

Survival of Trans-Pecos Gambel's Quail

Article by **RON JANKOWIAK** and **RYAN LUNA, PH.D.**
 Photos by **BILL BROYLES**




The Trans-Pecos allows for unique research opportunities on desert quail species, such as Gambel's Quail. This male Gambel's Quail is equipped with a leg band so that researchers can monitor its survival and movements.

Over the years, Texas has developed a reputation for being a mecca for quail hunting. During the last decade, quail hunting has contributed millions of dollars to rural Texas communities and should continue to do so if our quail populations remain at current levels.

Of the four quail species that inhabit Texas, the Gambel's Quail (*Callipepla gambelii*), is one of the lesser known and the least widespread. Heavily vegetated riparian areas such as draws, creeks, washes and arroyos generally typify Gambel's Quail habitat. Gambel's Quail are known to populate the upper Rio Grande Valley as far east as the Chisos Mountains in Texas and westward into New Mexico, where they inhabit the valleys and drainages of the Rio Grande River. Their range extends further west and northward into Arizona, California, Colorado, Utah and Nevada. In Texas, Gambel's Quail are restricted to the Rio Grande corridor and its major tributaries and drainages in the Trans-Pecos.

The Trans-Pecos allows for unique research opportunities on desert quail species, such as Gambel's Quail.

LYSSY & ECKEL
FEEDS



*Supplementing
the Habitat*

www.lefeeds.com

Although the species has been studied quite thoroughly across the Southwestern U.S. in other states, the Texas subspecies of Gambel's Quail (*C.g. ignoscens*) has received little attention from biologists, managers and researchers because of its limited distribution in the state. The majority of information we have regarding Gambel's Quail is from research conducted in Arizona and New Mexico.

Reproductive success is widely known as the driving force in sustaining all quail populations. Because annual fluctuations of quail populations directly coincide with oscillations in annual precipitation, most aspects of quail ecology (i.e. reproductive success, abundance, recruitment and survivability) can vary drastically from year to year. Quail tend to follow a "boom or bust" population model which is usually highly correlated with the timing and abundance of precipitation. Ample rainfall before and during the nesting and brooding season typically results in successful quail production.

Nonetheless, other factors, such as predation, may influence quail populations and survival. Predation accounts for a high proportion of mortalities for both young and adult quail. Some bobwhite studies suggest that mammalian predators are responsible for the majority of nest predation; while avian predators such as hawks and owls frequently consume adults. Reptilian predation usually comprises the remaining percentage of quail nest depredation, with snakes being the main culprits.

With respect to Texas quail, the majority of the predation research has been conducted on the bobwhite. Little is known about Gambel's Quail predation; therefore, we set out to identify some of the major predators of this species.

This research was conducted on a private ranch located within Culberson, Hudspeth, Jeff Davis and Presidio counties. The ranch is primarily comprised of creosote flats, rolling basalt hills, desert grasslands, grass-shrub land areas and is situated in the Van Horn Mountains. Many valleys, washes, draws and arroyos traverse the ranch creating numerous riparian areas, which are prime habitat for Gambel's Quail.



A radio telemetry unit was recovered in the nest of this fledgling Great Horned Owl. Great Horned Owls have been known to depredate quail during the breeding season, and raptors are considered one of the most efficient quail predators.





A pair of Gambel's Quail at the study site (the male is on the left) where Borderland Research Institute researchers set out to identify some of the major predators of this species.

Gambel's Quail were captured in two consecutive spring trapping seasons, February – April 2014 and March – April 2015. Upon successful trapping, female Gambel's Quail were fitted with a leg band and a mortality sensitive radio transmitter to monitor survival and movements during the breeding season. Once the pairing of quail commenced and the nesting season began (April – May), birds equipped with radio transmitters were monitored and tracked via radio telemetry using a yagi antenna. Quail were tracked and located by triangulation and a GPS unit was used to document the quail location.

All radio-collared quail were tracked and located at least twice per week throughout the summer nesting season.

Predation events of radio-collared quail were scrutinized when a mortality signal was detected. Upon location of the carcass, cause of death was determined. Mortality sites and the carcass were examined for physical signs of what type of predator may have caused the mortality. The radio transmitter was also inspected for damage or evidence left from the predation event.

In the spring of 2014 and 2015, a total of 134 female Gambel's Quail were caught. Breeding season survival rates computed with program MARK were 43 percent and 62 percent respectively for 2014 and 2015. Of the Gambel's Quail mortalities, 18 percent were attributed to avian predators, 18 percent to mammalian predators, 47 percent of the predations could not be

attributed to a specific predator and 17 percent had an unknown cause of death.

Of the avian induced mortalities, one predator species was positively identified due to where the radio transmitter was retrieved. A radio telemetry unit from a Gambel's Quail female was recovered from a Great Horned Owl's (*Bubo virginianus*) nest, which was occupied by two fledgling owls. Great Horned Owls have been known to depredate quail during the breeding season, and raptors are considered one of the most efficient quail predators.

Regarding the mammalian predators, the predatory species couldn't be discerned for most mammalian induced mortalities due to absence of credible sign. However, there were mortalities attributed to bobcat



(*Lynx rufus*), coyote (*Canis latrans*) and grey fox (*Urocyon cinereoargenteus*). For this study, mortality rates were similar between avian and mammalian predators. Unknown predation accounted for the greatest number of mortalities and could have likely identified the major predatory group at the study site if we were able to classify all these predation events.

Overall, during the study period, survival rates for these Gambel's Quail were 53 percent, which was representative of most Gambel's Quail studies. Survival rates reported during this study were similar to survival investigations conducted on Gambel's Quail in other states where they occur. Although survival rates were relatively high, predation was still a factor. Even though predation is generally the primary source of mortality for quail throughout their life cycle, predator control has traditionally been disregarded as a primary management tool for quail.

It is more widely accepted that habitat, not predators, limit quail populations. Therefore, habitat management may be a more applicable management strategy for increasing quail populations. By managing the habitat, one can also increase concealment cover which should reduce potential predation events. Gambel's Quail are often associated with riparian areas and the subsequent associations of thick, brushy and thorny vegetation.

An increase in screening and loafing cover could decrease avian opportunities to depredate Gambel's Quail. It is suggested that certain brush species such as catclaw mimosa or mesquite are favored by Gambel's Quail for screening and escape cover. Riparian areas in which these are found are naturally well apt for providing protection from avian predators, because of the ample overhead cover. These habitats also provide thermal protection, especially in the summer when temperatures can exceed 100°F. These drainages, arroyos and riparian areas are focal points for suitable Gambel's Quail habitat.

Conservation of these riparian habitats may be essential for implementing sound Gambel's Quail management



This female Gambel's Quail was ready for release after being fitted with a radio telemetry unit and leg band.

strategies. One of the recommendations includes utilizing fencing as a barrier to help protect these areas from livestock disturbance and habitat degradation. Implementing management strategies to promote forb production such as deferred rotational grazing, as well as increasing the availability of water during dry spells by proper distribution and overflow of water sources can also benefit Gambel's Quail.

Facilitating Gambel's Quail survival may be as elementary as preserving and maintaining the quality of their existing

habitat by employing these rudimentary practices. Many wildlife species fall into the "field of dreams" habitat management program which states: "if you build it, they will come." Maintaining suitable habitat can decrease predation and bolster populations by providing adequate cover for nesting, loafing and roosting. Supplementary research may be crucial to determine how predators, environmental factors, ecological variables, habitat quality and the employment of different management strategies affect survival of Gambel's Quail in the Trans-Pecos. ☺

