana, North Carolina, South Carolina, and Tennessee reported that they spent a total of $215,075 exclusive of law enforcement but including the state's share of Pittman-Robertson Projects, to investigate or manage quail. In 1950, these same states spent $554,185, an increase of nearly 158%. During the same period, these states reported an increase of 115% in license sales and 192% in total revenue. In 1940, these eight states reported that their expenditures for quail management or research amounted to 8.4% of their total annual expenditures while in 1950, 7.1% of their total annual expenditures were made for the benefit of quail or quail hunting.

HUNTING RESTRICTIONS

A management procedure common to all the southeastern states is the adoption of regulations for the taking of game. Hunting restrictions were somewhat more

stringent in 1950 than they were in 1940; eight of the ten states replying to the questionnaire reporting shorter seasons, smaller bag limits or both. In Kentucky and South Carolina both the seasons and the bag limit were the same in 1950 as in 1940. For the 10 states, the length of the open season averaged 12.5% less in 1950 than in 1940 and the bag limit averaged 22.7% less in the same period.

RESTOCKING

Goodrum (1949) reported that in 1948 the trend in 39 states circularized appeared to be away from restocking as a management procedure. This trend does not seem to have made much progress as yet in the southeast. Although the number of states which operate game farms has decreased during the last decade, 7 in 1940 versus 4 in 1950, the number of quail stocked by the states has increased. Large game farms are operated by Kentucky and Tennessee, smaller ones by Virginia and Louisiana. Florida is constructing a game farm for the propagation of quail to be sold at cost to individuals cooperating in their feeder program.

In 1940, all of the 10 states reporting, stocked quail as a management procedure; in 1950, 4 states did so. Two other states reared or purchased a total of 8,946 quail in 1950 to supply field trials or for 4-H Club and FFA projects. In 1940, seven state-owned game farms produced 64,740 quail; in 1950, four such game farms produced 83,799 birds, an increase of 29.4%. In 1940, one state trapped and restocked about 7600 wild quail; in 1950, this state trapped and released about 8500 such birds. In 1940, five states purchased 25,174 pen reared quail for release; in 1950, two states purchased 62,152 pen reared birds, an increase of 146.8% over 1940. In 1940, two states purchased and released 34,500 "Mexican" quail; in 1950, no such birds were released. A total of 132,014 quail were propagated, purchased or trapped for release in 1940; in 1950, 154,451 such birds were released, an increase of 16.9% over 1940. The cost of this program could not be determined but a rough estimate would be that the total cost in 1940 could not have been less than $145,000. The cost of this program in 1950 could hardly have been less than $190,000. The cost of this program in the eight states which reported on their annual expenditures for quail work was 68% of their total outlay for quail management or research in 1940 and 34% of the total in 1950.

It is interesting to note that the four states still operating game farms and purchasing the largest number of quail for restocking have all recently completed research projects, which must have cost close to $100,000 in state and federal funds, to determine the value of releasing pen reared quail as a management procedure. These four projects (Marsh 1949, Perkins and Vernon 1948, Phelps 1948, Pierce, pers. comm.) were unanimous in conclusion that releases of pen reared quail were neither an economically feasible nor a very efficient method of supplying game for hunters or increasing quail populations. A certain amount of time lag can be expected, however, before the results of investigational projects are put into practice. It should be noted, however, that the quail production on one of these farms, Virginia's, has been drastically curtailed.

HABITAT IMPROVEMENT

All of the southeastern states have active farm game habitat improvement projects, carried on under the terms of the Pittman-Robertson Act. According to a

report published by the Wildlife Management Institute (1950), a total of $366,280 in federal funds had been obligated for these projects during the fiscal year ending June 30, 1950. With the matching state funds, this would mean that over $488,000 would be spent on these projects in a year's period. Most of these projects are devoted to production and planting of shrub lespedeza *(Lespedeza bicolor)* and multiflora rose *(Rosa multiflora)*. Most of these plantings are made in cooperation with the Soil Conservation Districts. Mississippi was also developing two state-owned areas for quail and other game and Florida had a small quail development project in Charlotte County. Approximately $49,000 in state and federal funds were available for the projects. At least seven other development projects were concerned secondarily with quail.

OTHER DEVELOPMENT

Some states are carrying on quail development work other than Pittman-Robertson Projects. Florida provides advice to private individuals who wish to improve their land for bobwhites and has initiated a quail feeder program. Kentucky is setting up a system of small game refuges throughout the state. Their goal is two or three per county. To date about 240 have been established. Mississippi and Arkansas have Youth Activities Projects operated in Mississippi, and possibly in Arkansas, in cooperation with the 4-H Clubs and the FFA. These projects involved about 9,000 farm youths in 1950, who did habitat improvement work or managed farm fish ponds on their farms. Tennessee is setting up an extensive Farmer-Sportsmen Cooperative Game Management and 4-H, FFA, Farm Game Management Program. North Carolina is distributing seeds for food patch plantings to those who apply too late to receive *Lespedeza bicolor* or who prefer annuals to bicolor. Kentucky, Louisiana, and Tennessee have extensive restocking programs in operation while Florida, Virginia and Mississippi distributed a few birds annually in connection with their other development projects. Mississippi maintains a quail refuge for bird dog field trials and other states encourage this type of activity in various ways. The cost of these various programs could not be determined.

RESEARCH

The Wildlife Management Institute's report indicated that there were six quail research projects being conducted during the fiscal year which ended June 30, 1950. The ten states which replied to the questionnaire reported on other Pittman-Robertson research project in operation. This later project, dealing with an evaluation of farm-game development work, was apparently initiated during the last half of 1950. There was, therefore, a total of seven PR research projects dealing with bobwhite quail active in the southeastern states during 1950. In addition to the above, several PR survey projects were concerned with quail as well as other species, and one PR research project, dealing with the value of bicolor field borders for quail, was completed by Arkansas in 1950. Some other quail research, not involving Pittman-Robertson funds, was being conducted, also, in the cooperative research units, universities, colleges, and several state game departments, governmental agencies, and private individuals.

According to figures published by the Wildlife Management Institute, the money allocated for quail research by the states and the federal government under the Pittman-Robertson program during the fiscal year ending June 30, 1950, amounted to slightly over 8% of the total amount obligated during the year for all PR quail projects. While complete data was not secured from all the southeastern states, enough information was obtained to show that in 1950 the amount spent by state game departments for quail research projects of all types did not amount to as much as 2% of their total annual expenditures for quail research or management.

Two PR research projects, active in 1950, were concerned with an evaluation of the effect of farm-game habitat improvements. One, Alabama 10-R, was concerned specifically with the value of field borders to quail; the other, Kentucky 28-R, with an evaluation of field borders and other plantings. One project, Arkansas 18-R completed last year, was a study of the value of bicolor field borders for quail. Kentucky's Project 19-R was concerned with a study of the effects of quail refuges as a restoration technique and a fox food habits study.

Four research projects were concerned with an evaluation of various quail management procedures and with the development or demonstration of new management techniques. Georgia's Project 20-R, Coastal Plains Wildlife Experiment and Demonstration Area, was conducting experiments on improved management of quail and other farm game and demonstrating management procedures applicable to agricultural practices. Florida's Project 11-R, The Charlotte County Quail Investigation, was providing data on the ecology of quail for the specific purpose of developing practical management procedures for quail in South Florida flatwoods. Mississippi's Project 33-R was designed to evaluate quail management practices and study factors influencing productivity. Florida's Project 24-R, Farm Quail Food Investigation, now completed, tested the suitability of various quail foods for use in the state's quail feeder development program.

In addition to the above, several PR research projects dealing with the effects of releases of pen reared quail upon quail populations have recently been completed. Louisiana's Project 2-R, Tennessee's Project 8-R, which also included studies on quail for relationships, and Kentucky's Project 6-R studied this problem. Earlier in the past decade, two other studies of the survival or effects of releases of pen reared quail had been completed in the southeast, one in Virginia and one in Florida.

Aside from Pittman-Robertson projects, several states have, or are contemplating research projects, dealing with specific problems which have arisen in connection with quail management or populations. Alabama is doing food habits work, studies on the effects of cotton poisons on quail, and a study of the food habits of foxes during the quail nesting season. These studies are apparently being made in connection with the Alabama Wildlife Research Unit. Tennessee is to study the ratio of juvenile to adult quail in hunters bags in specific counties in order to justify the existing open season or to recommend changes. Florida (Frye 1950) has been studying the value of quail feeders as a management procedure for supplying food where this is a factor limiting quail populations.

Several federal agencies are conducting quail research in the southeast. The Soil Conservation Service is studying methods for the best use of bicolor and multiflora rose and are also developing new strains of bicolor for use in the northern sections of the region. The merits of *Lespedeza japonica* and *L. thunbergii*

are being investigated. Studies are being made at the Alabama Cooperative Research Unit regarding the production and availability of bicolor seed during various months of the year. Quail populations on Alabama plantations which have extensive plantings of bicolor are being measured by personnel of the U. S. Fish & Wildlife Service. The U. S. Fish and Wildlife Service has a quail research project in Louisiana which is being conducted by Mr. V. H. Reid and Mr. Phill Goodrum. This project, which is being done in cooperation with the Louisiana Department of Wildlife and Fisheries and the U. S. Forest Service is designed to discover factors that would be of use in the management of quail on strictly forest land.

Several colleges have graduate students doing work on quail problems, presumably mostly for Master's degrees. One student at the Louisiana State University is studying food preferences of quail and the nutritional values of various grains and legumes. The Virginia Cooperative Research Unit has a long term quail research project under the direction of the unit leader, Dr. Henry S. Mosby. Various phases of the project have been investigated by graduate students as a part of their work for Master's degrees. Some of the results of these studies have been published by Mosby and Overton (1950). One student is so employed at present. The present work is concerned with a continued examination of the effect on over-winter survival of the removal of as much as 50% of the early fall quail population, and a detailed measurement of food and cover conditions on individual quail ranges and the effect of these two factors on over-winter survival.

Another recent investigation of importance has been that by Linduska and Springer (1950) on chronic toxicity of some insecticides to quail and by Coburn and Treichler (1946) on the chronic poisoning levels of DDT for quail. Some results of the value of corn fields to quail have been reported recently by Komarek (1950).

DISCUSSION AND CONCLUSIONS

As indicated by Goodrum (1949), quail research and management was making good progress when World War II started, but most of the gains were lost because of loss of personnel and the switch to a wartime economy. With the return to a peace-time economy, more or less, and the return or replacement of personnel, quail research and management appears to be gathering momentum. It would be easy to assume that the present increases in quail populations as reported by half of the states which replied to the questionnaire indicate a new population trend which is due to the renewed activities of conservation agencies and a return to peace-time economy and that the decreases reported by Goodrum were the result of curtailment of conservation programs and the stresses of wartime production goals. While this thesis would be encouraging if true, it might be best to defer judgment at least until the suggested trend becomes more pronounced.

Whatever factors have been responsible for reported increases or decreases in statewide populations, quail management and research programs have been greatly expanded during the past decade. The expanded quail programs have failed to provide better hunting conditions however. Due to increased land restrictions, an ever growing army of hunters is finding more and more difficulty in finding a place to hunt. The situation is aggravated further by poor availability of birds which often appear to have changed their habits from fields to woods and thickets. The

situation is one which promises to provide many headaches for administrators in the not too distant future. Planning and research now, to provide answers for future problems such as these, might ease the pain when it becomes acute. The expanded quail programs have also apparently failed to provide more game per hunter since hunting restrictions have generally become more stringent during the past decade.

In spite of completed research which has demonstrated restocking to be a very inefficient and uneconomical management practice, this program has expanded, also, during the last decade. Progress in the curtailment of this type of management has been made, however, since funds for restocking consume only half the proportion of the states' quail money that it did 10 years ago.

The states are engaged in a number of quail management activities of greater or lesser importance. One such activity, which promises to assume more and more importance in the future, is the farm habitat improvement work which is being encouraged in several states in connection with the 4-H Clubs and the FFA. Tennessee's farmer-sportsmen's cooperatives may provide an answer to the problems now arising because of increased land restrictions and poor availability of game.

All the southeastern states are engaged in extensive farm-game habitat restoration programs. Except for Florida, these programs are mostly concerned with the production of *Lespedeza bicolor* and the establishment of bicolor field borders. This program is by far the most important management technique presently being employed and nearly half a million dollars in state and federal money was allocated for it during the 1950 fiscal year. The principle of quail management through habitat improvement has been accepted by the states and is rapidly being sold to the public. Although the assumption that the most important limiting factor for quail is winter food and that the best remedy is a one-eighth acre food patch may be questioned, the field border program has been a most effective method for turning the thoughts of the public to the importance of habitat improvement and for providing an action program which could give participants the feeling that they were actually doing something to improve their sport.

The present status of the field border program well illustrates the difficult position in which quail research finds itself in the southeast. Arkansas' 10-R project was carried on along with an expansion of the field border program while Alabama and Kentucky have two more recently activated projects evaluating the value of bicolor. Georgia's Project 20-R and Mississippi's 33-R will apparently study the effectiveness of bicolor as a part of their program. These five projects were all activated during or after the field border program was started. Today the southeastern states have sold a $450,000 a year program to the public and are, at the same time, just beginning to be concerned over whether it will perform as advertized.

Kentucky's 19-R Project is evaluating the effectiveness of a program already sold to the sportsmen. Three projects, completed since the war, evaluated the effectiveness of release of pen reared quail — after the public had been sold on the value of such a program. While these projects are certainly of great value, it would appear that poor timing has greatly reduced their effectiveness. Many costly errors might be avoided if research preceeded rather than followed development.

Some projects are being conducted, however, with the aim of securing information on which to base future management practices or to secure answers to specific problems. The project being conducted in Louisiana by the U. S. Fish and Wildlife Service, Florida's Charlotte County Quail Study, Georgia's Coastal Plains Project, Mississippi's Quail Investigation and Studies on the toxicity of cotton poisons and the age of juvenile quail in hunters' bags all promise to provide valuable information on which to base more efficient action programs in the near future.

There is as great a need for more basic quail research as for pheasant research (Allen 1950) and most of those needs which have been outlined for pheasants by Dr. Allen are applicable to quail. Except for the program at the Virginia Polytechnic Institute, there appears to be no long term quail research being done at present in the southeast. The possibility of such studies being initiated at the state level appears to be remote, however. Funds allocated for quail investigations are hardly sufficient for effective serious research and present salary policies are seldom adequate to hold capable, trained biologists in research positions. As Dr. Allen has observed wildlife's careless attitude towards research is probably one important reason "for evidences of amateurism, inattention to fundamentals, and the want of a sound management philosophy."

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