# Chapter 6

# PREDATION AND PREDATOR MANAGEMENT

## PREDATION

By all accounts, most of the individuals in a bobwhite population live less than one year. The proportion of juveniles in fall populations is typically 70 to 80 percent, as determined by age ratio analysis of hunter harvested birds. Recent radio telemetry studies of declining bobwhite populations in current landscapes have shown annual mortality in excess of 90 percent.[5,9] Telemetry has demonstrated that most bobwhite deaths occur from avian and mammalian predators, which may cause more than 80 percent of annual mortality.[45]

*About two-thirds of the bobwhite mortality that occurs in winter is caused by raptors. Predation by mammals increases during the nesting season.*
TED DEVOS

During winter months, raptors may account for two-thirds of bobwhite losses.[31] Cooper's hawks and the less numerous sharp-shinned hawks are the most efficient quail predators,[51] but other raptors such as red-tailed hawks, red-shouldered hawks, and the various species of owls also capture quail.[41,45]

Avian predation of quail remains high,[12,41] and predation by mammals increases during the bobwhite's breeding season.[5,9] Predatory mammals may account for more than 40 percent of adult summer mortality.[12] Bobwhite males call from exposed perches during breeding season, and consequently suffer higher losses to raptors during summer than do females.[5] Bobwhite females experience physiological strains from laying and incubating eggs and become increasingly vulnerable to predators as renesting occurs.[41] Overall, summer mortality of adult males and females does not differ.[5] Some 30 to 60 percent of the adult bobwhites alive at the beginning of breeding season die by autumn, largely a result of predation.[12,41]

## PREDATOR MANAGEMENT

Conflicting professional opinions exist about the ecological impact of predators on bobwhite populations, though all agree that predators are the major cause of mortality. Consequently, recommendations about predator management vary. Stoddard recommended rational and intelligent control of the worst natural enemies of the bobwhite as a requisite of any program to build bobwhite populations, and reasoned that control of natural enemies was needed to offset losses to hunting.[51]

This, however, is not to say that bobwhite numbers cannot increase without predator control. Rosene cited examples of rapid bobwhite population increases in response to habitat management, with no efforts to control predators; as well, he described an example of intense predator control that did not improve bobwhite numbers in habitat not highly favorable to quail.[37] He concluded that predator control is generally not recommended in quail management, and instead emphasized improving the bobwhite's environment.

An analysis of the effect of hunting on bobwhite populations indicated that populations can stabilize at different levels across a range of harvest regimes.[34] Hunting is a form of predation, and it is reasonable that natural predation can cause similar population responses.

Improvement of bobwhite environments and expansion of those environments in the landscape are without question the foundation of quail population increase. Habitat management can create quail abundance suitable to many. In circumstances where intensive quail management is the goal, predator management is an additional tool. Researchers monitored nest predator abundance and productivity of radio tagged bobwhite hens on northwest Florida quail plantations. On sites where mammalian predator abundance was low, bobwhite productivity ranged from 60 to 90 successful nests per 100 hens alive on April 1. On a similar site with relatively high abundance of nest predators, hen productivity was only 16 successful nests per 100 hens.[27] A Tennessee study determined that total nest production provided the strongest correlation with December bobwhite population densities.[15] The management of nest predators can increase the production of bobwhite nests and broods, and elevate bobwhite population densities.

*Many predators of quail utilize hardwood trees for nesting and denning. Mechanical removal of upland hardwoods on ranges managed for quail has been shown to reduce quail predator abundance and increase bobwhite survival and reproduction.*
TED DEVOS

To increase quail abundance, Stoddard recommended reasonable and rational control of major bobwhite nest predators, such as raccoons, opossums and skunks, by trapping and hunting.[51] He stressed that such efforts must be continual to be effective. Trapping and hunting impact only certain quail predators and may alter the incidence of nest depredations by other species. Predator management must be conducted in accordance with state and federal wildlife laws and regulations. All raptors are protected by federal and state law. Mammalian predators may be trapped and hunted according to state seasons and regulations.

Predator populations can be managed through practices that create habitat types suitable for quail and that remove habitats favoring predator species. Many of the major natural predators of quail, such as Cooper's hawks, owls, snakes, raccoons and opossums, utilize hardwood trees for nesting and denning. The hardwoods also create shade conditions and prevent the growth of groundcovers that bobwhites require. Removal of canopy level and mid story hardwoods on ranges managed for quail has been demonstrated to improve habitat conditions for quail and reduce predator abundance.[48] Bobwhite adult survival, nest production, nesting success, and brood survival improved dramatically following mechanical hardwood removal on research sites in southwest Georgia.[46]