

lands,

***advising and directing graduate students doing research on natural resources,

***collaborating with wildlife, forestry, and range specialists to get management information into the hands of users and

***conducting research on game and nongame birds in upland settings.

Being selected as the first Bollenbach Chair is indeed an honor for me. Let me describe my background for those of you who don't know me. I have been in the business of game bird research and management since 1970. I've worked for Texas A&M University and Texas Tech University. I was associated with the Caesar Kleberg Wildlife Research Institute in Kingsville, Texas, from 1984 through August 1997.

During those years, my students and I studied sandhill cranes, mourning doves, ring-necked pheasants, lesser prairie-chickens, scaled quail and bobwhites. We took side trips into nongame birds, coyotes and grackles, among other topics.

Was all that research worthwhile? No. Some of it was downright goofy.

But without doubt research leads to keener knowledge and better management of game bird populations and their habitat. To make a useful management decision, one has to know what is going on, what works, and what doesn't. Research leads to low-fat management.

I look forward to developing new friends and

QUAIL NEWS is published by the Department of Forestry, Division of Agricultural Sciences and Natural Resources, Oklahoma State University, Stillwater, OK 74078 (phone 405/744-9431, email forfsg@okway.okstate.edu). Subscribe with a donation to GAME BIRD RESEARCH FUND. Direct inquiries or information to Fred S. Guthery at the above address. The Bollenbach Chair is part of the Oklahoma Agricultural Experiment Station.

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SEND QUESTIONS TO THE BOLLENBACH CHAIR; DEPARTMENT OF FORESTRY; OKLAHOMA STATE UNIVERSITY; STILLWATER, OK 74078.

programs in Oklahoma, while maintaining contact with supporters from Texas and elsewhere in the nation.

Feel free to call or write if you have a question about game birds.

Fred S. Guthery
Bollenbach Chair in Wildlife Ecology
Oklahoma State University



Population growth of Nantucket bobwhites

During February 1954 wildlife biologists with the Massachusetts Division of Fisheries and Game trapped 2 coveys of wild bobwhites on the mainland and released them on Great Island in Nantucket Sound. No bobwhites inhabited the island at the time of release.

Thirteen of the 17 birds released survived to 1 April. The population grew to 60 birds by mid-October 1954 and to 94 by mid-October 1955.

For the first 2 years, the Great Island population grew at a finite rate of about 1.8. This number means the population multiplied itself by 1.8 from 1 fall to the next. This is a high growth rate. About the best a bobwhite population can do is double from 1 year to the next (growth rate of 2.0).

Population growth cooled down by the third year. The spring population stabilized at 40-60 birds and

the fall population at about 100 birds (0.26 bird/acre).

Why did the population grow rapidly and then stabilize? As quail populations become more dense survival may decline, production may decline or both. These declines are due to density dependent effects. The biologists conducting the research felt survival remained stable but production declined as the population grew.

"Initially, we thought the Island had only a moderate capacity to support quail because of limited food supplies," the biologists reported. "Accordingly, we maintained automatic bucket feeders from the time of liberation through the winter of 1957, but not thereafter. We doubt that the feeders had more than a minor role in the observed population responses."

Supplemental feeding has never been demonstrated to influence bobwhite populations, either positively or negatively.



Winter survival of plantation bobwhites

"Northern bobwhite populations have decreased in the southeastern United States since the early 1970s," report Kenneth R. Dixon and associates, Clemson University. "The cause for this decline is uncertain, but hypotheses include habitat loss resulting from monoculture timber management and agricultural practices, increased urbanization, excessive hunting, predation, invasion of fire ants and toxic chemicals in the environment."

Populations may decline because of low survival, weak production or both. The researchers set out to determine if low survival could explain the downward trend in southeastern bobwhites.

Survival of bobwhites in coveys not hunted (56.3%) was higher than in coveys hunted (19.9%). These survival rates apply to the 117-day period from 24 November through 20 March. Harvest took from 13.6% to 54.5% of bobwhites, depending on study area.

"While it is not our part either to advocate or to oppose quail shooting for sport, the data show that reasonable shooting is biologically possible, and ... would be most advantageous in early fall, in order that the kill might comprise birds from the doomed seasonal surplus."
--Paul L. Errington and F. N. Hammerstrom, Jr., 1935

Removal of 20 to 55% of the fall population of bobwhites had no conspicuous effect on the breeding population from year to year.--F. M. Baumgartner, 1944

"Bobwhites are able to absorb as much hunting as they do because (1) the impact of fall shooting on breeding densities is numerically less than the actual number of birds removed, and (2) the loss of potential breeders that does occur is partially compensated by density-dependent recruitment the following summer."--John L. Roseberry, 1982

"The hunting-nonhunting mortality relationship [for bobwhites] was intermediate between completely additive and completely compensatory, but nearer the additive end of the spectrum."--John L. Roseberry and Willard D. Klimstra, 1984

"Our work at Fort Bragg suggested that hunting may be a potential factor depressing bobwhite populations, particularly low populations."--Charles F. Robinette and Phillip D. Doerr, 1993

"Survival of bobwhites in hunted coveys was significantly lower than in nonhunted coveys."--Kenneth R. Dixon et al., 1996

The 9 hunted coveys were flushed by hunters and their dogs an average of 5.3 times, the researchers report. "Despite the number of flushes and disturbances to all coveys, 86% of the hunted birds were relocated in their respective coveys by dusk, and 94% of the coveys accidentally flushed had regrouped within 24 hours.

"Regrouping of covey mates after a hunt was not related to the time of hunt. Of the 5 hunted coveys that were together after dusk, 3 were hunted in mid-morning and 2 were hunted in mid-afternoon.

"Our results indicate that the declining population of bobwhites ... may be a combined result of hunting pressure and predation during late fall and winter," the researchers concluded. "It appears that hunting mortality is additive rather than compensatory, depending upon the relative levels of predation and hunting pressure, and the timing of hunting mortality."

For further information contact Kenneth R. Dixon, P.O. Box 709, Clemson University, Pendleton, SC 29670. Ask for a reprint of *Northern Bobwhite Habitat Use and Survival on a South Carolina Plantation During Winter*.



Heat shrinks usable space for bobwhites

Recent research by scientists with the Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, indicates high temperatures at quail level limit the amount of habitat available to bobwhites.

N. David Forrester and Will E. Cohen measured operative temperatures at points where bobwhites occurred and at random points to determine how heat affects the occurrence of bobwhites in habitat space. Operative temperature usually is a few degrees higher than air temperature because of the added heating effects of sunlight. Quail respond to operative temperature.

On an annual basis, bobwhites seemed to avoid about 50% of habitat space because it was too hot. A critical temperature was 102 F. When the operative temperature at quail level reached this landmark, bobwhite used cooler space.

The results indicate that when one views 100 acres of habitat, only 50 acres may be available to bobwhites.

Bobwhites tended to occur at operative temperatures within their thermoneutral zone. This zone provides comfortable temperatures, as 72 F is comfortable to humans. The zone for bobwhites is thought to range between 86 and 95 F. The average temperature at bobwhite points was near 90 F during spring, summer and fall.

Bobwhites selected for cooler operative temperatures at landing points than at flushing points. This observation held for all 4 seasons. Bobwhites may need to dump heat after a flight, especially during summer. Muscle activity during flight could raise body temperatures near a dangerous level during summer, but this observation is speculative.

Managers may foster cooler temperatures at quail level by reducing grazing pressure and preserving mottes and strips of brush. Cooler temperatures may make more habitat available to bobwhites.



QUAIL QUESTIONS???

I have a quail lease in La Salle County, Texas. The past 3 years have not been good. The 1996-97 season was especially poor. Would you please give me your appraisal of the situation and your forecast for the coming years?—Richard S. Inge, Hammond, LA

What does the future hold for quail populations in South Texas and elsewhere?

Bobwhites and blues have been in a general decline in the United States for the past 2 decades or so. In fact, one projection indicates bobwhites will be extinct by 2005.

Texas in general and South Texas in particular likely will not follow the general prediction. Quail populations have enough habitat to persist indefinitely in this region.

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Year-to-year variability, booms and busts, will characterize quail populations in your semiarid region. These population dynamics will depend on rainfall patterns and amounts to a large extent.

Historically, the chances for a rainy, a normal, or a droughty year have been about one-third in the Rio Grande Plains. In other words, we expect 3 years in 9 to be rainy, 3 to be normal and 3 to be droughty. If you have a run of bad luck on your lease, say 3 droughty years in a row, the expectation would be for luck to improve. If luck improves with respect to rainfall, the population may require 2 or 3 years to reach high levels.

I have a quail lease in Fairy, Texas, which is between Hamilton and Hico. This lease is on a working ranch and is about 1,100 acres. This property is basically prairie with a creek running through the middle. It lacks sufficient cover to support more than 12 coveys. I am planning on disking along most of the fence lines and the rancher has agreed to leave an edge around all of the planted fields. In addition to that what can I plant for feed and cover that the cows won't eat?--James B. Cheatham, Conroe, TX

Annual sunflower (wild variety) is one of the few plants available that provides food for quail and doves and is not popular with cattle (the plant may be unpopular with ranchers). Another option you have is to work with native foods. A good plant in your area is one-seed croton, which will grow with the soil disturbance created by disking. Many other native foods will grow with disking.

Let us respectfully suggest that the primary management need on the ranch is not food, but rather usable space. If there is only enough cover to support 12 coveys on 1,100 acres, then more cover needs to be added. By adding more cover, if possible, the lease potentially would hold 70 coveys in good years.

Generally, it is not possible to increase the number of coveys by adding food to the good cover within which the coveys live.

Please respond to the question we have around predators. We agree that here in Georgia there aren't enough birds for hunters and predators.--Louis Schlein, Grovetown, GA

A discussion of quail and predators must always begin with this question: At what rate would quail die in a perfect environment, one with abundant food supplies and no predators, diseases, accidents or hunters? We do not know the answer to this question exactly, but it is probably 20-40% annual mortality. Pen-confined Japanese quail died at a rate of 40-50% annually with quality foods and disease and parasite hygiene.

Death from old age, or senescence, puts absolute limits on the response we can expect from taking predators out of a system. Animals with high metabolic rates, like quail, have short life spans in perfect environments.

A second important question is this: What mechanisms permit quail populations to persist under predator pressure? After all, quail and predators have been cohabiting the planet for something like 12,000,000 years.

There are 2 main considerations: behavior and density-dependent population processes. These are the primary mechanisms by which quail populations balance high mortality with high productivity.

The behavioral repertoire of bobwhites and other quail includes reneesting if a clutch is destroyed and multiple brooding. Reneesting alone permits most hens to be successful in a laying season even if the chance of success is low for any nesting attempt. Suppose 1 nest has a 65% chance of being destroyed. If, under this condition, a hen will reneest up to 3 times, she has a 73% chance of raising a brood.

Multiple brooding does not ordinarily add much to total production in a laying season, but this behavior does help counterbalance losses.

Density dependence is not a popular topic around campfires and clubhouses, but it is crucial to quail populations. Consider some quail management area. If the area has fewer quail, the quail will tend to raise more young per individual. Conversely, if the area has more quail, the quail will tend to raise fewer young per individual. Nobody knows precisely why density dependence operates, but we have known of its occurrence in bobwhite populations since the 1930s. Density dependence provides a counterbalance to predator losses when quail populations are low.

Here's a third important question: What is the risk structure in a quail population under management? This question relates to all sources of loss--predators, starvation, hunters, diseases, parasites, weather factors, accidents, old age--and the relative strength of each source of loss.

When we remove 1 risk, such as predators, other risks become stronger. A quail not killed by a predator becomes more vulnerable to death from a different cause. A nest not depredated by a raccoon becomes more vulnerable to trampling by a cow. The more diverse the risk structure for a population, the less impact predator removal will have on the population. It turns out one of the best ways to reduce predation on quail is to harvest more because of competing risks.

Now let's draw some conclusions from the somewhat theoretical prelude:

***Quail die at fairly high rates in perfect environments.

***Quail have population mechanisms for dealing with losses of all types, including predators.

***Quail become more vulnerable to competing risks when predators are taken out of a system.

These conclusions do NOT mean it is impossible to increase quail abundance with suppression of predation. The conclusions DO mean management with predator control is something like walking up a steep sand dune: for each step forward you slip back

three-quarters of a step, more or less.

We turn now to the back forty. Recent research with radio-tagged bobwhites has given an impression of what kills quail in the wild. Predators usually take a fairly heavy toll of radio-tagged birds. But let's invoke a note of skepticism here. Some of the annual mortality rates reported for radio-tagged birds are so high that a quail population cannot persist. That is, the population cannot possibly be productive enough to balance the high mortality rates.

We have to wonder whether the radio transmitters attached to the birds make them more vulnerable to predation. How do you think an Olympic hurdler would perform if he or she were handicapped with a backpack totaling 1-2% of body weight? Likewise, how would a quail perform in the Back Forty Olympics with the same relative handicap?

Finally, we have some examples of how game bird populations respond to the removal of predators. Consider partridge populations in England. Agricultural landscapes there provide inferior habitat (little livable space) that forces predators and game birds to occupy the same strips and patches of natural cover. There is ample evidence that predator suppression in such inferior landscapes increases game bird production.

On the other hand, consider the vast rangelands of south Texas, where predators and quail are not forced into the same small patches and strips. Field research shows that in such settings removal of mammalian predators has little, if any, effect on the abundance of bobwhites and blue quail.

The above answer to your question stands a chance of being more confusing than enlightening. Your supposition could well be correct if the landscape on your management areas fits the English model.

Note to the media: Feel free to use the information in Quail News. Please acknowledge the office of the Bollenbach Chair, Department of Forestry, Oklahoma State University.

Dear Readers,

Conservation and wise use of natural resources are vital for our future. At the same time, farmers and ranchers, as well as other citizens of Oklahoma and the United States, are seeking expanded economic opportunities and recreational experiences as well as an overall improvement in their quality of life. In Oklahoma and the entire Southwest region, wildlife has been and can be an increasingly important part of meeting these goals.

The Bollenbach Chair in Wildlife Ecology is a significant investment by the Oklahoma Agricultural Experiment Station aimed towards enhancing our knowledge about upland wildlife, and especially game birds, on private lands. We at OSU greatly appreciate the support of the many individual donors to the endowment. Their understanding and commitment to the vision have allowed us to create this truly prestigious research position.

We are excited that Dr. Fred S. Guthery has joined OSU as Professor and as the first Bollenbach Chair. He brings breadth and depth of experiences, a cooperative spirit, an understanding of private land management, and an innate inquisitiveness that insures success. Dr. Guthery will be working closely with faculty from many departments throughout OSU, cooperators with other agencies and organizations, and landowners across the region. We welcome him to OSU and look forward to his contributions.

D. C. Coston
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