Nest Success and Brood Habitat Selection of the Northern Bobwhite in Managed and Unmanaged Landscapes

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Goals and Objectives:

- Estimate the probability of nest success and brood rearing habitat selection as a function of habitat composition and landscape spatial pattern.
- Compare nest success and brood habitat selection in a managed and unmanaged landscape.
- Evaluate effectiveness of specific habitat management practices.

Progress:

The consensus among upper Midwest bobwhite biologists is that nesting and brood-rearing habitats are limiting reproduction and population densities. Therefore, this study focused on bobwhite nest success and brood habitat selection in relation to landscape spatial patterns and habitat composition between managed and unmanaged landscapes.

Our 2 study sites were in southeastern Iowa. One site is the 1464 ha Lake Sugema Wildlife Area (LSWA), on which bobwhite habitat management has been emphasized for several years. The second site is a 2360 ha area in an adjacent township (HTA) that is dominated by private crop and livestock production. During the 2003– 2005 breeding seasons, we equipped >150 bobwhite with radio transmitters, and monitored approximately 70 nests. There were no differences in daily nest survival between years, and the overall combined nest success estimate was 0.534. There was evidence of a difference between nest success on LSWA (0.628) and HTA (0.444). Nest initiation date was not associated with nest success, but daily nest survival decreased with the age of the nest. We could not document any association of success with either microhabitat vegetation characteristics or distance to enhanced management practices such as strip disking or burning. Although there was a significant difference between the sites in habitat composition of the nest buffer areas, due primarily to less corn and more grass in LSWA, composition did not significantly influence nest success.

Data on individual brood selection was pooled over all years (n = 18 on LSWA, n = 10 on HTA). Brood use areas on LSWA consistently contained a larger proportion of grain, grass, and roadside habitats, and a smaller proportion of timber, pasture and corn habitats relative to available habitat in the study site ($P < 0.01$). Grain and grass were the dominant (~ 70%) habitat types in the brood habitat polygons. Analysis of brood selection on HTA suggested that brood use polygons had significantly ($P = 0.01$) relatively greater areas of grass and pasture and relatively less area of corn and grain. Brood habitat polygons on HTA had relatively greater areas of pasture and grass and relatively less area of grain, but overall habitat composition of polygons was not dominated by any one or 2 habitat types. At the smaller scale of an individual habitat patch, grain structure and roadside patches had a relatively greater chance of increased use in LSWA. Habitat type did not influence patch use in HTA. Patch vegetation characteristics did not generally influence probability of use in either study site. Recently burned patches or patches with strip disks did not have a greater probability of use, but presence of linear areas of edge-feathered woody vegetation was associated with greater patch use.

Conclusions and Recommendations:

Survival of young between hatching and fall remains an important unknown and future breeding ecology studies should concentrate on comparison of this critical parameter between landscapes with alternative habitat composition and pattern. We could not demonstrate meaningful relationships between fine scale habitat characteristics or management practices and nest success or brood rearing habitat selection, and we hypothesize that large scale landscape habitat attributes are more important in determination of equilibrium bobwhite density in a given landscape. We documented that bobwhite populations had not been extirpated from a working midwestern landscape dominated by row crops and pasture, but we hypothesize that densities were lower than those in the managed LSWA. Our results could be used to develop a landscape scale model of usable bobwhite space that could be implemented as a tool in development of large scale habitat modification strategies for increasing bobwhite densities.