



# TALL TIMBERS

# Quail

# Call



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2003-2004

VOLUME 7 • NO 1

## What a difference a year makes



By now you probably have walked over enough hunting grounds to realize that bird numbers this season are down from the previous year's record populations in the Thomasville-Tallahassee area. If you have been reading our Research Notes, you will probably have an idea about why the decline occurred. In the next few paragraphs I will explain in greater detail why some properties are down 10-40% this year following last year's great numbers and what we have learned this year that may help to improve bobwhite numbers in the future. While weather induced declines in bobwhite populations are inevitable, good management can often reduce their severity.

### Cold winter weather, heavy predation, slow start

In 2001-2002 carryover of bobwhites from September to April was very high. This helped to boost production in 2002 and ultimately record production for many properties in the Red Hills that season. This past winter of 2002-2003, our radio-tagged bobwhites exhibited much lower survival. For instance in 2001-2002, most coveys had greater than 75% of their members survive the peak hawk migration periods of late-winter and early spring. In contrast, in 2003 most coveys lost more than 50% of their membership to predation. While predation was not that high everywhere these data indicate there was a trend toward higher mortality last winter. Lower over-winter survival can have a big impact on production of young the following spring. Therefore while carryover of birds from 2002 high populations was good, it was not as good as the year before.

The management key to reducing over-winter mortality of bobwhites is to minimize their predators' habitat on your property. This can be accomplished in most cases by reducing tree density to 40 basal area or less (see graph on p. 2), heavily thinning planted pine stands, and removing hardwood and pine thickets that harbor hawks and their prey. Reducing invasive hardwoods that suppress cover and supplying your birds with supplemental feed will also reduce the mortality caused by avian predators (if habitat is sufficiently cared for).

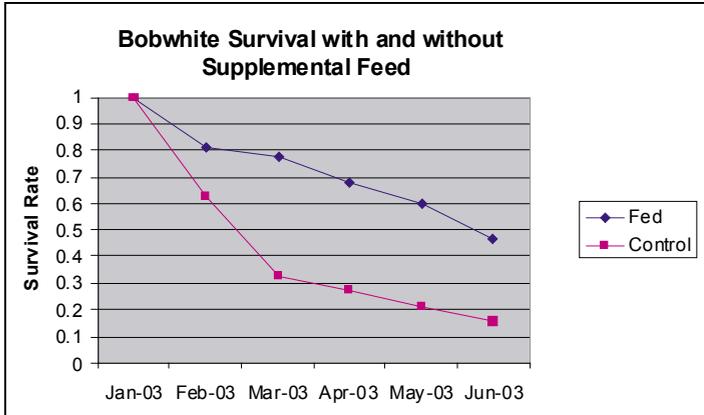


*Cooper's hawks are efficient bobwhite predators but with good habitat management and supplemental feeding their predation on quail can be minimized. Photo by Shane D. Wellendorf.*

For instance, the figure on the following page shows how bobwhites on Tall Timbers survived at a higher rate this past winter when supplemental feed was provided. When supplemental feed was provided more than half the birds survived until the beginning of the nesting season, whereas less than a quarter of the birds without feed survived. The impact of this difference in survival on nesting production and chick production is huge. Populations on the unfed site this fall declined 50% more than the populations on fed portions of the property. Why? A combination of improved survival and

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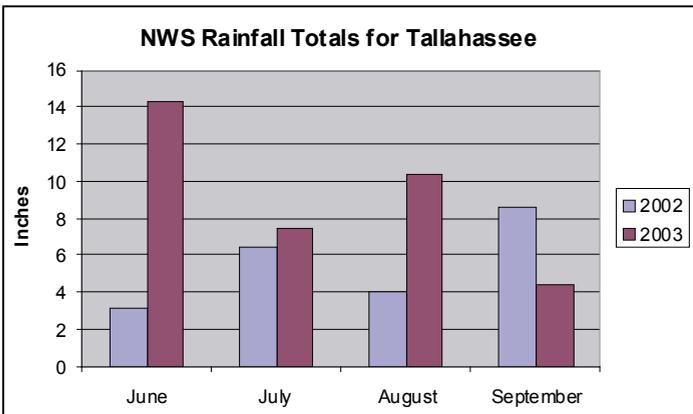


Bobwhite survival, January – June 2003 on an areas with and without supplemental feed spread twice per week on dedicated feed trails.

improved nesting resulted in higher production of chicks on the fed sites. If you are not supplemental feeding year-round you may want to rethink that decision.

### Peak hatch coincided with cooler temperatures and rainfall

For no apparent reason, nesting began nearly three weeks later than normal this past spring. While this had no impact on total nesting for the season it did result in our first peak hatch occurring at a time when weather was less than perfect for young chicks. For instance, in June, rainfall was seven inches above normal and average daily high temperatures were three degrees below normal in Tallahassee. In our experience watching bobwhite quail chicks forage, we have noticed they become easily chilled when temperatures are below 85 degrees and two-thirds of the daily high temperatures during June through August were less than 90 degrees. Conditions did not improve substantially until September, when rainfall and temperatures returned to normal in the Tallahassee area. The impact on chick survival was tremendous. We essentially lost the first hatch of the season.



Consider the potential impact poor chick survival has on productivity of a quail population. When a hen loses its nest of eggs to predation she can quickly re-nest, often incubating a new nest of eggs within two and a half weeks. However, losing chicks over time while brooding, as was the case this year, means that hens had lost nearly two months to egg-laying, incubation and unsuccessful brooding of young. Many plantation managers noticed lower than normal “covey” sizes this fall. In fact, average covey size in November was down approximately 25% on our study areas.

Also as a result of our low chick survival and delayed re-nesting, we had greater production of young in September and October than normal. In fact, during our fall captures to band birds on Tall Timbers, nearly 30% of our birds were hatched during September and October. This is 5-fold higher than the normal percentage of late-hatch birds. As a result of the late hatch, covey formation occurred much later than normal in mid-November, rather than mid-October.

What can a manager do about the effects cool, wet weather has on chick survival? The only obvious answer is to ensure that habitat management is adequate for broods. Burning is essential to produce good brood habitat in the Red Hills. Broods select burned areas over unburned areas each year and dense cover at ground level during wet years is a negative for bobwhite chick survival. Ensuring fields are disked on a 2-3 year rotation will also provide good brood habitat. Finally, good timber management is essential for maintaining good brooding habitat.

### If cotton rats decline, do predators switch to quail?

We have monitored cotton rat numbers on Tall Timbers to establish how burn size affects rat populations. This past year there was a noticeable decline in cotton rats on Tall Timbers, and likely other properties in the area. As cotton rats are a major prey item for many predators in our area we expect that when their numbers decline, predation on bobwhite, their nests and chicks, increases because predators switch to alternative prey. While it is difficult to put an exact number on how this affected bobwhite production in 2003, it was likely a factor in lower chick production this year. We will continue to track both bobwhite and cotton rat numbers to see if a relationship becomes apparent over the low portion of the cotton rat population cycle.



## Wrap-up of 2003

Many different events came together this year to reduce production of bobwhites in our immediate area. The good news is the declines in numbers come following record high populations; this means that hunting will still be very good this season with covey finds similar to 2001. Interestingly, temperatures and rainfall were essentially "normal" in the Albany area and according to Clay Sisson, of the Albany Quail Project, their brood sizes were normal this year. Last year it was almost the opposite, with record hatches in the Thomasville-Tallahassee area and only average hatches in the Albany area due to dry weather. What a difference an hour drive can make for bobwhite populations!

## Dynamics of bobwhite populations at high density



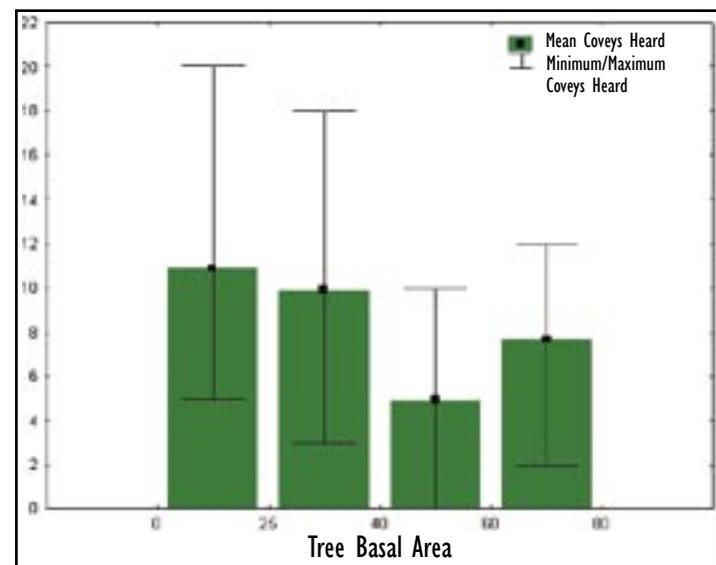
Over the past 10 years, Sunny Hill Plantation has developed a tremendous bobwhite population. In fact, last year we documented over five bobwhites per acre on our study area on Sunny Hill. As previously reported this provided us with an opportunity to examine how bobwhite populations operate at high densities. In 2002 we noticed relatively low nesting effort by hens and this year our results were similar to 2002. Nests per hen were the lowest recorded for bobwhite populations since we began monitoring this statistic. Super-high bobwhite numbers (>4 quail/acre) have been found before, but rarely last over the long haul. If nesting effort by hens decline, then populations ultimately drop to high, but not super-high numbers.

To get a better picture of how bobwhite nesting is affected by density, we plotted how many nests are incubated per hen against bobwhite density over all the properties we have monitored. The results indicate that the highest nesting effort is obtained at densities of around two bobwhites per acre. The reason nesting is lower at low quail density is likely poor habitat or excessive predation. However, at high quail densities, the cause of low nesting is less clear, but may be a response of the bird to overcrowding. We are hopeful to determine the mechanism which causes hens to nest less vigorously at higher densities. Only then will we be able to develop or test different habitat management practices to change this phenomenon. For now, this relationship suggests it is possible to maintain populations at approximately three bobwhites per acre, but maintaining populations in the 4-5 bobwhites/acre will be difficult.

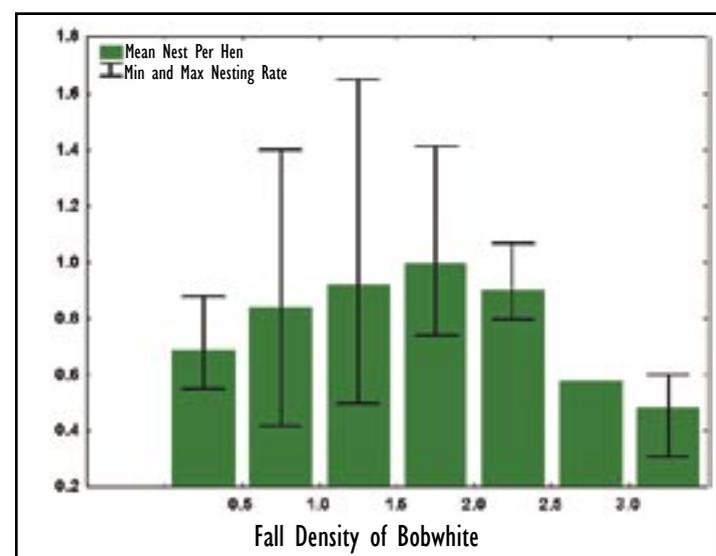
## Timber density and bobwhite quail abundance

While maximizing timber and bobwhite on the same area is impossible, the relationship between timber and bobwhite numbers has yet to be adequately quantified. Therefore, two years ago we began monitoring bobwhite numbers in the fall on sites across the Red Hills using covey call point counts and relating this index of bobwhite abundance to timber density. To do so, we are comparing timber basal area over 200 acre plots surrounding the point count. We obtain multiple counts from each point and take the most coveys heard at that point.

Timber density continued on page 4



Number of coveys heard in areas with different timber densities. Timber influences habitat, predators and micro-climate on the ground.



Nest production of hens by bobwhite density. Notice that at low and high densities, number of nests per hen declines. At the low end, this is likely a habitat or predation limitation. The mechanism causing low nesting at high densities is less obvious.

Timber density continued from page 3

While it will take many more points to establish a complete curve, early results support that density of pine timber can influence the population levels of bobwhite on a plantation. As you can see, there is a negative correlation between basal area and fall densities of bobwhite quail. But, below a basal area of about 40, the density of quail is not strongly affected by pine timber. At this point we have not collected enough sites to separate out the effects of different species of pine on habitat or fall densities. Our experience suggests that more longleaf pine can be carried per acre than old field pines; however this is just speculation at this point. More information on timber management and bobwhite can be found in our new “Red Hills Forestry Stewardship Guide” available from Tall Timbers. (See page 5.)

We also compared bobwhite numbers to timber density for 2002, a good production year for bobwhite, and 2003, a poor production year for bobwhite. Timber density had more of a negative relationship during 2003, the wet cool summer, than 2002. That is, during good years, all stands produce birds relatively equally, but during poor years, lighter timber maintains bobwhite numbers better than heavily timbered stands. Therefore, maintaining the correct timber density on a property managed for bobwhite may reduce the variation in bobwhite numbers from year to year.

There are economic and ecological trade-offs to consider when managing timber. For instance, Kevin Robertson, our Fire Ecologist, has begun studying how pine timber density affects fuels for burning and hence maintenance of bobwhite habitats. Specifically, he is quantifying if thinning pines ultimately results in increased grass cover and if grasses at lower pine densities offset the lost fuels provided by pine needles. Stay tuned for more information on this interesting study.

*These photos show how mature pine forests appear at different basal areas.*



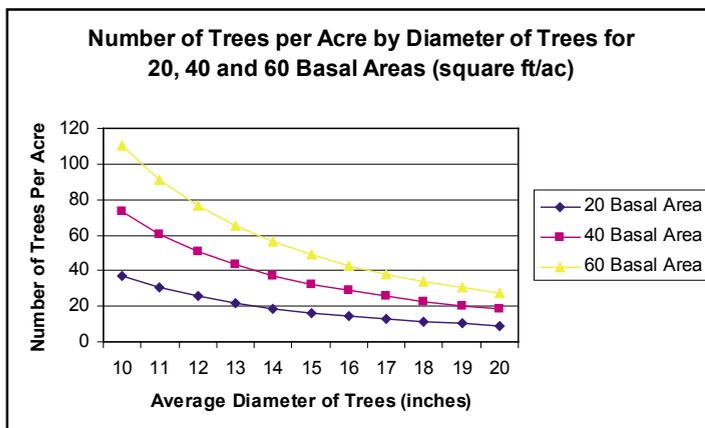
*BA40 – Mature pine timber. This density, or lower, will not limit bobwhite numbers.*



*BA60 – Mature pine timber. Between 50 and 60 basal area is a good balance for optimizing both timber and quail.*



*BA80 – Mature pine. Quail habitat declines above 80 basal area. Photos by Ronald E. Masters.*



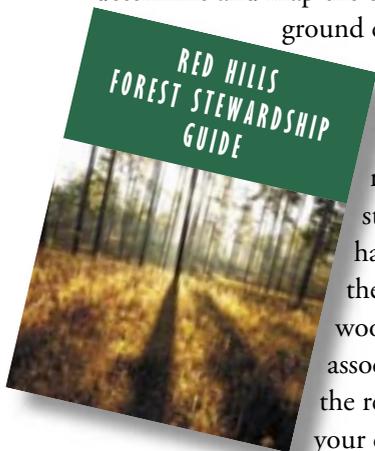
*The above graph numerically shows how many trees per acre exist at different basal areas for trees 10 to 20” in diameter.*

## Tough work, but somebody has to do it

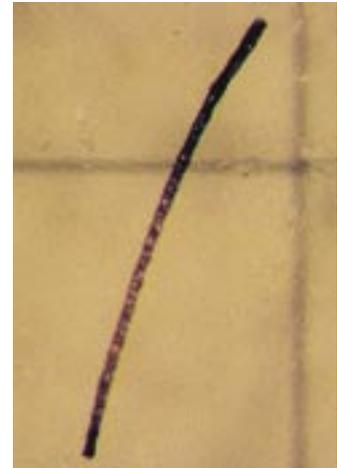
Although it is known that insects are a vital source of food for bobwhite chicks, little work has been conducted to identify which species are most important to the chicks. The abundance of these insects within brood-foraging habitats may influence chick survival and habitat use. Analysis of chick droppings collected from brood roost sites provides a non-invasive technique for investigating chick diet. To identify the type and number of insects present in the diet, insect parts unique to particular group of insects are sorted from the chick droppings and then identified and counted.

In 2002 and 2003, bobwhite chick droppings were collected at roost sites of broods 1-14 days old from farmland in central Georgia, and Tall Timbers and Pebble Hill plantations. Our 2002 data showed that beetles, ants, true bugs, cicadas, leafhoppers and aphids were the most abundant insects eaten by chicks at all three study sites. The proportion of grasshoppers and crickets in the diet of the chicks on all sites was very similar, approximately 7%. This consistently low proportion across the sites seems to indicate that bobwhite chicks have difficulty in catching grasshoppers which are generally very abundant on our study areas.

The *Red Hills Forestry Stewardship Guide*, the final product of a grant Tall Timbers received from the Turner Foundation is now available. The purpose of the grant was to determine and map the extent of native ground cover in the Red Hills, and to evaluate and describe forest management strategies that have perpetuated the open pine woodlands and associated values in the region. Order your copy today!



*An ant mandible, left, and an aphid tibia (leg segment), right, are only about a millimeter in size, but indicate the type of insects eaten by quail chicks. Over 2000 tibia were collected from a brood's droppings at one roost site.*



## 2003 Game Bird Research Team

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*This issue of the Quail Call was made possible through the generous support of Mr. and Mrs. Virgil R. Williams*

# Support Quail Research!

## Quail Research Initiative

Tall Timbers has a long and rich tradition of leadership in quail research. Beginning with Herbert Stoddard's first study of quail life history nearly 75 years ago, Tall Timbers has led the charge to gain new knowledge that can be used to improve quail management. In 1994, Tall Timbers embarked on an ambitious three-year initiative to help accelerate funding for the future of the Game Bird Program. Because of its overwhelming success in generating new interest and support for the Game Bird Program, the Quail Research Initiative (QRI) is now a long-term research and conservation program and serves as the nucleus for the funding of quail research at Tall Timbers. Since its inception, QRI has been able to leverage the amount of dollars raised with outside financial assistance. The Game Bird Program is able to match annual contributions to QRI with grants to increase the size and scope of quail research at Tall Timbers three-fold!

The Game Bird Program continues to be an innovative leader in the research and management of bobwhites, and serves as an important resource for those who value the future



of sustainable populations of wild birds. Once again, our QRI fundraising goal is \$250,000 for 2004. We hope you will consider making a contribution to QRI along with your annual membership gift. Contributions earmarked for QRI are used specifically for the Game Bird Program and the research projects contained within it. If you love these birds as much as we do, please take a moment to fill out the enclosed envelope and mail it today, or visit our website at [www.talltimbers.org](http://www.talltimbers.org) and make your QRI gift online.

*Thank you for your continued support of Tall Timbers and quail research!*

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