

TALL TIMBERS RESEARCH STATION



Quail Call



Fall 2001 ■ The Newsletter for Red Hills Quail Management ■ Volume 5, Number 1

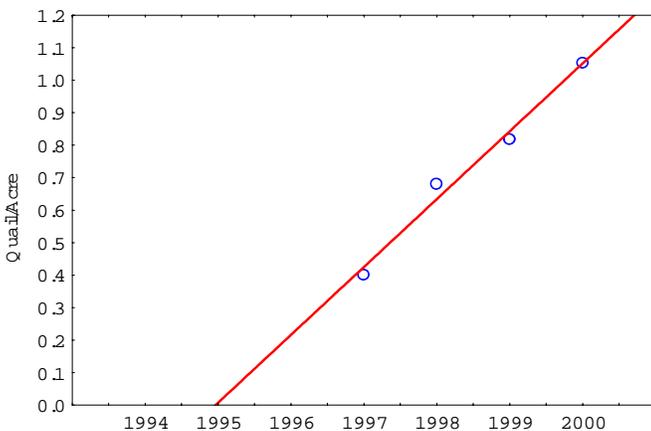
Jones Tractor Company helps Tall Timbers develop Model Quail Course

Jones Tractor Company has graciously agreed to provide a new tractor each year to Tall Timbers to support our *Model Quail Project*. This long-term relationship will help Tall Timbers to demonstrate excellent land stewardship on our properties. In the past, Jones Tractor has supported our field days where they have demonstrated innovative and useful equipment for quail management. Their continued partnership with Tall Timbers and their excellent service to the plantation community is greatly appreciated. Look for them at Fall Field Day.



New tractor donated by Jones Tractor Company to Tall Timbers is ideal for the model quail course. Standing in front from left to right, Kim Jones, Jimmy Carver, from Jones Tractor Company, Lane Green, Tall Timbers Executive Director, Vince Carver, Tall Timbers Land Manager and Dr. Lenny Brennan, former Tall Timbers Research Director.

October Quail Density using Covey Call Surveys



Bobwhite numbers have steadily increased since 1997 as we have instigated habitat management on Tall Timbers model quail course.

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Great season ahead

We expect quail populations to have increased across the plantations in the Red Hills Region between Thomasville, Georgia and Tallahassee, Florida in 2001. This, following increased quail numbers last year and record-breaking hunting success, should translate into improved hunting this season. With ample rainfall this year, ground cover should have been average to above average. Our data suggests that quail "enjoyed" increased survival this year over the past several years, which tends to result in increased overall populations due to increased productivity. If we have good hunting weather this season, we expect an increase in covey finds for the 2001-2002 season.

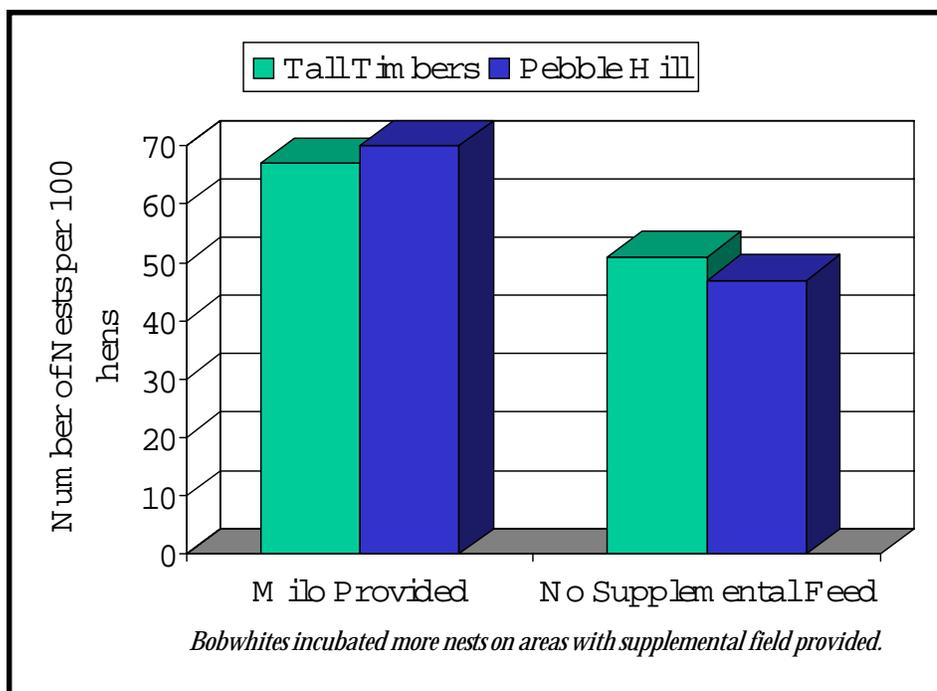
The Game Bird Program also had a successful year of research. We greatly appreciate your continued support of our research and extension program. By leveraging our local support with funds and resources from grants and cooperators, we were able to double our productivity. We have taken on new projects this year, some with short and long-term implications for bobwhites in the Red Hills and the Southeast.

Supplemental Feeding Study continues

In 2001 we began a long-term study of supplemental feeding on four 1500-acre areas. This study is designed to assess the short-term and long-term costs and benefits of supplemental feeding year-round. Most importantly, we are assessing the population response of bobwhites provided with supplemental feed. The key questions are does supplemental feeding improve productivity every year and does supplemental feeding result in greater bobwhite populations over the long-term? In the past, we have reported on how supplemental feeding appears to reduce the impact of weather conditions and increases the effective nesting season by > 30 days. This year, we documented increased production during a "normal" weather year. Over the long-term, improvements in survival and reproduction, especially during periods of extreme weather conditions, may result in higher "low's" and "high's" in quail populations in the Red Hills.

As in 1999, the first and last nests occurred on fed sites on our study areas. This year nesting was greater on the two fed sites as compared to their paired unfed sites (see graph). This response appeared to be related to increased nest production of hens, as survival was not different across the fed and unfed pairs of sites. When the success of nests was taken into account along with increased nest production, we witnessed a 40% increase in hatched nests on the fed site on Tall Timbers and a three-fold increase in hatch nests on Pebble Hill!

We fed between 1 to 2 bushels per acre of quail habitat per year on our study areas. We recommend feeding smaller grains, such as sorghum or wheat rather than soley corn or soybeans during the growing season. We know that chicks are utilizing grains at this time, especially after the first few weeks after hatching, and suspect this may improve their survival during the summer months. Because whole kernel corn is essentially too large for quail chicks, we recommend against corn during the growing season.



Rats! Quail are foiled again

This year there was a noticeable increase in cotton rat populations on our study areas. Based on the previous literature, we expected to find cotton rats depredating nests, and indeed as of this year, we have documented two actual nest depredations. However despite what you read about cotton rats being nest predators, they are of minor importance as nest predators because they have difficulty biting whole eggs. In fact, our video documents two rats attempting to depredate a quail nest over a three-hour period and while they manage to disrupt the bob's nest, they only destroyed two eggs in the process. In the past, investigators misidentified cotton rats as egg predators because the rat's scattered eggshell fragments from hatched nests or nests already depredated by another predator.



Bobwhite quail chick killed by a cotton rat.

So, does this mean cotton rats are not important to quail management? What we did not expect to find was that cotton rats were killing young quail chicks. We discovered this during our early-morning captures of broods less than 10 days old. This year, our chick survival rates on Tall Timbers were lower than we expected given the excellent rainfall that provided good overhead cover. One



Brood capture ring that is erected before sunrise to capture chicks brooded by adults, and cotton rats, after sunrise.

morning during a brood capture, one of our field technicians, Mike Eudy, reported finding four 9-day old quail chicks in the capture ring that had been killed and partially-eaten by a small predator. The hen was still with the remaining brood of 4 chicks. Inside the ring (about 18' diameter) there were 3 cotton rats. It was not until several weeks later during another brood capture when Shane Wellendorf witnessed a cotton rat capturing and running off with a quail chick. Now we had solid proof. So, while cotton rats are not significant nest predators, another question is raised concerning their impact on bobwhite populations – their potential impact on chick survival.

Cotton rat populations tend to cycle in the Red Hills on a 4-5 year time frame. However, habitat management also tends to affect cotton rat abundance. Research at Tall Timbers shows that cotton rats increase dramatically in three year, unburned roughs. Therefore, we recommend maintaining a distur-

bance cycle of two years for quail habitat. Supplemental feeding tends to slightly increase rat populations, but most studies indicate that this is due to immigration rather than dramatically improved reproduction or survival. Given that cotton rats serve as a major prey base for the predator community, the next obvious question is how important are cotton rats as a buffer prey species for other predators that feed on quail or quail eggs? Read how our video camera results changed dramatically this year in the nest predator identification update below.



Video camera update

Over the past two years, we have documented the species of predators that depredate quail nests on our study areas. We documented the potential impact of common snakes (primarily the gray rat snake) and the lack of impact of most other snakes. Over the past two years, our primary nest predators, in order of prevalence have been snakes (44%), raccoons (22%), armadillos (20%), fire ants (8%), and opossums (4%).

This year, with the apparent increase in cotton rat populations on our study areas, the picture changed dramatically. We radio-tagged approximately 300 bobwhites on these two study areas and because of additional cameras provided by our cooperators (UGA and GA-USDA Wildlife Services (See Below) we were able to video almost every nest depredation this year. The most obvious change was that depredations caused by snakes and raccoons declined dramatically, accounting for only 13% and 4% of depredations, respectively. This year the order of importance was: opossums (22%), bobcats (17%), snakes (13%), fire ants (8%) armadillos (8%), raccoons (4%), and coyotes (4%).

This shift in the predator community did not affect overall nesting success on our study areas without predator removals. We suspect that the reduction in snake depredations may have been due to the abundance of cotton rats on our study areas. Essentially, the rats “buffered” the quail nests from depredations by rat snakes. The increase in bobcat depredations may have been just the

Visit the Tall Timbers web site (www.talltimbers.org) for more information on quail nest predators and to view interesting video clips of predators at quail nests, and of other quail behavior.

opposite situation. Bobcats, and coyotes, may have found more quail nests because they were searching nesting cover for cotton rats and simply found quail nests along the way.

What does this mean for predator management? Well it should be more obvious than ever that the predator-prey relationships in the Red Hills are complex and can vary from year to year. Only through intensive long-term research can we unravel the mysteries of predator-prey relationships of bobwhite quail. It is also apparent that it may be difficult to predict which predators will or will not impact quail nests in a given year. Therefore a balanced predator management program is recommended where predators limit quail abundance.

What does it mean to hunt a bird per acre?

We have noticed that plantation managers tend to be modest when we tell them they probably have > 1 quail per acre. However, with the advent of the covey calling technique

for estimating quail density, there have been several opportunities for measuring quail densities on various plantations and associating it with hunting success measured in coveys seen per hour. Despite the fact that every plantation hunts differently, the similarities and consistencies are apparent.

We and our cooperators in Albany have measured quail densities up to 2.5-3.0 quail per acre on more than one occasion and at more than one site. What does it mean, hunting-wise, to have one quail per acre? Based on the hunting records from various plantations, and associated density estimates the relationship goes something like this:

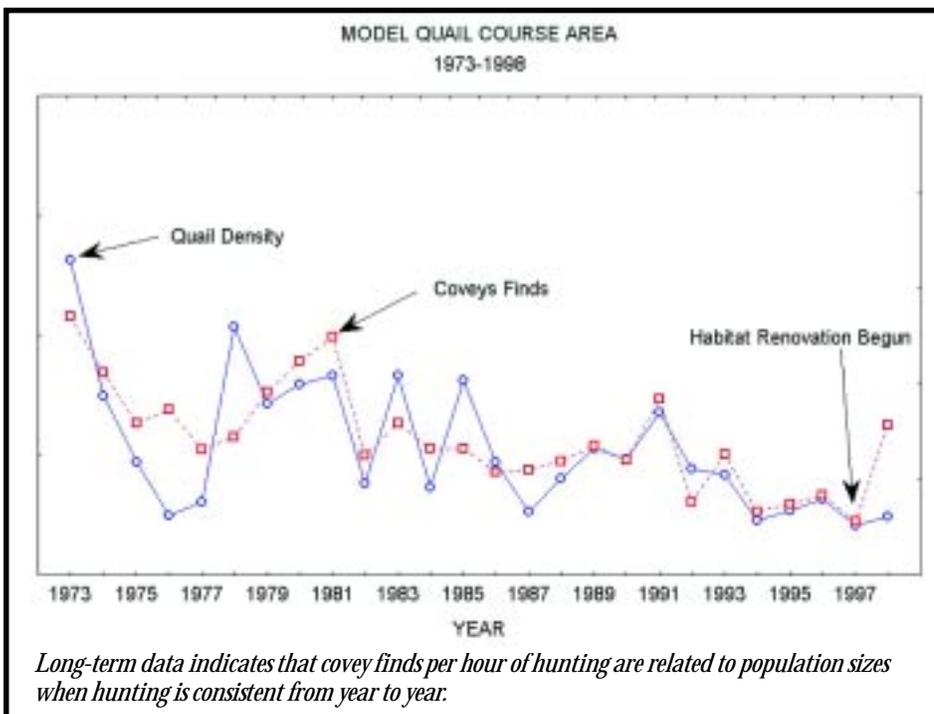
- 2-3 coveys per hour – 0.5-1 quail per acre
- 4-5 coveys per hour – 1-1.5 quail per acre
- 6-7 coveys per hour – 1.5-2 quail per acre
- 8-10 coveys per hour – 2-3 quail per acre
- >10 coveys per hour – too high to count

Having bobwhite populations that provide this range of hunting success is something to be proud of given the state of bobwhite in the Southeast. The take home point is that many plantations have likely maintained densities above one quail per acre for decades. But, why are we not seeing densities at four or more quail per acre? Combining this information with telemetry data on nesting, we are beginning to see evidence that at densities greater than three quail per acre during fall, the production of young (on a per capita basis) the following spring may decline because of some behavioral mechanisms. This suggests that density of three quail per acre is near the highest sustainable density. With the intensity of management reaching a zenith on some properties, the ultimate goal of plantation quail management may be managing annual variation in hunting success, rather than maximizing density.

New Research

Cooperative Bobwhite Genetic Study off to great start

Tall Timbers has a history of breaking new ground in quail research and management. From the development of quail transmitters in the 1970's to techniques to measure quail populations, assessment of supplemental feeding, predator identification using video technology and research on predation, the Game Bird Program at Tall Timbers enjoys tackling new territory. This year, we began a novel and exciting cooperative investigation to assess the genetics of bobwhite populations in the Red Hills. This research is possible thanks to recent advances in molecular techniques that provide an opportunity to investigate genetic issues through examination of small, repetitive, regions of DNA





Chicks are captured soon after leaving the nest to collect genetic information.

known as microsatellites. Using microsatellite DNA obtained from quail feathers, we are gaining insights into many elusive behaviors of bobwhite.

We have designated an area on Tall Timbers as the Genetics Research Area. Our goal is to maintain > 75% of the population radio-collared, to capture every chick that hatches and mark them and collect genetic information, and to track associations of all birds in the area to assess various behaviors, such as pair bonding and covey formation. In 2001, we collected genetic information on 154 bobwhites and 136 chicks on the 350-acre genetics area.

Our research team, composed of members from University of Georgia, Mississippi State University, and University of Nottingham, England, will be addressing questions that range from paternity of chicks to relatedness of individuals in coveys. Other questions include; how bobwhite genes flow in the

Red Hills as compared to more fragmented populations, how have bobwhites changed genetically since museum collections were taken in the 1920's, do released bobwhites alter genetics of wild bobwhites, and are bobwhites on the edge of the plantation range, or in isolated situations throughout the southeast, genetically different from bobwhites in the "core" plantation range? These issues have critical conservation and management implications, such as the impact of habitat fragmentation on gene flow.

The wild bobwhites of the plantation communities in the Red Hills are the last widespread population of wild bobwhites in the South. Today, we may be able to utilize their genetic condition as a benchmark to assess the genetic health of declining populations throughout the Southeast.

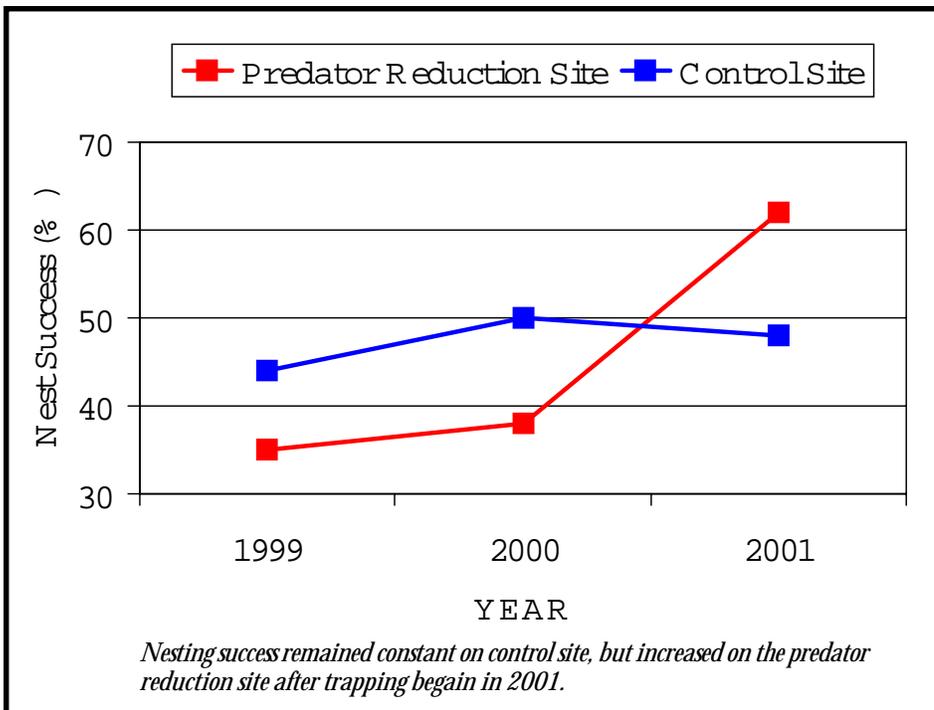


Cooperative Predation Management Study begun

The Game Bird Program is cooperating on a six-year project to assess the effects of predator management on quail survival, reproduction and population size. Including researchers at University of Georgia, Auburn University and Georgia-USDA Wildlife Services, and the Joseph Jones Ecological Research Station, the objective of this study is to determine whether reducing mammalian predators will provide landowners a means of enhancing wildlife production and populations on their lands. Any predation management program will not replace the more important need for widespread habitat management; however, it may provide a valuable additional tool for landowners to use to increase the production and diversity of wildlife on their land. This project is also an important test of the new regulation in Georgia to allow private landowners to remove predators, if they have a certified habitat management program on their lands.

We choose sites for predator management based on Integrated Predator Management ideas. Therefore, sites chosen for this study were based on the results of monitoring predator abundances and quail demographics on dozens of sites; work that was partially supported by Quail Unlimited. Two sites selected in the Thomasville-Tallahassee area are being monitored by Tall Timbers, and the Albany Area Quail Management Project is monitoring two sites selected in the Albany area. Wildlife professionals in the Georgia-USDA Wildlife Services are conducting predator removals. The goal of trapping is to maintain an ecologically functioning predator commu-

continued page 6



nity, but one below thresholds limiting quail production.

After one year of study the results are dramatic, but should be considered preliminary. On the removal sites bobwhite nesting productivity increased dramatically. For instance, on the predator reduction site monitored by Tall Timbers, the number of nests incubated per hen entering the nesting season increased 57% over the previous two years. Following predator reductions, nesting success increased from 35% and 38% the previous two years to 62% this year (See graph for comparison). That equates to a 2.5 fold increase in chick production over previous years.

How did our control site do this year? On our control site, nest production fell from the previous year. The number of nests incubated by hens entering the nesting season was 0.54 this year, down from 0.87 the past two years. Nesting success remained about the same on the control site over the last 3 years. The net result was that the number of

successful nests (on a per capita basis) on our control site was down 61% from last two years.

In addition to monitoring nesting and survival of adults, all aspects of quail demography are being assessed, including population sizes each spring and fall, annual and seasonal chick survival, and annual adult survival. In addition the food habits, abundance and age and sex structure of the predator communities are being assessed.

Any one-year's data is interesting and provides some insights for bobwhite management. Therefore, we will continue to update you on the progress from this project. However, only after completion of this project will we have a powerful answer for the importance of, or lack thereof, for predation management as a tool for bobwhite managers.

Snake Ecology Study underway

Given the interest in snakes we have teamed up with researchers at University of Georgia to learn more about

snake communities and habitats on our study areas. Many amphibian and reptilian populations throughout North America have been diminishing as a result of habitat loss, disease, pollution, and various other factors. At the same time we now realize that certain common snake populations may play an important role in bobwhite and red-cockaded woodpecker population demographics. This study, headed by graduate student Seth Stapleton, will provide us with information on how these key nest predators affect bobwhite quail and at the same time provide a broader picture of the snake communities in the Red Hills.

We are radio-tagging common upland snakes, such as rat snakes, to learn more about their habitat selection and how they interact with quail management. However we are also conducting surveys of the snake communities on our study areas. We hope to find methods of habitat management that reduce the impact of these nest predators on quail nesting.

Live oaks and longleaf

Removal of invasive hardwoods in upland pine communities on quail plantations has received a lot of attention lately. The goal of hardwood removals is to improve the ground cover to increase survival rates. We also suspect that a short-term reduction of certain predators may result in increased quail production and populations following hardwood removal cuts. In fact, on one of our study areas we have monitored for four years, we documented the highest reproduction and survival the year after live oak removals. Prior to live oak removals, breeding season survival (4/1 – 9/1)

of adults averaged 40%. After live oak removals, survival of adults increased to 57%. The timing of the adult mortality also changed in a significant manner. During the previous two years, predators killed 25% of adults during the last two weeks of April. After live oak removals, only 6% were lost during this period and survival remained high throughout the rest of the breeding season. This is significant because the longer quail live the more nests they produce. On this area, hens that incubated two or more nests survived at least 132 days. Hens that incubated only one nest survived as little as 46 days. Hens that incubated two or three nests produced 75% of the chicks for this population.

Creating large gaps in the pine canopy create challenges and opportunities for ground cover management. Fire will become less effective over time and hardwoods will encroach again. To help stop



Longleaf pine are adapted to fire. This young tree has bolted out of the grass stage. Although its pine needles have been scorched, the tree is unharmed.

the cycle of hardwood encroachment, now is the time to consider planting longleaf pine into these openings. We have begun a similar process on Tall Timbers and Pebble Hill to demonstrate and test various site-prep methods and tree spacing distances. Our goal is to discover methods to plant longleaf on old-field sites to avoid encroachment of old field pines, maximize seedling growth to get them quickly out of the grass stage, and minimize impacts on quail and quail hunting. If you would like more information on this, give us a call or stop by to see for yourself.

Herbicide tip

After burning an area next spring, notice where the sweet gums and water oak thickets still stand unharmed by the fire. This may be the most economical time to go back with a tractor or 4-wheeler and spray these patches of invasive hardwoods with herbicides. After all, they have already shown you they are fire-proofed and will certainly need to be mowed or chopped in the near future.



Fall Field Day 2001 at Pinckney Hill Plantation

This year Fall Field Day will be held at Pinckney Hill Plantation in Monticello, Florida on Tuesday, November 6 from 7:30 AM-1:30 PM. The featured speaker will be Rob Olson, Vice President of Delta Waterfowl Foundation. Delta Waterfowl is an independent, non-profit, waterfowl conservation organization. It is North America's leader in waterfowl ecology and waterfowling.

A field tour of the property and research updates are also on the program. Look for details and registration information in the mail.

2001 Bobwhite Quail Research Team

William E. Palmer, Ph.D., Robert C. Balfour, Jr. Game Bird Management Research Fellow
Shane Wellendorf, M.S., Senior Research Technician
Eric Staller, M.S., Senior Research Technician
L. Wes Burger, Ph.D., Board of Trustees, Research Associate, Mississippi State University
John Carroll, Ph.D., Research Associate, University of Georgia
Koon Wah Fok, Research Associate, University of Nottingham, U.K.
Brant Faircloth, Graduate Student, University of Georgia
Seth Stapleton, Graduate Student, University of Georgia
Ryan Thornton, Graduate Student, University of Georgia
Kristine Oswald, Graduate Student, Mississippi State University
Katherine Crook, Research Technician
Michael Eudy, Research Technician
Cory Croft, Research Technician
Brent Womack, Research Intern



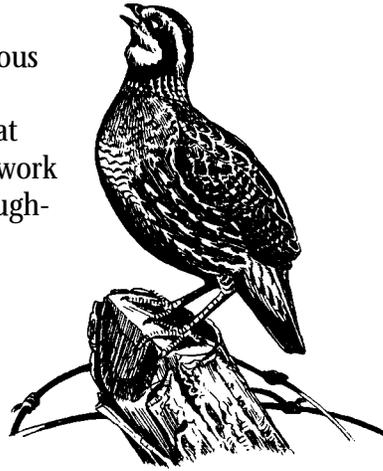
Support Quail Research!

Quail Research Initiative

In 1994, Tall Timbers embarked on an ambitious three-year quail research initiative (QRI). This project demonstrated overwhelming results that warranted continuation of this research. Our work has positively affected quail management throughout the Southeast. QRI is now a long-term research and conservation project.

Our annual fundraising goal is \$250,000 per year. We hope you will consider a gift. Remember, no gift is too small and is exclusively for quail research. If you love these birds as much as we do, please fill out the enclosed envelope and mail today!!

Thank you for supporting quail research at Tall Timbers.



Next issue: Scale of management

- What scale of management do quail respond too?
- What type of feed is best during the growing season?
- Update on new genetics project
- What habitats are selected and which avoided by bobwhites on plantations?

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 Established 1958.*