

# The Role of the Hunting Plantation in the Development of Game, Fire Ecology and Management

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It is a pleasure to address a group of geographers such as you for four reasons.

One—It gives me an opportunity, which I have never missed the past 45 years, to talk about fire ecology, fire management and its early beginnings.

Second—It gives me the opportunity to discuss with you game management as a viable, economic land use which has been neglected by geographers.

Third—To point out to you the relationship of farming to fire ecology and game management.

Fourth—To illustrate the role that private hunting plantations of the Southeast have played in the development of game management and fire ecology.

The southeastern hunting plantations are a multiple-use endeavor, and the quail crop and other game are a by-product of certain kinds of agriculture and forestry practices. In many cases quail is the primary crop on these plantations, but on others the game crop is also very important but secondary.

I must define some terminology because the words “fire”, “plantation”, and “forest” have considerably different meanings to different people.

Unfortunately the word “plantation” has many different connotations such as the “cotton plantation”, “sugar cane plantation”, “rubber plantation”, and other such agricultural crops, but all are monocultures. The word has also been taken over by foresters so that now we hear of “pine plantations” and “tree farms”, also monocultures. Thus, a plantation is simply a word designating principle use of the land. “Multiple use,” a term widely promoted by foresters, usually means that more benefit will be derived in the long run both economically and environmentally, as well as aesthetically, than a monoculture of any one crop. The habitats of the bobwhite quail and much of our other game and non-game species are dependent upon land that is being utilized for either agriculture or forestry, or a combination of both and thus multiple use occurs widely its diversity depending on land tenancy.

Another word that needs clarification is the word “forest.” Forests, as we commonly term them, developed as a by-product essentially of game management and hunting. In 1062 Canute, The Dane, established certain areas as hunting reservations in England. His order stated:

“A forest consisted of: ‘a circuit of woody grounds and pastures, known in its bounds as privileged for the peaceful being and abiding of wild beasts and fowls of forests chaste and man, to be under the King’s protection for his princely delight, bounded with removable marks and meres . . . replenished with beasts of venery and chase and great coverts of vert for succour of said beasts; for preservation thereof there are particular law, privileges, and offices belonging thereunto.” (Leopold, 1933).

The history of forestry in central Europe certainly shows that most of the modern forests of that region began as hunting reservations and that the forests were secondary to hunting. The “circuit of woody grounds and pastures . . .” was also farmed in scattered patches and most of this farming was carried out on a rotation basis, leaving much of the land laying out so that it could recover and be farmed again. Most of the early references point out that forests were dense only in

certain areas, but in the hunting reservations trees were more widely spaced.

Today in our western national forests only a relatively small portion of the total acreage called "national forests" is actually in economical forestry. A large share of such land is in range and in open lands that are of benefit to game animals.

"Fire" also has several meanings. There is a considerable difference between a wildfire—a fire set by lightning or by man under circumstances that it burns fiercely and devastates a considerable portion of forest, and a controlled burn prescribed for stated objectives. Unfortunately due to the Smoky Bear program, until very recently all forest fires were considered wildfires.

"Controlled burning" is fire under control and has been used by man from his earliest beginnings for the simple reason that he lived in a fire environment. If he didn't control fire and use fire properly he could not have existed. It is recognized today, though debatable, that the early beginnings of man *did not start in forests* but in open parklands or savannahs and grasslands. Such open type forests are usually maintained by fire. The human animal is a grassland animal, not one of forests. What is the diet today of modern man? He is a cereal or grass eating animal. His present-day cereals trace back directly to early plant ancestors that lived in a fire environment and must have had fire at regular intervals to exist. In fact, today, the areas of dense forests left on the face of the earth are areas that have little human population. Even here in the southeastern United States wherever the wood pulp companies have acquired large acres of land and planted all in pine trees, the local human population has had to move out and many small towns have become ghost towns or ceased to exist. Harvest may be delayed 15 or more years. And the trend in mechanization in forestry today is such that very little human labor is utilized; it is mainly used to run machines.

Our early ancestors certainly learned, just as shepherds all over the world, that animals are attracted to the greening-up of a recent burn. Early shepherds knew on what kind of growth their sheep, their goats, their cattle, their horses gained weight and produced bountifully. They were not interested in why. They were only interested in the fire management aspect of fire—that is, if land is burned regularly then their animals or crops produced well.

There is the classic argument between the Roman poets Virgil and Varro in 20 BC. Virgil believed burning crop residue was a good practice. Varro insisted it was a bad practice (Komarek, 1973). Unfortunately science waited until the last two decades or so to test whether burning crop residue was a good or bad practice. All the scientific tests that have been made in the last 20 years show that it is indeed a good practice, for burning crop residues is a sanitation method, holds down insects and disease, and also turns the dead organic matter into quickly available fertilizer for the next crop (Hardison, 1976; Komarek, 1965).

When the Dutch settled New Amsterdam the first treaty with the Indians set up certain regulations on burning, for the Indians burned the grasslands on Long Island regularly from their viewpoint and for their purposes. The Dutch, however, wanted some of it left for wintering of livestock so insisted on parts of it being burned at different periods.

Forests first became of considerable importance with the beginning of industrialization and for this reason man had to consider methods on the control of fire, particularly in the younger stages of most of our forests' trees (Komarek, 1975).

In 1945 the term 'prescribed burning' was developed and is now used by government agencies in the United States. It is called "fire by prescription" and simply means that for a certain piece of land a plan must be made and certain kinds of fire are to be used as a prescribed treatment. Thus, the prescription resembles a medical prescription given to correct an ailment. Unfortunately, fire was kept out of many of our fire-type forests for a long period so that prescribed burning is indeed a good term because it is a prescription to make the forests healthy again.

Thus, fire management is the prescription or control part of the wise use of fire, and fire ecology is the scientific basis on which the management is based.

Both fire and farming have played a large part in the development of both forest and game management. The fire because of its direct effects on the vegetation; the farming because of the disturbance of the ground and the rotation of the fields, letting some lay fallow, which creates much more diversity and a much greater variety of

plants that are useful to various kinds of game.

“Game management is the art of making land produce sustained annual crops of wild game for recreational use.” (Leopold, 1933). I would expand this definition to include not only game for recreational use but for food and economic purposes. Hunting is a viable land use and many people will pay for the harvest of the crop, and who are not particularly interested in either the forest or the agriculture upon which the game crop is based. In some parts of the world the harvest of the game crop is sold and is a considerable item of income in the management of the hunting plantation.

Leopold (1933) stressed that *management is an art*, and not a science. There is this same confusion, of course, between fire ecology and fire management. Generally the arts antedate the science in agriculture, in forestry, in fire management, and in game management. That fire and food planting was part of game management in the earlier years was pointed out by Leopold (1933):

“William and Mary in England about 1694: ‘prohibited the burning of nesting cover in spring.’”

Marco Polo on his visit in the late 1200s to the Great Khan found that the Khan had great hunting preserves with a system of food patches as well as a complete system of feeding and cover control for the winter. Although I find no reference to fire in Marco Polo, I am certain that it was used both in agriculture and by the nomads for without burning of the grasslands there could not have been the kind of animals that Marco Polo reports, such as cranes, pheasants, partridges, etc.

Unfortunately, it is very difficult to learn much about the early use of burning in the United States since its settlement. Fire was such a common factor that the only fires that were ever written up and published in newspapers or journals were of devastating wildfires. The early techniques of the Indians and that of the early settlers as well have been lost except in a few areas. It has been a common practice for cattlemen in south Florida to burn on a regular basis the grasslands that were mixed with pines and cypress. Today it is still being carried on but in a more sophisticated way, but the techniques and the judgment of when to burn and when not to burn an area are pretty similar to what I saw some 45 years ago.

The development of various types of hunting dogs all over the world is also evidence of the early development of game and fire management. Hunting dogs must be seen for most types of hunting, and they were used not only to hunt animals for food and for sport, but to control other animals such as wolves as well. In northern Portugal there are special breeds of dogs maintained to protect the flocks of sheep from wolves and these dogs are equipped with metal-spiked collars to keep the wolves from killing them. The first hunting dogs in the Southeast were brought in by DeSoto, both the greyhound and the bloodhound to hunt down animals as well as intractable Indians. The dogs were later used in the handling of sheep, cattle and hogs.

Perhaps the best known hunting dog in the Southeast is the English pointer. To use these kinds of dogs one must have open country without too much brush. The birds these dogs hunt, either quail or partridge, inhabit open type grasslands. If the land gets too thick with brush then the country is no longer able to produce many of these birds.

With this as a background I want to discuss the development of both the science and art of both game management and fire in the Southeast and the role that hunting plantations play in developing both the science and the art.

#### EARLY HISTORY OF BURNING AND GAME

When the first settlers came into the northeastern and southeastern part of the United States they found Indians already using fire for many uses, particularly for hunting. The Indians knew very well that game congregated on the fresh burn, and this was probably the most important use of fire from a hunting standpoint. Much has been written about the spectacular fire drives for game. However, animals are not instinctively afraid of fire and only run from it when they feel trapped or when it is moving at a rather high speed. This is abundantly proven on the game preserves of Africa where millions of large and small animals live on land that is burned under a regular rotation of burning, and death or injury by fire of any of these animals seldom occurs (Komarek 1969.).

When we read the early historical accounts of both the Southeast

and the Northeast we find that the game upon which the colonists and explorers depended were the same as those of today which are managed by burning practices.

### EARLY DEVELOPMENT OF HUNTING PLANTATIONS

Early in the settlement of the Northeast, particularly Long Island, Staten Island, the New Jersey coast, and parts of Virginia plantations, of which game was a by-product, were in existence. Many such lands had been worn out and had reverted back to natural vegetations in different successional stages. Along with the constant use of fire (largely for grazing) in the woods, these areas developed into good game habitats. In fact burning was such a general practice in both the Northeast and the Southeast that very few writers paid much attention to it. This practice was not stopped until the development of forestry in eastern United States, which was very late in the 1800s and early 1900s.

As land was periodically fallowed, particularly in the South, and the practice of burning for livestock and other purposes continued, the game populations of some of the southeastern areas must have increased tremendously during the period after the Civil War. This was particularly evident in those areas that had good soils such as the Red Hills of the Thomasville-Tallahassee region and some of the coastal areas of South Carolina, North Carolina and Georgia. During this period scattered hunting plantations on old rice plantations were developed along the South Carolina coast as well as on Edisto and Hilton Head Islands. Others developed in the coastal area south of Savannah. Another area of considerable development was southwest Georgia and north Florida, and part of south Alabama. By the early 1930s there were well over 200 hunting plantations with an average size of about 10,000 acres scattered from coastal North Carolina, around the coast and into southern Alabama and Mississippi. Essentially this development followed the range of the longleaf pine.

### EARLY HISTORY OF BURNING RESEARCH

Although some botanists had pointed out that fire was a natural factor and that the vegetation and animals in the longleaf pine belt

E. V. KOMAREK

were adapted to fire, the earliest scientific work was done by Dr. H. H. Chapman of Yale University, who began his experimental work on the use of fire and the management of longleaf pine in 1923. Dr. S. W. Green did his initial work in animal husbandry at McNeil Agricultural Experiment Station in Mississippi on the use of burning for cattle and proved that cattle gained weight on burned land. H. L. Stoddard began the Cooperative Quail Study Investigation for the U. S. Biological Survey (now the Fish and Wildlife Service) in 1924. Also during the early period the Southeastern Forest Experiment Station was doing considerable work in the investigation on the place of fire in silviculture. However, about this same time the U. S. Forest Service made an intensive effort to stop all burning regardless of purpose, and the first such movement was called "The Dixie Crusaders". This was followed in later years by the Smoky Bear program. However, as this early history is documented partially in Schiff's (1962) book *Fire and Water: A Heresy of the Forest Service*, it is not necessary for me to go into this further except to point out that Dr. Schiff had been told that Mr. Stoddard was dead and that I had gone into hybrid corn work and was therefore not interested in fire. Consequently Dr. Schiff did not visit us while writing his book.

Both of these fire prevention programs had a missionary spirit and developed a zeal to stop all burning, not only the control of wildfires. However, as such missionary propaganda efforts developed they became mechanisms for half-truths. In spite of the work of Dr. Chapman, Dr. Green, Mr. Stoddard, the propagandists condemned fire for all purposes and at all times. To get their program over they played on the emotions of people and much of this early propaganda was directed at the assumption that fire was deadly for all wildlife.

#### COOPERATIVE QUAIL STUDY INVESTIGATION

Stoddard's report on the Cooperative Quail Study Investigation *The Bobwhite Quail, Its Habits, Preservation and Increase* was published in 1931. However, as the following statement portrays, he had some difficulties in having his fire chapter cleared by the U. S. Forest Service. He was employed by the U. S. Biological Survey but the study was privately financed by the owners of game plantations in the Thomasville, Ga., and Tallahassee, Fla. area, and other sportsmen.



“ . . . I had first outlined the fire chapter in 1928 and 1929, for I anticipated we were going to run into publication difficulties of a serious nature [with the U.S. Forest Service]. Manuscript originating in one bureau had to ‘go through channels’ and be approved by others concerned before publication. To make a long story short, I rewrote the fire chapter five times in the attempt to get it cleared. Finally seeing no other course to pursue, I passed the word where I knew it would spread to the effect that the fire chapter, already sadly ‘watered down’ would have to be cleared for publication or else I would resign and write a book on the subject that would not be a compromise.” (Stoddard, 1962).

Herbert L. Stoddard has rightly been called the “father” of modern wildlife management for his pioneering quail research. Although published nearly a half century ago his book has been reprinted and considered a classic. This study led the way to effective and productive management of the bobwhite and its habitat. In many respects Stoddard should be considered one of our earliest true ecologists—this in spite of the fact that his only formal schooling was in the elementary grades (Stoddard, 1969).

Aldo Leopold, in his own classic book *Game Management* (1933) had this to say:

“The first large-scale private practice of game management, in the sense of a rounded-out system of control of all actionable factors, based on a preceding scientific life-history investigation, was instituted by Herbert L. Stoddard on the South-Georgia Quail Preserves during the period 1924-1928.”

Durward L. Allen wrote in the introduction of Walter Rosene’s book, *The Bobwhite Quail, Its Life and Management* (1969):

“ . . . In the twenties, Herbert L. Stoddard had this bird under biological scrutiny. In the colorful setting of the deep South, he made good quail hunting better. His book, published in 1931, was the first major landmark in species management, establishing principles and methods on which an expanding technology could build.”

Stoddard felt that the main purposes of wildlife research should be for the preservation and increase of the plants and animals studied. When the Cooperative Quail Study Investigation was formed in 1924,

it is interesting to note that Dr. E.W. Nelson, Director of the U.S. Biological Survey (now the U.S. Fish and Wildlife Service, considered the purposes of the Investigation to be as follows: 1) to make a thorough life history study of the Bobwhite; and 2) to conduct the necessary research for the proper application of correct methods to increase the Bobwhite. Quoting from Dr. Nelson's letter (1923) hiring Stoddard for the investigation, he wrote:

“. . . The purpose of this investigation is to make a thorough study of the life history of the quail in southern Georgia, its relations to its environment, and all factors, both favorable and unfavorable to the maintenance of an abundant supply of these birds.

“. . . It is hoped that you will be able to definitely determine methods whereby the quail can be increased and maintained in numbers far beyond these at present. The subscribers to the fund hold their lands in that region mainly for the quail shooting they get and naturally desire a practical outcome to the investigation.”

Emphasis was placed not only on preservation but also on an increase in the numbers of quail. In the introduction of his report, Stoddard wrote:

“This programme as adopted among other things called for an intensive study of all phases of the life history of the bobwhite, with special emphasis on the character and improvement of the food supply and general environment . . .”

“The present and final report is a semitechnical and detailed summarization of the findings of the Investigation, prepared with a view to making it of interest to ornithologists, bird lovers, and conservationists in general, as well as of maximum value to sportsmen, game propagators, and others interested primarily in increasing the numbers of these outstanding game birds in the region under consideration.” . . .

#### COOPERATIVE QUAIL STUDY ASSOCIATION

The Cooperative Quail Study Association was organized May 1, 1931 and closed out in 1943. Stoddard was the Director and Henry L. Beadel was Secretary and represented the various plantation members in the Association.

The purpose of the Cooperative Quail Study Association was “. . . to observe and record improvements of methods developed on quail preserves in the Southeast, and last, but most important, to pass the results of such studies, experiments, and observations on to our members, *as an aid to the economical development of their lands.*” (Stoddard, Beadel, and Komarek, 1961). (italics by author)

Henry L. Beadel, owner of Tall Timbers Plantation, was an original donor to the Cooperative Quail Study Investigation. Tall Timbers Plantation had been burned regularly by his uncle Edward Beadel, and later by himself. However, in the early 1920s he was influenced by the no-burning propaganda, but in 1924 Stoddard's research already indicated a contrary viewpoint, so he conducted some experiments of his own in a very practical way.

“So the frequency-of-burning experiments consisted simply in excluding fire from selected plots for terms, of one, two or three consecutive years. Three years of exclusion were enough to convince me that the old-time settlers knew *very* well, in fact better than some of us do now, what they were about when they burned yearly.” (Beadel, 1962).

Although a retired architect, Beadel had a love for natural history and in his early years was a member of a group that eventually developed into the present Staten Island Institute of Arts and Sciences and associated with some of the earliest botanists and naturalists of that region.

During the years of 1932 to 1943, the clients of the Association owned hunting plantations from North Carolina to Stuttgart, Arkansas. All together Stoddard and I visited regularly more than 100 of these plantations. They ranged from very sandy soils as in some of the coastal areas to rich red land such as in the Thomasville-Tallahassee-Albany region, southern Alabama, southern Mississippi, and some even in the delta of the Mississippi River on rich black land.

The practices for developing the bobwhite quail followed those first promulgated by Stoddard in his book “The Bobwhite Quail” and included considerable amounts of time and effort to put in the proper kind of controlled burning. In fact we were called “quail doctors.” In most cases when we first visited the plantations the fault of the

problem was in the lack of the use of fire or its improper use.

Besides regular reports to the hunting plantation owners some publications were issued in small amounts. None of these editions were ever more than 300 to 500 copies and many of these went to various government agencies.

A considerable number of visitors came to the Association headquarters and these are listed in the "Cooperative Quail Study Association" by Stoddard, Beadel and Komarek (1961). It is interesting to note that not only private individuals visited the experiment station but also a great many government people from the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Soil Conservation Service, as well as many universities. A list of agencies and individuals from various other organizations that visited Sherwood Plantation to go over fire and other game management practices is large. The Soil Conservation Service held a one week workshop at Sherwood Plantation where Stoddard and I trained some of the first wildlife biologists in the Soil Conservation Service in both land and fire management for the Bobwhite quail.

The Cooperative Quail Study Association had a great impact throughout the United States. It proved to be a very successful organization and followed through the early work of the Cooperative Quail Study Investigation. Its publications in small editions became essentially classic writings. Unfortunately we were not able to publish in larger editions. In 1961 the annual reports were reprinted under the title "Cooperative Quail Study Association" Beadel, Stoddard, and Komarek. Although this edition was 1,000 copies it was soon out-of-print.

Thus, the impact of the privately financed Cooperative Quail Study Investigation was continued through the Cooperative Quail Study Association. On April 15, 1943 the Association was disbanded. One reason for its demise was the fact that certain forestry and agricultural practices, which were developing at a rapid rate, were detrimental to quail and other desirable southeastern wildlife. It was felt that more impact could be brought to bear on these practices if Stoddard and I became active privately in forestry and wildlife management. Stoddard became a registered forester as well as a wildlife consultant, in which capacity he remained until he died. I became deeply involved in agriculture and wildlife, and also as a private consultant.

At the end of the quail investigation Stoddard had been given the 1,000 acre property which is now known as Sherwood Plantation and which was the headquarters and experiment station for both the Investigation and the Association. In 1938 we (the Komareks) acquired Birdsong, 565 acres adjoining Sherwood on the south. Both properties were not far from Tall Timbers Plantation; thus, for many years Stoddard and I were able to do considerable experimental burning on our own properties at various times of the year as well as for management purposes. However, a larger area was really needed to test theories we had developed over the years for game management, fire management, forestry and agriculture.

### **THE GREENWOOD PLANTATION PROJECT**

In 1945 we were given the opportunity when my brother Roy and I were asked to take over the management of Greenwood Plantation.

A management program for Greenwood was outlined to Mr. John Hay Whitney (owner) and Major L. A. Beard, his representative. That active management project started in 1945 and still continues. It is amazing to me how little of Stoddard's original practices have had to be modified over the years. The results of these management and research projects have not been published except in a few brief items (Komarek, 1977). It is sufficient to say that Stoddard's methods have produced quail crops beyond any of our original ideas.

Basically the management practices consisted of three primary objectives, all of which were first discussed in "The Bobwhite Quail."

1. The proper use of controlled burning in the development and increase of the necessary plant and animal foods and of the habitat in which quail thrive. The proper use of controlled burning expanded and improved the habitat of the Bobwhite, and made hunting conditions more pleasant for the hunter. At the same time the semi-wide ranging hunting dogs could then be seen at their best.

2. The rebuilding of worn-out farm fields by past improper practices. Stoddard recognized that land of poor fertility could not produce abundant crops of quail. We increased dramatically the fertility of the 2,000 acres of farmland by the use of cover crops, rotations and higher fertilization of the corn crop. Much of this was accomplished by the development of a hybrid corn for the Deep South. This had

been done in cooperation with the Georgia and Florida Agricultural Experiment Stations and the U.S. Department of Agriculture. The breeding program for hybrid corn led to the creation of small isolated fields for different strains of corn located within the pine timber areas. These efforts of increasing the fertility along with the scattered fields in turn benefited the quail production (Komarek, 1954, 1957, 1976).

3. The proper management of the timberlands was first stressed in several of the annual reports and other publications of the Cooperative Quail Study Association. The commercial timberlands of Greenwood were put on a profitable sustained yield management program by selective cutting. Stoddard had pointed out that by opening up timber stands sufficient light could then reach the ground and produce larger crops of food for quail. Opening up the timber stands also prohibited the stagnation of the forest. Under this treatment the timberlands have more than doubled their increment in annual income and at the same time produced more quail.

Our original goal was 18 coveys for every two hunters, but for the last 10 years the actual find of coveys has been an average of 30 to 35. For many years there was an annual shoot on Greenwood with Stoddard to check the coveys. Fortunately he lived long enough to witness this dramatic response to his basic ideas.

#### TALL TIMBERS RESEARCH, INC.

During all these years, a Sunday morning "coffee klatch" developed in front of my wife Betty's bird window at Birdsong. At these very informal meetings all kinds of ideas were tossed around. The idea of a wildlife experiment station was also discussed with scientists and interested laymen who came that way for the coffee hour. Beadel was a frequent member of this "coffee klatch." Stoddard (1931) had pointed out that fire and the effects of burning—

“. . . present a complex problem, one that would require years of careful research on the part of the personnel of a well equipped experiment station to work. Such research is greatly needed and should be carried on, for fire may well be the most important single factor in determining what animal and vegetable life will thrive in many areas.”

Thus, at the Sunday morning meetings we dreamed of the develop-

ment of an ecological experiment station. The formation of Tall Timbers Research, Inc. was the culmination of over 25 years of discussion, contemplation, reflection and dreams by Henry L. Beadel, his brother Gerald, Herbert L. Stoddard, Sr., Leon Neel, Roy Komarek, Betty and myself, and many others.

On the organizational night of March 15, 1958 what had begun as a vision became a reality. Vital and central to that reality was the establishment of an ecological foundation which in general, would incorporate Stoddard's critical focus, on the ecological effects of fire and where emphasis would be placed, on a quest for an ecological understanding of a complex natural environment.

Ecology, once called scientific natural history, would be associated more closely with science education and healthy doses of "historical ecology."

The Charter contains the following statements:

"This corporation is organized exclusively for public, scientific and educational purposes and for no other purposes . . .

"The general nature and object of this corporation shall be to conduct public, scientific experiments . . .

"To instruct the public on subjects useful to the individual and beneficial to the community . . .

"(To operate) . . . any and all manner of biological stations, research and experiments . . .

"To manage and conduct ecological research . . .

"(To conduct) demonstrations or educational work in such fields as wildlife management and the proper use of fire as a management tool.

"To publish and distribute to the public generally any knowledge or information acquired as a result of such research, experiments and studies . . ."

I particularly want to emphasize two commitments made in that Charter: "*to instruct the public on subjects useful to the individual and beneficial to the community . . .*" and "*to publish and distribute to the public generally any knowledge or information acquired as a result of such research, experiments and studies . . .*" (italics by author)

The founders recognized the absolute necessity of developing public and scientific interest through long-term experiments, research,

and demonstrations. This meant a research institution so well structured and of such permanence and continuity that experiments lasting a century or more could be undertaken and brought to fruition, and where no subject of investigation was taboo in and of itself. There is real danger that the work of closely controlled governmental and university (even commercial) research institutions will tend to reflect policy at best—and politics at worst—instead of objective study. The history of fire ecology and its relationships to the ecology of plants and animals as well as man shows the danger of such a situation. The present pesticide controversies also serve to point up the lack of independent, privately organized, yet public, non-governmental biological research organizations.

On the other hand, long-range undertakings bring up unique legal, financial, scientific, and educational problems. How does one establish a study and an institution so that 100 years hence money as well as men or women are devoted to carrying on investigations begun so long before? And in so doing, how does one guard against “strait-jacketing” both the study and the institution in this changing world? A basic ecological principle is “always there is change” (Allee, 1932) and an organization must be flexible within itself to change when necessary.

#### TALL TIMBERS RESEARCH STATION

Shortly after organization, Henry L. Beadel transferred 34 acres for the development of an ecological experiment station, and upon his death we acquired the remaining nearly 2,800 acres of Tall Timbers Plantation. This is known as Tall Timbers Research Station. In both the Charter and Beadel’s will, this station is always to remain as a “fire type” preserve to be maintained by controlled burning, as an open park-like pine forest with an herbaceous vegetation understory. No timbering is allowed except for possible thinning and “. . . it is also contemplated . . . that mature pines will be allowed to die naturally and left standing for woodpeckers and other wildlife, and for ecological study and the study of the uses of dead and dying trees as food producers for wildlife, or as furnishing homes for wildlife.”

Even before the station was established, studies of ecological importance were started. Stoddard laid out 84 fire study plots of one-half



acre each, randomized over the 2,800 acres, with various frequencies of burning as well as fire exclusion (Stoddard, et al. 1962). Later other experiments were laid out for longtime study of fire effects, as well as other disturbance at different seasons by harrowing. When a television tower was erected in 1956 Stoddard began a study of the bird kills (Stoddard, 1961; Stoddard and Norris, 1967). This study is also to be continued for a long time. The tower is now 1,010 feet high and stands on 34 acres of land rented to the Phipps Broadcasting Company, WCTV. The grounds are maintained by the Station.

Studies are also carried on by staff members, and grants for graduate and post-graduate studies ranging throughout a broad spectrum of interests—mammals, birds, reptiles and amphibians, fish, earthworms, ants, insects, spiders and snails. Likewise studies have been and are being made on several botanical problems.

Results are published in standard scientific journals as well as in a technical bulletin series, and a more general Miscellaneous Publication series. Thus, Tall Timbers Research Station is not only devoted to fire research but the whole spectrum of living things. However essential to the experimental research, it is, of course, necessary to engage in more basic investigations as well.

In fulfilling our Charter—

“To instruct the public on subject useful to the individual and beneficial to the community . . . To publish and distribute to the public generally and knowledge or information acquired . . .”

and as well as to stimulate certain lines of scientific research, Tall Timbers Research Station has organized several different conferences. Tall Timbers Fire Ecology Conferences were first organized in 1962 and 15 such conferences have been held. These have not only considered fire ecology, fire effects, and fire management in the United States, but on a worldwide basis. Some conferences have been devoted primarily to certain regions, such as African, European, and North American grasslands. The Proceedings have been made available, to the “public generally” as well as to investigators. Although the Proceedings are published in editions of 4500 copies they become out-of-print within three to four years.

We feel we have accomplished our major goal—to stimulate fire research on a worldwide basis. Fire research is now a common field of investigation by governmental agencies, universities, and many other

E. V. KOMAREK

institutions and individuals. Stoddard's original statement in 1931 that "fire may well be the most important single factor in determining what animal and vegetable life will thrive in many areas" has certainly been documented on a worldwide basis in these conferences.

### CONCLUSION

I hope I have made clear to you the role of the hunting plantation in the development of game and fire ecology and management. I have discussed my first reason—fire and its early beginnings. I want to point out that the Thomas and Grady Counties, Georgia, and Leon County, Florida area is the birth place of what is now known as fire management and fire ecology in relation to the bobwhite quail and other plants and animals of the ecosystem in which the bobwhite habitat is developed. The Bobwhite is a key bird but it is also an index species for this entire ecosystem.

There has been a solid line of continuous research on fire and its effects on plants and animals for over 55 years, beginning in 1924 with Herb Stoddard's bobwhite quail investigation. All this research for all these years has been funded primarily by the hunting plantations of the southeastern states. To accomplish its goal it had to have international fire conferences. In 1974 we had a cooperative symposium with the Intermountain Research Council made up of state and federal foresters of that region primarily. The first speaker on the program presented a new policy of the Forest Service, the title of which was "From Fire Control to Fire Management, a Major Policy Change in the Forest Service." Since that time we have seen a change in all the large federal agencies that have the supervision of federal lands. We have seen most state forest services and most game departments recognize the value of fire for a great many different purposes for both plants and animals. As one of those that helped organize the Wildlife Society back in 1937, I have been chagrined that the wildlife profession was the last to recognize the value of fire in the management of wildlife in this country.

My second reason for talking to you today is because of the opportunity to discuss game management as a viable, economic land use which has been neglected by geographers. Not only has the role of the hunting plantation of the Southeast played a large part in the

development of game and wildlife management, but due to Stoddard's initial work with the bobwhite quail, this region is also the birthplace of what we now term game or wildlife management in the scientific sense. I wish to again point out the phrase used in the purpose of the original Cooperative Quail Study Association that stated, ". . . as an aid to the economical development of their lands." Unfortunately because of the romanticism and myths that have been attached to any kind of plantation, particularly the hunting plantation with the exception of those that are devoted to monocultures, even the geographers have overlooked this economic land use which is really an ancient land use.

Prunty documented some of the background in connection with the economic development of hunting plantations in the South in "Renaissance of the Southern Plantation" (1955) and "Woodland Plantation as Contemporary Occupance Types in the South" (1963).

In the Thomasville-Tallahassee-Albany region the economic place and effect of the hunting plantation on the surrounding communities has been important but generally not recognized. I have been concerned with these plantations since 1934. I know how many of them operate and I know in detail how Greenwood operates.

For example, the average 10,000 acre quail plantation has a winter home, a resident manager, a staff of servants for the house, a staff of employees for the farm and the quail work, for the dog kennels, and the dog men. In other words, if we look at the entire picture of an operating quail plantation on a 12-month period we find that it will take more than \$150,000 to run it successfully. This includes the house, the winter guests, the hunting dogs, as well as the management of the land. This comes to more than \$15.00 per acre per year. Many of the plantations because of bigger winter residences, more staff, and more polish to the hunting, etc., turn into the local economy even much more than that; as much as \$40.00 to \$50.00 per acre per year. In large measure much of this money is imported and spent in this region, in addition to the recirculation of dollars from the forestry and agriculture activities. These are some of the financial aspects and values of private hunting lands.

This area has led in the selective cutting of timber. This was initiated by Stoddard and is now carried on most intensively by Leon

E. V. KOMAREK

Neel. The initiation of this type of selective cutting, always taking out the poor quality trees and leaving the best to grow, was the complete reversal of the practice that had been used in the late 1930s, when usually the straightest and best trees were taken out.

The pine plantation, or the large areas devoted to pulpwood production, have moved people off the land and have destroyed houses to reduce taxes. It is rare indeed to find such a timbered property that becomes a monoculture of nothing but planted pine trees with a resident manager, let alone any real staff. They depend largely upon the State Forest Service to protect their lands from fire. The supervisory labor is usually situated a considerable distance from the woodpulp plantation. In the early development of the woodpulp industry much ado was made about the opportunity for labor. I want to point out that there are very few individuals working on the land in the woodpulp industry. When an area is planted to pine trees it produces little revenue for 20 to 30 years. When it is time to cut it is all done by machinery. Thus, very little local labor is utilized in the regular pulpwood type forest plantation.

There has been so much discussion about the value of different crops or different land uses. I challenge you geographers to show me a land use that will produce more income than by these multiple-use hunting plantations. It is a combination of forestry, agriculture, recreation, and game management. I want to repeat the figures that every hunting plantation (of those of which I am familiar) with a winter resident, resident manager and staff turn in to the local economy anywhere from \$15.00 to \$50.00 per acre per year, *for every single acre in their ownership*. Certainly there are crops that produce more per acre but these are limited in acreages such as peanuts, corn, or even pine trees.

The economical aspect of what a hunting plantation accomplishes in a community in which it is situated has been overlooked because it has not had a press. The plantations are not organized in groups like industry. They are individual enterprises. Today the Thomasville-Tallahassee-Albany region is a mecca for people interested in multiple-use, ranging from environmentalists, ecologists, foresters, game managers, and anyone who has anything to do with the use of the land.

I hope I have given you food for thought in looking upon the role

THE ROLE OF THE HUNTING PLANTATION

that private hunting plantations have played in the development of game and fire ecology and management in the Southeast.

BIBLIOGRAPHY

- Allen, Durward. 1969. Foreword. *In: The bobwhite quail; Its life and management.* Rutgers Univ. Press.
- Beadel, H. L. 1962. Fire impressions. *Proc. Tall Timbers Fire Ecol. Conf.* 1: 1-6.
- Hardison, J. R. 1976. Fire and flame for plant disease control. *Ann. Rev. Phytopathology.* 14: 355-379.
- Komarek, E. V. 1965. Fire ecology—grasslands and man. *Proc. Tall Timbers Fire Ecol. Conf.* 4: 169-220.
- \_\_\_\_\_. 1969. Fire and animal behavior. *Proc. Tall Timbers Fire Ecol. Conf.* 9: 161-207.
- \_\_\_\_\_. 1973. Comments on the history of controlled burning in the southern United States. *Proc. 17th Ann. Ariz. Watershed Symp.* Phoenix, Ariz. pp. 11-17.
- \_\_\_\_\_. 1975. An historical and cultural account of private hunting in Florida. *In: C. R. Douglas and A. S. Jensen (eds.). Proc. Florida Game Bird and Preserve Conf.* Univ. Florida, Gainesville. 62 pp.
- \_\_\_\_\_. 1976. Greenwood. pp. 177-184. *In: R. W. Treftz (ed.) Heritage of Thomas County. Bicentennial Comm.* Thomasville, Ga.
- \_\_\_\_\_. 1977. A quest for ecological understanding. The secretary's review. *Tall Timbers Res. Sta. Misc. Publ. No. 5.* 140 pp.
- Leopold, Aldo. 1933. *Game management.* Scribner's Sons. N.Y. 482 pp.
- Nelson, E. W. 1923. Letter to H. L. Stoddard; in *Tall Timbers Archives.*
- Schiff, A. L. 1962. *Fire and water. Scientific heresy in the Forest Service.* Harvard Univ. Press. Cambridge. 229 pp.
- Stoddard, H. L. 1931. *The bobwhite quail; its habits, preservation and increase.* Scribner's Sons. N.Y. 559 p.
- \_\_\_\_\_. 1962. Use of fire in pine forest and game lands of the deep Southeast. *Proc. Tall Timbers Fire Ecol. Conf.* 1: 31-42.
- \_\_\_\_\_. H. L. Beadel, and E. V. Komarek. 1962. The cooperative quail study association. *Tall Timbers Res. Sta. Musc. Publ. No. 1.* 500 pp.