

# HISTORY AND STATUS OF FOREST GAME HABITAT RESEARCH IN THE SOUTH

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In this presentation the term "game" will be restricted mainly to white-tailed deer, gray and fox squirrels, wild turkeys, and the bobwhite quail — species widely hunted for sport. The southern pine-hardwood forest is the natural habitat of these species, and their abundance is a function of its quality.

This southern forest habitat extends from the piney woods of Texas and Oklahoma eastward through Virginia; it comprises approximately 197 million acres. Since 1900 these forests and the intermingled agricultural lands have undergone drastic changes — events witnessed by many men still active in wildlife and forestry professions.

Coinciding with changes in the environment were wide fluctuations in game populations. In some cases increases were noted. For example, the crude farming, clearing of virgin timber, burning, and grazing of forest lands during the early 1900's increased the quail populations to highs that are unlikely to be equaled again (St. Amant, 1959).

On the other hand, extensive timber cutting and clearing for agricultural purposes, coupled with unrestricted hunting, practically eliminated deer and turkey throughout most of the South.

More recently the squirrel has experienced hard times as a result of upland hardwood eradication, conversion of bottom lands to farmland and pasture, and construction of large reservoirs.

## HABITAT RESEARCH DEVELOPMENT AND ACCOMPLISHMENTS

Scarcities of game had one redeeming feature. They caused concern among the public, and as a result pressures were exerted in State legislatures and Congress for action to save or restore huntable populations. Eventually several laws were enacted, forming the basis for present-day programs in wildlife management and research.

Wildlife research in the South began about 1885. Early investigators were generally biologists with strong zoological backgrounds. Logically, they oriented their research towards the taxonomy, life history, and protection of game.

Knowledge of the game species itself is essential, but nevertheless is only a part of good game management. It soon became obvious that one of the keys to game abundance is the habitat. Thus in the 1920's research agencies and personnel began to concentrate on the food, cover, and space requirements of specific game animals, and the habitat phase of wildlife management emerged as a definite discipline of research.

Probably the first significant habitat research was Herbert Stoddard's quail study in south Georgia and north Florida (Stoddard, 1931). This study was financed and published by a group of sportsmen in cooperation with the Bureau of Biological Survey of the Interior Department. It stemmed from the wish of owners of large plantations to learn about quail habits in the north Florida - south Georgia pinelands — an area then and now renowned for its quail hunting. Stoddard was perhaps the first to advocate prescribed burning for improvement of quail habitat. His recommendations are still being applied throughout the Coastal Plain.

Stoddard (1963) also studied the habitat requirements of wild turkey and formulated management measures that include timber harvesting and control of stand structure, regulated kill, moderate control

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of certain predators, common-sense use of fire to control understory cover, and planting of supplementary foods.

The Bureau of Biological Survey, now the Fish and Wildlife Service, conducted research through the 1930's. Mainly it was concerned with plant and animal surveys—the securing of data basic to setting hunting limits and seasons for various game species. The data also illustrated that the habitat was usually the limiting factor in game management.

In 1944 Fish and Wildlife Service personnel were permanently stationed in the South for the specific purpose of conducting upland wildlife research. At this time Phil Goodrum began his deer browsing studies in Alabama and Mississippi—areas where very little was known about the food habits and habitat requirements of the whitetail. About a year later Vincent Reid joined Goodrum in making quail studies in cutover longleaf pinelands in Louisiana—a forest type particularly suited to the highly popular quail. Walter Rosene began additional quail studies in Alabama during 1947. It is noteworthy that these Fish and Wildlife Service investigators emphasized the habitat in their research. Rosene (1954) found that burns made too frequently or too late in the spring may be a serious detriment to quail. Goodrum and Reid (1958) showed that deer reproduction is closely related to the availability of preferred food plants, that late summer is apt to be a very critical period, and that a variety of food including mast is essential to herd health. Goodrum was the first to call attention to the possible serious consequences of timber stand improvement on game, and by so doing influenced some organizations to recognize the need for forest habitat research.

Nationwide Cooperative Wildlife Research Units were inaugurated in 1935. They were an outcome of the realization by the Fish and Wildlife Service of the need for men trained in wildlife management. Units were established at Virginia Polytechnic Institute (VPI) and at Auburn, Alabama, in 1935, at Oklahoma State University in 1948, and at Louisiana State University (LSU) in 1962. Although their main purpose is to prepare students for professional careers in wildlife management, they also conduct research. The unit leaders, working with graduate students and university facilities, have generally concentrated on applied phases of animal research but have also made notable accomplishments in habitat research. The Auburn Unit has shown that it is difficult to over-harvest quail in a good habitat and that birds increase with controlled burning.<sup>2</sup> It has also demonstrated that short-term selective timber cuttings benefit deer foods, and that failure to remove surplus deer reduces the preferred food plants. At VPI, manipulation of the forest did not increase deer, but wild turkeys increased 1,000 percent in three years where managed clearings were present (McGinnes and Ripley, 1962).

In 1928 the Forest Service, U. S. Department of Agriculture, was authorized a program of forest research through the McSweeney-McNary Act. In addition to other items this act provided for research into the life histories and habits of forest animals and birds, and into the most effective methods for the management and control of such wildlife. The Multiple Use-Sustained Yield Act of 1960 re-emphasized the policy of the Forest Service in recognizing wildlife as a product of the forest, thereby further endorsing and strengthening habitat investigations.

Research by the Forest Service's Southern and Southeastern Forest Experimental Stations began in 1956 with publication of Hubert Burke's "Wildlife Habitat Research Needs in Southern Forests." Prior to this, the stations' research in silviculture, range management, fire, and ecology had contributed information to habitat management.

In 1961 the Southern Station—whose headquarters are at New Orleans—established a new project at Nacogdoches, Texas, from which the Station's habitat research in the Midsouth is directed and coordinated. Of the studies to date, one has measured the degree to which

<sup>2</sup> Baker, Maurice F. Personal correspondence. 1965.

forage declines as tree density increases (Halls and Schuster, 1965). Other studies have shown that forage responds immediately to thinning or removal of overhead timber, but that unless action is taken to keep the browse low it soon grows beyond the reach of deer and forms a midstory that seriously curtails forage at the near-ground level (Blair, 1960; Schuster and Halls, 1962).

The Southeastern Station, with project headquarters at Asheville, has evaluated forest types in relation to forage composition and quantity (Ripley and McClure, 1963), and has shown how timber cuttings can be managed to furnish needed tree reproduction concurrent with ample deer forage (Ripley and Campbell, 1960).

Large deer enclosures at both experiment stations contribute to a knowledge of deer carrying capacity.

Various States established fish and game departments soon after 1900, but for many years their activities were largely administrative or protective. The Pittman - Robertson Wildlife Restoration Act in 1937 gave them funds to begin research.

One of the first projects under the P-R Act was an east Texas survey of game species and food habits in relation to habitat types. Dan Lay and Phil Goodrum participated in this early study.

Habitat is now considered an important phase of wildlife research by most State game and fish commissions. Lay's (1957) work in east Texas points out critical limitations in forage quality and the relation between forage supply and prescribed burning. His studies on deer food and habitat, along with those by Goodrum and Reid, are the most intensive of their kind in the South.

In Louisiana, Robert Murry of the Wild Life and Fisheries Commission, is testing methods for planting preferred deer browse plants.<sup>3</sup> Other studies by Murry and associates show how the relative palatability of sprouts is affected by herbicidal treatments, and how burning at different intervals affects the forest forage.

Surveys by the Florida Game and Fresh Water Fish Commission reveal which major forest-habitat types are most productive for deer, and that acorns and palmetto berries, when available, constitute most of the food (Harlow, 1959). Harlow and Eikum (1965) demonstrated that selectively thinned stands of oaks yield as much mast as unthinned stands, and that a three-year burning rotation is best in pinelands. Strode (1957), also working in Florida, suggested leaving 20-50 oaks per acre and four den trees per 10 acres on longleaf pinelands.

Lewis (1964), working in Tennessee, found that a forest opening, or field, containing 10 acres, or areas of concentrated small fields, maintained larger resident turkey populations than smaller and more scattered fields.

Habitat research at a few southern universities is of recent vintage. Beckwith (1964), at the University of Florida, showed that forage increased substantially after site preparation in Florida sandhills and that deer use increased when one-half to three-fourths of the native plant cover was removed from plots one mile square.

Bryant Bateman at LSU, James Jenkins at the University of Georgia, and Henry Mosby at VPI have made valuable contributions in habitat - game relations and game food measurement.

Several other organizations contribute to habitat research. The U. S. Soil Conservation Service empirically tests practical soil and water conservation measures, and — mainly through the efforts of Vern Davison — has appraised game plants and made food habit studies. The Tall Timbers Research Council, under the leadership of Herbert Stoddard and Edwin Komarek, continue with ecological studies of particular significance in quail and turkey management. The Council's annual fire ecology conference is distinctly wildlife-oriented.

Appreciation of the need for good public relations has led many land-owning companies to begin habitat management and research pro-

<sup>3</sup> Murry, Robert E. Personal correspondence. 1965.

grams. For example, Carroll Perkins, a biologist with International Paper Company, takes pride in showing how large numbers of quail can be grown and harvested in south Georgia through a program of prescribed burning and planting brown-top millet on disked firebreaks.

The Wildlife Management Institute contributes to the Cooperative Wildlife Research Units and continues to encourage habitat research.

It is appropriate too that we mention the Forest Game Committee of the Southeastern Section of the Wildlife Society. This committee, appointed in 1954 and endorsed by the Southeastern Association of Game and Fish Commissioners, includes representatives from several Federal, State, and private organizations. It functions through subcommittees to improve and coordinate research, and to aid in disseminating the findings of research.

## STATUS AND TRENDS OF CURRENT RESEARCH

Perhaps the greatest contribution of experience and research has been to establish practical guides and operating principles for good game management. For example, the understanding that game abundance or scarcity depends largely on habitat condition is a simple yet fundamental concept that has evolved through the years. With this and like principles as basic patterns, a major task of present and future research is to fill in many of the details and to refine the application.

Several examples illustrate this point.

It is well established that forest openings are beneficial to wildlife. Now we need to work out the specifics of size, number, distribution, and maintenance, and to develop equations for predicting how various game species will respond to the openings.

It is possible, to some extent, to predict deer herd response on the basis of forage production. Now we must improve sampling techniques so the job can be accomplished objectively and efficiently and so that the meaningful factors of the forage complex can be delineated and evaluated.

It has been shown that squirrel populations fluctuate directly with acorn crops. Now we need to define the kind, number, and spacing of trees that will provide stable populations in commercial stands. High-producing mast trees can be spared during timber harvest or stand improvement, but land managers want criteria for selecting such trees.

In order to learn about research efforts and plans in the South Mr. Halls and I corresponded with various key individuals and organizations. Replies indicated that most recognize the inadequacies of present research and agree that much remains to be done. It was encouraging to note that there is now a definite trend to expand habitat research. Even though only 15 or so professional man-years of research effort are being expended annually, this is a great improvement over the three to four man-years of a decade ago.

Too, the scope of activities is widening. In the past, studies were mainly on quail and deer. Now there is a lively interest in the habitat needs of turkey, squirrel, and other wildlife.

Replies to correspondence also indicated that broad, empirical investigations are less evident now than in the past. Current studies are usually reasonably well defined as to objectives and procedures, and considerable thought is given to statistical control and interpretation. Many studies include long-term evaluation of basic concepts with the ultimate goal being the development of applied techniques for use in management. There is also a trend toward exploring the causative agents upon which existing concepts are based. Thus, in effect, studies are becoming more specialized and objective, both in the basic and applied aspects of habitat research.

Definitely on the bright side is the trend toward cooperative research. There was a time when each research organization and agency tended to operate largely independent of others. The results often were unnecessary duplication, inadequate financing, and poorly designed studies. Today much of the habitat research is cooperative. Investiga-

tions by the Fish and Wildlife Service and by the Forest Service are so located and organized as to complement each other. In several instances, private companies, universities, State game and fish departments, and Federal agencies cooperate actively. For example, large deer pen studies now under way in Arkansas, Louisiana, and Texas are possible only through cooperation. This working together to solve problems of mutual interest encourages efficient use of resources of technology and a broad application of research results.

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