

Integrated Predation Management for Quail Managers

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Quail and deer feeders are especially good locations to remove problematic raccoons. Game cameras can be deployed to provide intelligence on when, where, and how many raccoons are visiting feeders.



RC55 RAPIDFIRE

"For a Central American dictator, he died a natural death – he was shot in the back."

–Will Rogers

For a quail, a natural death is usually from fang or talon. Predation is the primary cause of death for a quail at each stage of its life, from egg to chick to adult. Various "mesocarnivores" (e.g., raccoons, skunks) rule the nesting season, while hawks rule the "quail skies" from October through April. Alas, quail managers, what can we do to mitigate the impacts of predation?

A Bird Nest on the Ground

Because of their relatively small size, and the fact that they spend their entire lives on the ground, quail are extremely vulnerable to predation. However, prevailing paradigms in quail management suggest that predators are rarely a management concern and that predation should be managed only indirectly (i.e., via habitat management).

Estimates of predation rates on quail nests are typically high, and hatch success rates

vary from 12 percent to 45 percent (mean across the range of bobwhites equals 28 percent). Hatch rates in Texas have ranged from a low of 12 percent, to a high of more than 60 percent, with higher hatch rates observed in good nesting habitat. A 50 percent hatch rate was observed in western Oklahoma, with predators accounting for 81 percent of the losses. Hatch rates from 2009-2012 at the Rolling Plains Quail Research Ranch averaged 52 percent.

Mesocarnivores are the most important group of nest predators. Coyotes were the most frequently photographed nest predator in South Texas, while raccoons were the most common egg bandit (perhaps, that black mask is a tip-off) in the Edwards Plateau. The list of egg robbers is a long one, and it includes various mammals like feral hogs, coyotes and foxes, skunks, raccoons,

badgers, opossums and armadillos. Birds such as ravens, crows, caracaras, and, perhaps, roadrunners and wild turkeys are on the list of suspects. Snakes such as rat snakes, bullsnakes, and coachwhips round out the line-up.

Most of the above, plus various raptors (e.g., Cooper's hawk, northern harriers) and felines (feral cats and bobcats) also prey on adult quail. It's a rough neighborhood out there.

Chick survival is the least understood aspect of quail mortality. Researchers have attempted to assess mortality of chicks after hatching, but it's a difficult metric to grasp. A survival rate of 36 percent, from hatching to 39 days post-hatch, was reported in western Oklahoma. Survival of adults and juveniles (older than six weeks) typically ranges from 30 percent to 50 percent from May through



August and about 35 percent during the winter months.

The Times They are a Changing

There is general consensus that mesocarnivore populations (e.g. raccoons) have increased over the last 30 years. Hypotheses to explain this increase include 1) demise of the fur market in the mid-1980s, 2) increased supplemental feeding of deer, 3) increasingly fragmented habitats, and 4) a proliferation of farm ponds on the landscape.

An example of temporal changes in a predator community is suggested by comparing two studies conducted in north-central Texas (Wise and Parker counties). A. S. Jackson removed potential quail predators (n = 574) from a 3,000-acre study site in Wise County over a 13-month period (1948-1949), but he dismissed the predator removal as having no impact on quail abundance. Of particular note, only 11 raccoons (two percent of the predators removed) were trapped during his study. Fifty years later, E. Lyons (Angelo State University) removed 21-40 raccoons from two study sites (640 acres) during only 30-day trapping efforts in an adjacent county (Parker County) during 1999 and 2000, respectively. In other words, Lyons removed about three times more raccoons than Jackson did on study sites only 20 percent the size of Jackson's sites and with only 10 percent of the trapping effort. Such temporal changes in predator populations may be important, especially in light of landscape changes that may make quail more vulnerable to predation.

Is Predator Control an Option?

Given these "vital statistics," should predator control be included in the quail manager's toolbox? I believe so. But, that doesn't always mean "nuking the varmints." Appreciating which species of predators are the most problematic, and what one's options are for minimizing predation, are important prerequisites as we muse this decision.

Empirical evidence of the impact (or lack thereof) of predator removal on quail abundance is limited. Beasom (1974) studied the effects of intensive predator control on bobwhites and wild turkeys in the eastern Rio Grande Plains of Texas. He removed 188 coyotes, 120 bobcats, 65 raccoons, 46 striped skunks, and 38 other mammalian predators from a nine-square-mile study area over a two-year period. He observed moderate gains in bobwhite abundance and strong increases in turkey production.

Guthery and Beasom (1977) conducted a follow-up study of intensive removal of mammalian predators (e.g., coyotes, striped skunks) from a six-square-mile study area in the western Rio Grande Plains of Texas, but they could not demonstrate a treatment effect on either bobwhite or scaled quail populations. Their conclusion was that, if predator removal was effective at all, the effect would be demonstrated by allowing quail populations on "poorer" areas to be similar to better habitats.

If an effect is to be realized from reducing predators, it will most likely be by reducing potential mesocarnivores involved in nest predation. However, reducing the populations of nest predators is labor intensive, costly, and will not necessarily result in an increase in quail abundance. Removal of various mesocarnivores has been shown to be effective for quail in Georgia and for waterfowl in the "Prairie Pothole" region of North America.

Frost (1999) removed approximately one mesocarnivore per 12 acres (mostly raccoons) from 600-acre study areas over a 30-day period, just prior to the 1998 and 1999 nesting seasons in Tom Green County. Survival of radio-marked bobwhites and fate of simulated quail nests were similar on trapped and non-trapped sites. Scent stations indicated that, at this scale and level of trapping (180 trap nights per acre), mesocarnivore abundance (primarily raccoons) was not reduced, even in the short-term.

Predator Paradigms

Although predation is usually the primary source of mortality for quail at all stages of their life cycle, predator control has historically been dismissed as a management recommendation for quail. Long-term studies of bobwhites and predators in the Upper Midwest suggested that habitat, not predators, limited bobwhites. This concept (i.e., manage habitat not predators), has





Some prefer a 4-foot long cage trap (l) for trapping raccoons over the shorter variety. Longer traps are especially important when trapping gray foxes; they will tend to back out of 3-foot traps.

been pervasive in the quail management since that time. Now, I do not discount the current management paradigm of indirect predator control (i.e., habitat management), and especially, as the “first line of defense.” However, the issue of predation as it relates to quail must be evaluated in a more contemporary context of an increasingly fragmented landscape and temporal changes in predator populations.

Our challenge as quail managers is apparent: how to maintain (or restore) quail populations in an increasingly fragmented habitat amidst a rich, diverse community of predators. Perhaps, appropriate predation management techniques should be one of the tools considered in such restoration efforts.

An Integrated Pest Management Approach

Integrated Pest Management (IPM), which has been standard operating procedure in crop production since the 1980s, can be applied nicely to predator management, as well. An IPM strategy recognizes that:

1. Predators can be “beneficials” or “pests” or both, depending on the specific situation.
2. Scouting is necessary to determine the population levels of predators and prey and the amount of damage predators are causing.
3. There are economic thresholds or “action levels” to help determine when the level of

pest damage justifies control measures.

4. A combination of lethal and nonlethal control practices is usually necessary (and best) in any situation

Perhaps the best example of a predator species being “friend or foe” is the coyote. Coyotes are opportunistic – they will catch every quail they can, but they also eat other various predators of quail. A recent three-year study at RPQRR showed that coyotes consumed more “enemies of quail” (skunks, raccoons, feral hogs, badgers, and snakes) than they did quail (only one of 1,028 scats contained quail feathers).

Scouting can be useful in studying game and predator species. Managers can employ game cameras at strategic locations such as wildlife feeders, water sources, fence crossings and game trails to assess the relative abundance of various species of predators. Scent stations are another method for monitoring predator abundance.

Control Options

There are both lethal and nonlethal methods of controlling predators. Lethal methods kill the predator, while nonlethal control options reduce the predator’s efficiency at locating nests or killing birds.

In Texas, you must have a trapper’s license to trap any animal and retain its pelt for sale. Fur-bearing predators can be trapped without

a license, but their pelts cannot be traded or sold. Bobcats are not considered furbearers, but you must have a tag from the Texas Parks and Wildlife Department to sell the pelt. A hunting license is required to shoot the predators mentioned, except for feral hogs.

Nonlethal methods (i.e. indirectly via habitat management) are the most natural way to minimize predation. This involves manipulating the habitat to favor the prey species. Generally, the more cover available to a prey species, the better its odds of survival. Habitat enhancement ranges from strategic brush removal to changes in grazing management. The goal should not be to improve only isolated patches of the landscape but, rather, to make the landscape uniformly habitable. This allows the prey species to use the entire site to escape from predators.

Lighter stocking rates or rotational grazing systems can improve nesting areas. Bunchgrass (e.g., little bluestem) densities of at least 250 plants per acre are recommended for quail. Brush management (or brush sculpting) should be approached with predation in mind. For quail, suitable brush coverts (or “quail houses”) should be spaced about a softball throw apart, and larger brush coverts (e.g., catclaw acacia) and mottes of prickly pear serve as storm



shelters to protect quail from raptors.

Trapping Tips

Understanding predation and being able to do anything about it are not synonymous. Hawks and roadrunners enjoy “political immunity” (via state or federal laws) and are off-limits for direct control. But common mesocarnivores and feral hogs are fair game. Focus your time, effort, and funds on raccoons, skunks, foxes, and feral hogs.

Cage (box) traps are inexpensive, available in many sizes, easy to use, and can be used almost anywhere. Cage traps will catch raccoons, opossums, skunks, foxes, bobcats, feral cats and dogs, and feral hogs – they usually will not catch coyotes. The size of the trap and the bait used should correspond to the size of the target species. Baits may include corn, pet food, meat, fish and eggs. Eggs are good for trapping raccoons and skunks during warm weather, in lieu of meat (which attracts flies and fire ants).

A good place to trap for raccoons and skunks is around deer and quail feeders. Large cage (or better yet “corral”) traps that can hold several animals are good for catching feral hogs. Baiting the trap with the door wired open for a while allows the hogs to become comfortable moving in and out of the trap, and it increases the chance of a multiple catch when the trap is set. Pre-baiting cannot be overemphasized. As “Barefoot Bob” Richardson of Aspermont says, “Bait a lot, and trap a little.”

Another popular, but relatively new, option for raccoons are the “dog-proof” traps (e.g., Coon Cuffs, Coon Daggers). These traps target only raccoons. We have employed both dog-proof and cage traps at the RPQRR, and we tend to catch more raccoons with the cage traps. When our game cameras suggest raccoon activity at a feeder site, we’ll set several cage traps and several Coon Daggers. Our goal is to remove several raccoons at one time and, thus, minimizing their ability to become trap-shy.

Summary

Predator control is similar to supplemental feeding programs for quail – popular, inefficient, and, thus, expensive. But, my stance is, if you want to trap (or feed), and can afford to do it, then do it. The net results can be (at least, nominally) effective. To increase effectiveness, trapping should be done in a continuous manner and at as a large-scale effort, as feasible. Short-term, piecemeal approaches won’t return a dividend. ★



Raccoons are serious predators of quail nests across much of Texas. Male raccoons (as pictured here) tend to forage across the landscape, while females (and kittens) are typically constrained to riparian or more brushy habitats.

Useful References

Predator control as a tool in wildlife management. B-6146. Texas A&M Agrilife Extension Service. <http://agrifliefcdn.tamu.edu/txwildlifeservices/files/2011/07/PredatorControlforWildlifeMgt.pdf>

Websites:

Feralhogs.tamu.edu

YouTube Webisodes:

Nest Predation on south Texas Quail <http://www.texas-wildlife.org/resources/webcasts/nest-predation-on-south-texas-quail>
Hawks and Quail http://www.youtube.com/watch?v=9iPbiUjvndE&feature=c4-overview&list=UUi54r2qmzM_gqOaxiPkczw

Dummy nests and Quail CSI (<http://www.youtube.com/watch?v=n8MNaK5sIVw>)

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