

Habitat Availability for Northern Bobwhite Can Be Increased Using EQIP in the Texas High Plains

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The High Plains ecoregion of Texas supports a wide variety of wildlife, but as land management practices have changed through increased agricultural activities, so have suitable wildlife habitats. According to breeding bird survey data, northern bobwhite abundance has decreased 1.1 percent/year in the Texas High Plains since 1980. Agricultural practices influence more acreage than all other industries combined, and likewise have a direct influence on available quail habitat. Currently there are two practices in this region that seem to have the most impact on northern bobwhite abundance. First is cotton production, which renders land unsuitable for quail. The other practice is cattle grazing on natural or seeded rangeland. Cattle grazing can provide suitable habitat for quail, if managed properly. However, many areas have been grazed to the point that they provide no suitable habitat for northern bobwhite. Farm Bill programs hold promise for future quail populations in the Texas High Plains, because they can provide incentives for habitat management for quail.

The Environmental Quality Incentives Program (EQIP) is a Farm Bill incentive that encourages management practices that are beneficial to quail. EQIP was created as part of the 1996 Farm Bill to help individuals involved in farming or ranching



Sites such as this heavily grazed rangeland do not provide suitable habitat for northern bobwhite in the Texas High Plains (photo credit Eric Abercrombie, TTU).

deferment gives rangeland an opportunity to return to a higher range condition class by allowing for greater vegetation height, which provides superior cover for quail, and consequently more obstruction from predators. By providing these conditions, quail survival and reproductive success should increase. The potential benefits of EQIP projects for northern bobwhite populations in the Texas High Plains have not been evaluated. Prescribed grazing is a current NRCS standard practice which indicates that grazing animal duration, intensity, and frequency can be adjusted to provide adequate cover for wildlife. More specific guidelines are not available for the Texas High Plains, because the relationships among specific habitat characteristics such as vegetation composition and height and quail population size have not been evaluated. In our research we have examined these relationships in an effort to provide more specific habitat prescriptions for quail in the Texas High Plains.

We conducted a 2-year study on 8 separate study sites within 4 different counties of the Southern High Plains of Texas. Of the 8 study sites, 3 were enrolled in EQIP prescribed grazing and 5 were enrolled in EQIP brush management. Each study site had two areas: one area was enrolled in one of the EQIP practices and the second area was not enrolled in EQIP. This array of study areas provided a wide continuum of habitat conditions within which to evaluate the relationships between northern bobwhite abundance and specific habitat characteristics.

The guidelines for the EQIP prescribed grazing practice for the Southern High Plains require that landowners rest their grazing land for at least 2 non-consecutive growing seasons during a 5-year period of enrollment, while also requiring that landowners move from using primarily continuous grazing methods to primarily rotational grazing methods with reduced stocking intensities. This grazing prescription is intended to improve overall range condition, which is important in the High Plains where productivity is low due to low annual rainfall.

The guidelines for the EQIP brush management practice for the Southern High Plains require that landowners treat target brush species with herbicide to reduce brush density to a desirable percentage. Target brush species in our study included sand shinnery oak, honey mesquite, and yucca. This management practice stems from the idea that many upland bird species require a certain percentage of woody cover. Too much woody cover is undesirable because the woody plants will out-



This site in the Texas High Plains holds abundant northern bobwhite. Note the well distributed woody cover and significant herbaceous visual obstruction (photo credit Eric Abercrombie, TTU).

to address environmental problems. It is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. EQIP offers cost-shares and incentive payments for conservation practices that producers might not otherwise implement. Eligible land management practices for EQIP in this area are prescribed burning, brush management, and prescribed grazing. Though the primary wildlife species of concern for the Texas High Plains are the lesser prairie chicken and the black-tailed prairie dog, these management practices can be valuable tools for quail management as well.

Prescribed grazing by periodic grazing deferment may be one of the most effective methods of increasing acreage of suitable quail habitat in the Texas High Plains. Because the Texas High Plains is a relatively low productivity region, grazing



The cover board on the left is an example of visual obstruction scores of zero for every 10-inch height with the exception of the first 10 inches which would score a 1. The cover board on the right would score much higher (photo credit Eric Abercrombie, TTU).

compete the grasses and forbs that provide quail with nesting cover and food.

We conducted 3 replicate spring call counts per year to estimate northern bobwhite abundance during spring 2006 and 2007. Additionally, we measured habitat characteristics on all study sites using two separate methods. First we estimated percent woody cover, grass cover, forb cover, litter cover, and bare ground using the step-point method. Next we estimated visual obstruction, a measure of the vegetation's ability to provide quail concealment, using a profile board that provided visual obstruction scores for each 10-inch increment up to a height of 40 inches. We used correlation analysis and linear regression to examine the relationships between northern bobwhite abundance and individual habitat characteristics.

Percent woody cover had a strongly positive relationship with northern bobwhite abundance and was the most important predictor of abundance. Most studies indicate that northern bobwhite use woody cover for various life history purposes, including escape, shelter, and nesting. Studies in other ecological regions have reported that northern bobwhite require between 5 and 30 percent woody. Other researchers have suggested a woody cover requirement of $\geq 25\%$ for nesting habitat. Northern bobwhite were absent from the site in our study which had no woody cover. Although lack of woody cover makes habitat unsuitable for northern bobwhite, it is difficult to define an optimal percent woody cover because of the ability of some herbaceous cover sources to functionally make up for deficiencies in availability of woody cover. This interchangeability or slack makes it possible for two sites to have different amounts of percent woody cover and be equally suitable for northern bobwhite. In our study, the 8 greatest northern bobwhite abundances were recorded on sites that had $\geq 10\%$ woody cover. When percent woody cover occurred at a frequency $< 10\%$, northern bobwhite abundance was greatly diminished. Other limiting factors including herbaceous cover and bare ground may play more of a role in influencing northern bobwhite abundance on sites with $> 10\%$ woody cover. Consequently, the most important predictor variable of northern bobwhite abundance was woody cover. We suggest managers maintain 25% woody cover as herbaceous cover may be less able to supply visual obstruction during times of drought which can be frequent in the Texas High Plains.

After the requirement for woody cover is satisfied, visual obstruction becomes the next important predictor of northern bobwhite abundance. Visual obstruction at each 10-inch increment was positively related to northern bobwhite abundance. Visual obstruction between 10 and 30 inches was more important than visual obstruction between 0 and 10 inches. As average quail height is 10 inches, it is intuitive that visual obstruction greater than 10 inches would supply more concealment for an animal of this size than visual obstruction below 10 inches. The NRCS standard practice of prescribed grazing (Code 528) has great potential as a tool for management of quail in the Texas High Plains where woody cover is suitable. Other studies confirm that proper grazing management, which incorporates rotational grazing regimes with seasonal deferment and light grazing intensities, can greatly improve northern bobwhite abundance by providing some disturbance, for improved plant diversity, and increased protective cover. We recommend, when implementing the prescribed grazing practice in the Texas High Plains, that stocking rates and deferment periods be tailored so that visual cover is established and maintained at a height of 16 inches or more for northern bobwhite abundance to be improved.

The NRCS standard practice of brush management (Code 314) was not useful within the context of our study sites. But, if woody cover is not allowed to drop below 25 percent of a habitat, then brush management may be a useful practice within the Texas High Plains. We also recommend that the woody component of a habitat not become too dense, so that habitat diversity is maintained and the brush species do not out-compete the important grasses and forbs. In contrast to brush management (removal), range planting (Code 550) may be an approved practice that is a more useful tool for providing quail with the necessary woody component where it is lacking. EQIP can be a powerful tool for encouraging proper grazing management to achieve increased acreage of suitable habitat for northern bobwhite in the Texas High Plains.



This site held northern bobwhite because of the well distributed woody cover. However, the quail population was limited due to a grazing intensity which decreased the height of the herbaceous visual cover rendering the site overall less suitable (photo credit Eric Abercrombie, TTU).