

remember that particular feature much longer than if a number of identifying markings were used. Repetition and drill and testing pay off.

We know that in South Carolina and in Virginia, and in other places where this program has been presented that it has been well received. Increasing numbers of requests, not only in Warden training courses, but by sportsman groups, bird clubs, youth groups and others for this identification program lead us to believe that a simple presentation of such a program, coupled with numerous visual aids, has many possibilities for building up interest in waterfowl resources. It is very easy to lead directly from the identification phase into survey methods, flyway management and wetlands values. After an interest is gained it is easily expanded. We believe the first step in gaining that interest is through becoming more familiar with the duck itself.

If any of the members here are interested in instituting this program in your own State, Mr. Wade or I will be glad to give such information as we have, or you may write to the South Carolina Wildlife Resources Department, Columbia, S. C.

SESSION ON UPLAND AND BIG GAME

MANAGEMENT TECHNIQUES WHICH ENCOURAGE BOBWHITE QUAIL TO NEST

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For the last decade emphasis has been placed on increasing the bobwhite's food supply as a means of building up populations. Recent studies (Gehrken, 1954; Hunter, 1954; Rosene, in press) have indicated that this "one-shot" method of approach generally is not adequate for an effective quail management program in the Southeast.

Providing for adequate food supplies is of course important in quail management, but in many places deficiencies in the quality and quantity of cover on the quail range may be responsible for below-normal production. Coverts for quail in the southeastern states have generally deteriorated in the last 15 years and quail populations have declined in this region during the same period.

Most southeastern wildlife biologists are aware of the cover requirements of quail during the winter season, but many of them are not as well posted on the nesting cover needs of the species. A good nesting environment is vital to successful quail management as nesting success largely determines the size of subsequent winter populations.

Stoddard (1931) conducted the first thorough investigation of the nesting requirements of the bobwhite. Of 600 nests studied, 89 percent of the total were in unburned growth of the preceding season, 82 percent in growth sufficiently open at the birds' level for them to run about freely and 74 percent within 50 feet or less of an open, grassy edge. The results of his investigation can be used as a guide for management techniques which encourage quail to nest.

During the past eight years, bobwhite populations have been studied in relation to land use on quail preserves in Alabama and South Carolina. In this period an attempt has been made to correlate whistling cocks and corresponding breeding population with nesting cover types and breeding success.

STUDY AREAS

Good Habitat Other Than Nesting Cover: In 1952 and 1953, a South Carolina area of 2,342 acres which had an adequate supply of winter food and cover,

but was lacking in nesting cover, averaged only 12 whistling cocks per 1,000 acres. This indicated a low breeding population. During winters of these two years, there was an average of only 8.7 coveys for the same unit of area. Winter populations were believed to be well below the carrying capacity of the area for that season, an indication that the limiting factor was poor nesting cover. Apparently, breeding populations and nesting success both were low. There was little movement of quail to or from this area as surrounding lands had similar cover.

Fair Winter Cover and Food but Good Nesting Cover; and Good Winter Cover and Food but Poor Nesting Cover: A South Carolina area of 850 acres had only fair winter cover and food, but good nesting cover. An adjoining area of 895 acres had good winter cover and food, but poor nesting cover. During the four summers, 1950-53 inclusive, whistling cocks averaged 16.6 per 1,000 acres for the entire acreage. Over 2/3 of the whistling cocks were heard on the area with good nesting cover and only 1/3 on the area with poor cover. By winter, each year, a part of the quail population had moved from the area having fair winter cover and food to that with good winter cover and food. Winter populations on the latter area averaged 16.5 coveys per 1,000 acres, whereas on the former, there were only 11.3 coveys per 1,000 acres.

Good Nesting Cover and Good Winter Food and Cover: For the period 1950-54 inclusive, an Alabama area of 1,108 acres had the best nesting cover conditions of any studied, and also good winter food and cover. For the three summers 1950-53, whistling cocks averaged 34.3 per 1,000 acres and coveys in subsequent winters 39.8. Quail habitat around this tract was similar to that on the area, so there was little movement on or off the area.

SPECIFICATIONS AND TECHNIQUES TO BE EMPLOYED FOR GOOD QUAIL RANGE

Sound bobwhite management should provide for a vegetative pattern conducive to nesting. Several techniques can be applied to accomplish this goal. They are not listed here in order of importance as this order might change from one area to another because of variations in soils, topography and plant successions.

Composition and Density of Trees: On the uplands in the loblolly pine region, the most desirable woodland pattern for optimum quail range over a large area seems to be clumps, one to 15 acres in size, of mostly pine, with from one-third to one-half of the area in timber. In the longleaf region relatively high quail populations have been maintained with 90 percent of the area in a scattered stand of mostly pine. This variation in the amount of timber present in good quail habitat possibly can be explained by differences in the growth habits of the two tree species. The crown growth of longleaf is thinner than that of loblolly, so it admits more light. The ideal understory growth for quail habitat is one in which different age classes are present only in amounts necessary to maintain the "open" stand. Growth beneath the trees should be such that it is possible to see through the woodland. Plum and dogwood are desirable understory. On lowlands along drainageways, hardwoods usually volunteer more readily than on the uplands. If not suppressed, these tree species will become too thick.

This woodland pattern can be established by selective cutting when undesirable species can be removed and stems thinned to proper density. Controlled burning is also an aid in establishment and particularly in maintenance.

Control of Ground Cover to Proper Density: The density of breeding populations and nesting activity are governed to a large extent by the proper amount of ground cover for nesting. Vegetation so thick as to interfere with quail walking through it is not desirable. Low breeding populations, indicated by only a few whistling cocks, usually are found in such cover. Nesting attempts and survival of young are correspondingly low.

If the cover is too sparse or has been completely removed by a spring fire so that no unburned grass remains, breeding conditions are also unsatisfactory.

Proper ground cover density can be established and maintained by burning or mechanical methods. A controlled fire in early spring removes excess

vegetation and resulting growth is usually thin enough for quail to walk through. Disking is effective when sedge becomes too thick. In the woodland portions, the tree canopy should be maintained so that the amount of light which filters through is just enough to allow a weakened growth of ground cover.

The Importance of Bare Soil Next to Unburned Grass: This combination is important as it produces the type of "edge" along which quail prefer to nest. Cultivated fields can produce the desired edge. In large areas of broomsedge, edges may be made by disking strips 30-40 feet wide on the contour. This practice is most effective. Frequency of strips may vary according to topography but should range from 1-3 newly disked strips through each 40 acres of broomsedge. Strips should be continuous throughout the area and a 4-5 year strip-disking-rotation system should be used. A new strip is disked each year next to the old one. Thus, various stages of plant succession will be present each season which contributes substantially to maintaining good food and cover for quail. The rotation should be renewed when a strip has reverted to a thick stand of broomsedge. In the early spring, alternate areas between disked strips should be burned. The remaining unburned grassy edge adjoining bare soil is the desired pattern for nesting.

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THE BIRTH DATES OF ALABAMA DEER

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INTRODUCTION

Both in technical textbooks and in popular books on wildlife, there appears to be a misconception as to the time the white-tailed deer is born in the deep South. Trippensee (1948) on page 184 states, "May and June are the usual months of birth, but fawns conceived late in the mating period are born during the summer months and sometimes as late as October." On page 183 he states, "Mating or rutting begins in the autumn, usually in October in the North and somewhat earlier southward." Zim and Hoffmeister (1955) state on page 132, "The fawns, born in late spring (earlier in the South), remain spotted with white for four to five months." The data collected in Alabama shows that the fawning season extends over a considerable period of time and apparently has a peak in the late summer.

Studies on the mating and fawning seasons of deer have been made during the past two years under Federal Aid in Wildlife Restoration Project W-35-R. Some additional data were collected under a previous project. Acknowledgments are due the District Biologists and Refuge Managers of Alabama for their cooperation in collecting the data. Dr. A. O. Haugen of the Alabama Wildlife Research Unit has also assisted in collecting data and in verifying some of the ages of the specimens examined. C. W. Severinghaus and John E. Tanck of the New York State Conservation Department assisted in aging specimens early in the study.