

**Riverby Ranch Mitigation Site**  
**Quail Monitoring Effort**  
Spring Call Counts 2023

**Wildlife Habitat Federation**

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*Photo by: James Shugart*

## **Background:**

Restoration efforts on the Riverby Ranch Mitigation Site in Fannin County, Texas have provided a safe haven for over 200 species of birds, including a variety of grassland species that are currently experiencing steep population declines such as Dickcissels (*Spiza americana*), Bell's Vireo (*Vireo bellii*), and Grasshopper Sparrows (*Ammodramus savannarum*) (Crosby et al. 2015). One such species, the Northern Bobwhite (*Colinus virginianus*), otherwise referred to as "quail" or "bobwhite", occupies a particularly valuable ecological and economic niche in this region of Texas, acting as an umbrella species for grassland bird communities and as a popular game bird and important source of income for rural communities (Crosby et al., 2015; James et al., 2015).

Between 1966 and 2012, bobwhites experienced an approximate 4% decrease in population annually due largely to habitat loss and degradation through urbanization, unchecked forest encroachment and the replacement of native grassland with monocultured crops or invasive species (Jenke & Gates, 2013; Downey et. al, 2017). The restoration efforts on Riverby Ranch, resulting in the reestablishment of historical grassland, upland deciduous forest, and wetland communities have aimed to provide habitat for a variety of native species affected by these disturbances. As Northern Bobwhites act as an umbrella species in grassland communities, restoration of quail habitat will ultimately benefit other grassland birds who are otherwise facing population declines (Crosby et al. 2015).

In order to determine the efficacy of restoration efforts on the population of bobwhite quail on the ranch, annual spring call counts, as well as various other bird survey methods, have been implemented since 2021. Previous bird surveys as well as encounters by ranch staff and visitors have confirmed the presence of Northern Bobwhites on the ranch, although in varying numbers.

Continuing the annual monitoring of quail populations on the ranch, this spring count call was conducted in May of 2023 following the end of construction efforts by Resource Environmental Solutions, LLC (RES) to reestablish previously degraded habitat in the summer of 2022. It is predicted that as reestablished grassland communities are allowed to recover, increased quail habitat will increase the abundance of quail found on the property.

## **Methods:**

### **Study Area**

This survey was conducted on Riverby Ranch Mitigation site located in Fannin County in Northeast Texas along the border of Oklahoma (Fig. 1). This mitigation site is in response to the environmental impacts of the construction of the Bois d'Arc Lake reservoir. It consists of 15,000 acres (~ 6070 ha) of restored, enhanced, and preserved wetland and upland habitats. This ranch

was formerly used for agriculture and livestock production for over 100 years. The restoration goals are to establish multiple habitat types including; native grasslands and emergent wetland habitats along with intermixed restored patches of woodland habitat. These restoration efforts have included the implementation of a variety of preferred quail habitat types including early succession woody cover and grasslands, making this site a potentially suitable location for bobwhite populations (Janke & Gates 2013).



Figure 1. Map of Texas Counties highlighting location of Fannin County.



Riverby Ranch -  
Resource Environmental Solutions  
33°50'27.1"N 95°55'39.6"W  
Riverby, Tx 75488

QUAIL TRANSECTS  
(Monet Cover)

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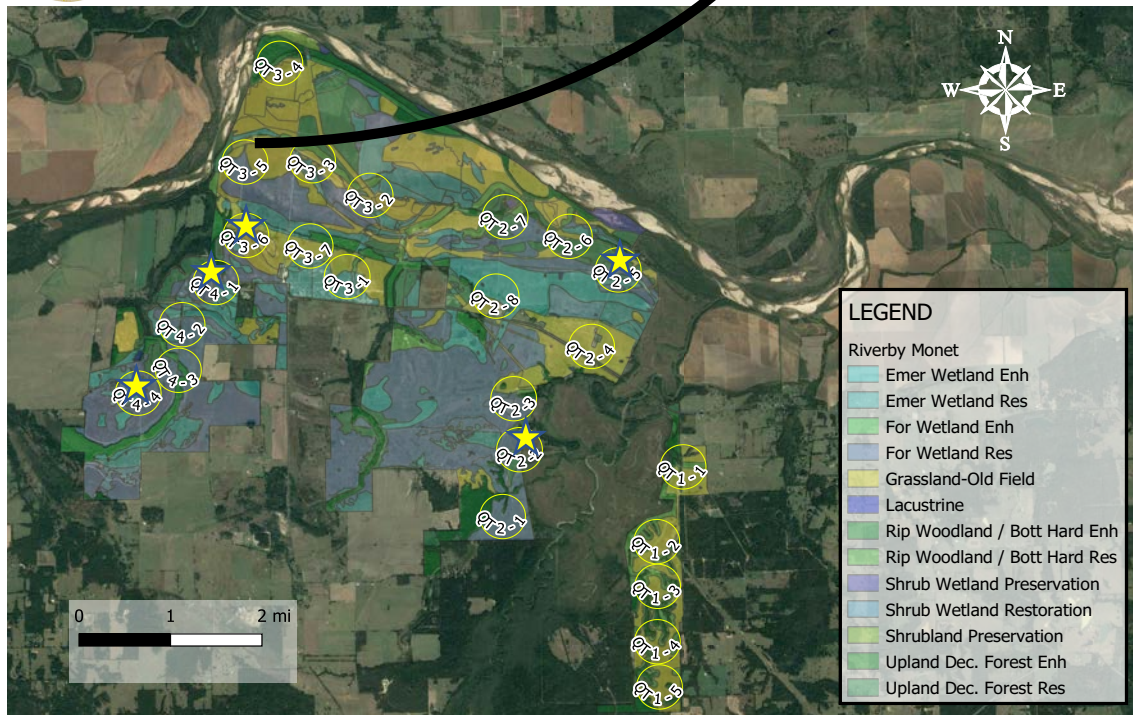


Figure 2. Map of Quail observations and Quail Transects located on Riverby Ranch Mitigation site. Map provided by William Kearney

## **Indirect Count**

Following the Indirect Count method (Rollins et al. 2005), stationary t-posts were marked and set up on 24 individual points (Fig. 2). Each point was spaced at least .5 mile apart. Call counts were conducted at sunrise (~ 6:15 am) and continued for 1.5 hours. This survey was divided into two routes to assure the completion before this timeframe. We drove to each point, turned off our engine, and waited for a settling down period of ~3 minutes. Distance of male call counts were documented at each observation. Anecdotally we also collected all bird observations at each point. Each point was monitored for a total of 5 minutes before driving to the next point. This survey was conducted three times over a three-week period in May 2023.

## **Data Analysis:**

Analysis of data collected during this call count was conducted using the “vegan” package in R Studio (Oksanen, 2022). Abundance, richness, and Shannon’s Biodiversity indices were calculated at each point and averaged in order to quantify and understand the quality and diversity of the organisms at each of these points. These biodiversity indices are only a snapshot of the diversity on Riverby Ranch taken during this quail survey.

## **Results:**

Mean abundance, species richness, and Shannon’s Diversity for all species at all sites are displayed in Table 1.

**Table 1: Mean Abundance, Species Richness, and Shannon’s Diversity**

<b>Abundance</b>	<b>Richness</b>	<b>Shannon’s Diversity</b>
<b>48.46</b>	<b>10.83</b>	<b>1.688</b>

During this call count, Northern Bobwhites were heard and documented on five occasions in five locations (Table 2). Site and date of sightings are recorded below, as well as abundance, richness, and Shannon’s Diversity calculated at each site.

**Table 2: Instances of Northern Bobwhites Encountered by Site, Date, and Shannon's Diversity Indices Calculated at Each Site**

Species	Site	Date	Abundance*	Richness*	Shannon's Diversity*
Northern Bobwhite	QT 2-2	5/6/2023	26	14	2.264
Northern Bobwhite	QT 3-6	5/7/2023	66	10	1.044
Northern Bobwhite	QT 4-4	5/7/2023	42	14	1.864
Northern Bobwhite	QT 2-5	5/13/2023	30	8	1.585
Northern Bobwhite	QT 4-1	5/14/2023	32	14	2.312

*\*Calculated for all species present at site*

This call count suggests not only an increase in quail abundance from the single quail recorded during 2022's survey, but an increase in the area of the ranch inhabited by quail. The number of bird species documented during this survey increased from 38 species in 2022 to 55 species in 2023.

**Future Recommendations:**

The 2023 call count saw an increase in quail abundance and general avian species richness from 2022. While this alone is not enough to claim that restoration efforts are entirely behind the change, further consistent monitoring efforts over time may give more answers as to whether the site is properly managed for the formation and long-term sustainability of quail populations. As the newly established communities are allowed to grow undisturbed after the end of construction efforts in 2022, more suitable quail habitat should follow, allowing for a stable population to reside on Riverby Ranch. Further analysis and surveys of habitat and vegetation alongside monitoring efforts could prove useful in devising management plans to produce and maintain premium Northern Bobwhite habitat.

## **Literature Cited:**

Crosby, A. D., Elmore, R. D., Leslie, D. M., & Will, R. E. (2015). Looking beyond rare species as umbrella species: Northern Bobwhites (*Colinus Virginianus*) and conservation of grassland and shrubland birds. *Biological Conservation*, 186, 233–240.

Downey, M. C., Rollins, D., Hernández, F., Wester, D. B., & Grahmann, E. D. (2017). An evaluation of northern bobwhite translocation to restore populations. *The Journal of Wildlife Management*, 81(5), 800–813.

James, A.S., Marshall, M., Hays, B., Hardin, J., Perez, R., and J.C. Cathey. 2015. Habitat guide for northern bobwhite. Texas AgriLife Extension. College Station, USA.

Janke, A. K., & Gates, R. J. (2012). Home range and habitat selection of northern bobwhite coveys in an agricultural landscape. *The Journal of Wildlife Management*, 77(2), 405–413.

Oksanen, J. (2022, April 17). *Vegan: Ecological diversity*. Vegan: ecological diversity. Retrieved July 2, 2022, from [b](#)

Rollins, D., J. Brooks, N. Wilkins, and D. Ransom Jr. 2005. Counting quail. Texas AgriLife Extension Bulletin 6173. College Station, USA.

Stephens, Garry. 2008. Bobwhite quail management in south Texas. United States Department of Agriculture Natural Resources Conservation Service

Appendix A. Bird List for Riverby Ranch Mitigation Site 2023 Spring Quail Monitoring Survey.

<b>Common Name</b>	<b>Scientific Name</b>
American Crow	<i>Corvus brachyrhynchos</i>
American Goldfinch	<i>Spinus tristis</i>
Bell's Vireo	<i>Vireo bellii</i>
Black Poll Warbler	<i>Setophaga striata</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>
Blue Grosbeak	<i>Passerina caerulea</i>
Blue Jay	<i>Cyanocitta cristata</i>
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>
Blue-winged Teal	<i>Spatula discors</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Canada Goose	<i>Branta canadensis</i>
Carolina Chickadee	<i>Poecile carolinensis</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Chipping Sparrow	<i>Spizella passerina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Common Yellow-throat	<i>Geothlypis trichas</i>
Dickcissel	<i>Spiza americana</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Eastern Towhee	<i>Pipilo erythrophthalmus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Great Blue Heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great Egret	<i>Ardea alba</i>
Great Horned Owl	<i>Bubo virginianus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
House Wren	<i>Troglodytes aedon</i>
Indigo Bunting	<i>Passerina cyanea</i>
Lincoln's Sparrow	<i>Melospiza lincolnii</i>
Mourning Dove	<i>Zenaida macroura</i>
Northern Bobwhite	<i>Colinus virginianus</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>

Northern Flicker  
Northern Mockingbird  
Orchard Oriole  
Painted Bunting  
Pileated Woodpecker  
Prothonotary Warbler  
Purple Martin  
Red-bellied Woodpecker  
Red-headed Woodpecker  
Red-shouldered Hawk  
Red-tailed Hawk  
Red-winged Blackbird  
Scissor-tail Flycatcher  
Summer Tanager  
Tufted Titmouse  
Turkey Vulture  
Warbling Vireo  
White-eyed Vireo  
Yellow Warbler  
Yellow-Billed Cuckoo  
Yellow-breasted Chat

*Colaptes auratus*  
*Mimus polyglottos*  
*Icterus spurius*  
*Passerina ciris*  
*Dryocopus pileatus*  
*Protonotaria citrea*  
*Progne subis*  
*Melanerpes carolinus*  
*Melanerpes erythrocephalus*  
*Buteo lineatus*  
*Buteo jamaicensis*  
*Agelaius phoeniceus*  
*Tyrannus forficatus*  
*Piranga rubra*  
*Baeolophus bicolor*  
*Cathartes aura*  
*Vireo gilvus*  
*Vireo griseus*  
*Setophaga petechia*  
*Coccyzus americanus*  
*Icteria virens*