

## Northern Bobwhite

### *Colinus virginianus*

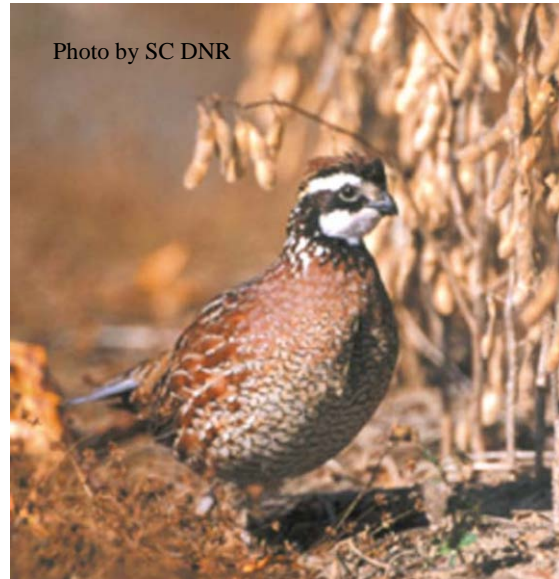
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#### DESCRIPTION

#### Taxonomy and Basic Description

In 1748, Catesby gave the Bobwhite quail the name *Perdix sylvestris virginiana*. In 1758, Linnaeus dropped the generic name *Perdix* and substituted *Tetrao*. The generic name *Colinus* was first used by Goldfuss in 1820 and, despite several ensuing name changes, became the accepted nomenclature (Rosene 1984). Bobwhite quail are members of the family Odontophoridae, the New World quail.



Bobwhite quail are predominantly reddish-brown, with lesser amounts of white, brown, gray and black throughout. Both sexes have a dark stripe that originates at the beak and runs through the eye to the base of the skull. In males, the stripe above and below the eye is white, as is the throat patch. In females, this stripe and throat patch are light brown or tan. Typical weights for Bobwhites in South Carolina range from 160 to 180 g (5.6 to 6.3 oz.). Overall length throughout the range of the species is between 240 and 275 mm (9.5 and 10.8 in.) (Rosene 1984).

#### Status

Bobwhite quail are still widely distributed throughout their historic range. However, North American Breeding Bird Survey data indicate a significant range-wide decline of 3.8% annually between the years 1966 and 2009 (Sauer et al. 2004). In South Carolina, quail populations have declined at a rate of 6.1% annually since 1966 (Sauer et al. 2011).

While not on the Partners in Flight Watch List, the concern for Northern Bobwhite is specifically mentioned due to significant population declines over the past 35 years (Rich et al. 2004). Despite rangewide declines, high densities of quail (6.6 to 7.6 birds/ha) are often

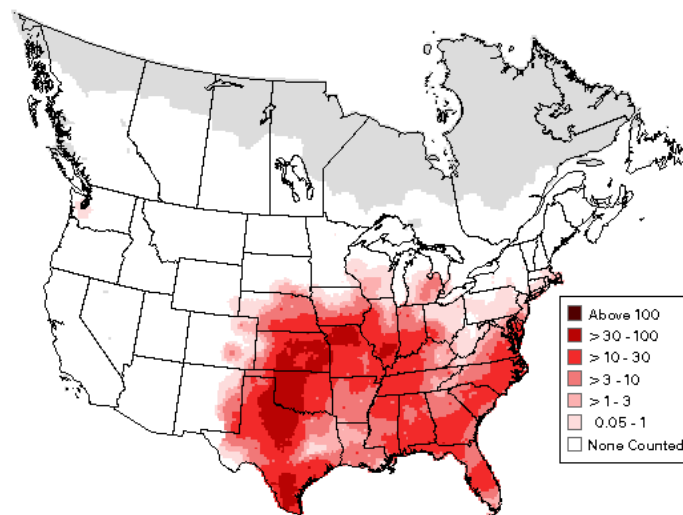
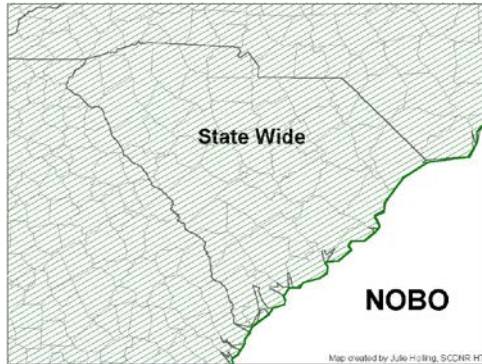


Figure 1: Average summer distribution of northern bobwhite quail 1994-2003. From Sauer et al. (2004).

maintained on lands where intensive habitat management occurs or conditions are otherwise suitable (Brennan 1999).

## POPULATION SIZE AND DISTRIBUTION



Bobwhite quail occur throughout South Carolina, with higher densities found in the Coastal Plain than the Piedmont (SCDNR unpublished data). Within the Coastal Plain of South Carolina, quail population densities are higher in the Inner Coastal Plain than in the Outer Coastal Plain and Coastal Zone. Greater concentrations and more wide-spread distribution of row-crop agriculture in the Inner Coastal Plain creates habitat conditions more favorable for quail than are found in heavily forested landscapes typical of the Outer Coastal Plain and Piedmont.

Quail populations exhibit dramatic seasonal and annual fluctuations, making accurate population estimates difficult. Estimated autumn and breeding populations of Bobwhites in 1999 were 20.1 million and 6.7 million, respectively (Dimmick et al. 2002). Partners in Flight put the estimated global breeding population at 9.2 million, with 82% (7.5 million) occurring in the continental US (Rich et al. 2004).

Quail habitat quality and population levels vary widely across the landscape, resulting in tremendous uncertainty related to extrapolation of population densities to the statewide level. Using assumptions contained in the National Bobwhite Conservation Initiative (NBCI) the estimated quail population for South Carolina in autumn of 2010 was 306,148 individuals (NBTC 2011).

An assumed autumn population of 306,148 individuals translates into a statewide density estimate of 3.9 individuals/km<sup>2</sup> (10.1 individuals/mi.<sup>2</sup>). Autumn population estimates conducted at select areas in South Carolina where timber density and fire regimes favor quail have documented populations estimated at 98.9 individuals/km<sup>2</sup> (256 individuals/mi.<sup>2</sup>) (SCDNR unpublished data). Some forested landscapes on which minimal management for quail has occurred have been documented to support autumn densities of 27.2 individuals/km<sup>2</sup> (70.4 individuals/mi.<sup>2</sup>) (SCDNR unpublished data).

## HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Bobwhite quail use a variety of cover types throughout their broad geographic range. Early successional habitats such as croplands, grasslands, fallow fields, open pinelands and open mixed pine-hardwood forests that have diverse groundcover vegetation are particularly important in the South (Brennan 1999). Perennial warm-season bunchgrasses are the preferred nesting substrate throughout much of the range of the species. Preferred brood-rearing cover consists of diverse communities of erect annual forbs with abundant insects, bare ground between stems, and a foliage canopy.

Eastern Towhee, Blue Grosbeak, Yellow-breasted Chat, Indigo Bunting, Northern Cardinal, Gray Catbird, Brown Thrasher, and Carolina Wren are among the many species that have habitat requirements similar to Northern Bobwhite such as shrub/scrubland. Many of these species are discussed in more detail in the Early- to Mid-Succession Birds Guild. Those species found in more of an open grassland habitat, which is also frequented by the Northern Bobwhite, include Barn Owl, Loggerhead Shrike, Eastern Meadowlark, Grasshopper Sparrow, Field Sparrow, and Common Ground-dove. All of these species are subject to the same threats as Northern Bobwhite, and will likewise benefit from habitat enhancement practices aimed at restoring populations of Northern Bobwhites. They are discussed in more detail in the Grassland Birds Guild.

## CHALLENGES

Habitat loss due to the effects of urbanization, modern agricultural and silvicultural practices, fire suppression, and the introduction of exotic pasture grasses is widely recognized as the primary problem for Bobwhite quail populations (Stoddard 1931; Rosene 1984; Barnes 1995; Brennan 1991; Brennan 1999; Thackston and Whitney 2001).

A lack of nesting and brood-rearing cover is believed to be the major limiting factor over much of the range of the species (Rosene 1984; Dimmick et al. 2002). For a more complete discussion of the effects of habitat changes on Bobwhite populations and habitat suitability, see the Northern Bobwhite Conservation Initiative (Dimmick et al. 2002) and the National Bobwhite Conservation Initiative (NBTC 2011).

Lack of qualified personnel for delivery of technical assistance to private landowners continues to be a limiting factor for state and federal natural resources agencies.

## CONSERVATION ACCOMPLISHMENTS

The SCDNR Small Game Program was established in 1978 for the primary purpose of addressing declining populations of traditional small game species, including Bobwhite quail, through technical assistance to private landowners. Since that time, biologists in the Small Game Program have completed over 500 site visits and written management plans for private landowners, potentially affecting over 500,000 acres of habitat. Over the same time period, biologists have developed numerous technical publications and conducted countless seminars, workshops and public presentations on Bobwhite quail life history, habitat requirements, and habitat enhancement techniques. In the past 25 years, over 1,300 landowners, land managers, and natural resources professionals have received instruction on proper quail habitat management techniques through the Small Game Program's annual Quail Management Seminar series. Recently, Program staff have begun to rely more heavily on web-based delivery of technical materials, and have developed a website for dissemination of information on quail habitat management and population status.

Bobwhite population trends in South Carolina are monitored through various surveys which include a summer census of whistling males, a summer brood survey, an annual survey of avid

quail hunters, fall covey counts on select Wildlife Management Areas (WMA), and a periodic statewide harvest survey. The Bobwhite Quail Whistling Cock Census, comprised of over 70 routes statewide, was begun in 1979 to provide broad-scale population trend data for Bobwhites. The Summer Bobwhite Quail Brood Survey has been conducted annually since 1994 in order to provide an index to recruitment for Bobwhites. The annual Quail Hunter Survey, conducted since 1987, tracks hunting success as a measure of the quail population at the county, physiographic region, and state levels. Fall covey counts have been utilized since 2001 on discrete WMAs as a measure of fall population and to assess effects of habitat management, and extrinsic factors such as weather, on Bobwhite quail reproduction and survival.

A multi-agency partnership led by SCDNR has established the Indian Creek Wildlife Habitat Restoration Initiative in Newberry County. Bobwhites are a focal species for habitat restoration efforts through the Initiative, and over 3,000 acres of early-successional habitat have been restored and maintained throughout the project area. Habitat restoration efforts through the Initiative are continuing, and relationships established through the formation of the Initiative have resulted in greater cooperation between state and federal agencies for management of early-successional habitat on public and private lands statewide. While not specifically identified as quail focal areas, efforts to restore and maintain early-successional habitat are underway at numerous WMAs across the state including Webb WMA and Hamilton Ridge WMA in Hampton County, Crackerneck WMA in Aiken County, Draper WMA in York County, Canal WMA and Bonneau Ferry WMA in Berkeley County, and Marsh WMA in Marion County.

Over the past decade, relationships have been established between DNR Small Game Program staff and staff of the USDA Farm Service Agency (FSA) and USDA Natural Resources Conservation Service (NRCS), resulting in a higher level of coordination in integrating wildlife objectives into USDA conservation programs. As a result of these relationships, as well as improved relationships between Bobwhite advocates and USDA staff at the regional and national levels, several beneficial programs and practices have been added or implemented to the benefit of Bobwhites and associated early-successional species. Within the Conservation Reserve Program (CRP), South Carolina received an allotment of 10,000 acres under the Habitat Buffers for Upland Birds practice (CP 33) and an additional 2,300-acre allotment under the State Acres for Wildlife Enhancement (CP38E) practice. Both of these practices have been implemented in South Carolina and have the ability to increase quail populations in agricultural landscapes. For years 2006-2008, DNR staff coordinated and participated in a coordinated monitoring effort to determine the effect of CP33 implementation on populations of Bobwhites and select songbird species. This effort indicated that Bobwhites were approximately 2- to 3- times more abundant on agricultural fields with herbaceous field borders than on similar fields with no herbaceous borders (Evans et al. 2009).

Several regional and national developments over the past 20 years have advanced the cause of Bobwhite conservation at the state, regional and national levels. In 1995, the Southeast Quail Study Group (SEQSG) was formed to identify causes of regional Bobwhite population declines and to devise solutions to reverse declining trends at state and regional levels. In 2002, the Northern Bobwhite Conservation Initiative (NBCI) was published (Dimmick et al. 2002). This range-wide recovery plan for Bobwhites identified specific habitat and population recovery goals at the state and Bird Conservation Region (BCR) levels. In 2009, the SEQSG was expanded to

encompass all states in the historic range of Bobwhites nationwide and renamed the National Bobwhite Technical Committee (NBTC). The NBTC was revised and renamed the National Bobwhite Conservation Initiative in 2011 (NBTC 2011). This revision provides a spatially-explicit habitat suitability ranking for all landscapes in South Carolina, which will allow geographic prioritization of future habitat enhancement efforts across the state. The NBTC revision also includes major constraints and opportunities for Bobwhite habitat management and contains estimated and projected densities of Bobwhites under a variety of management scenarios.

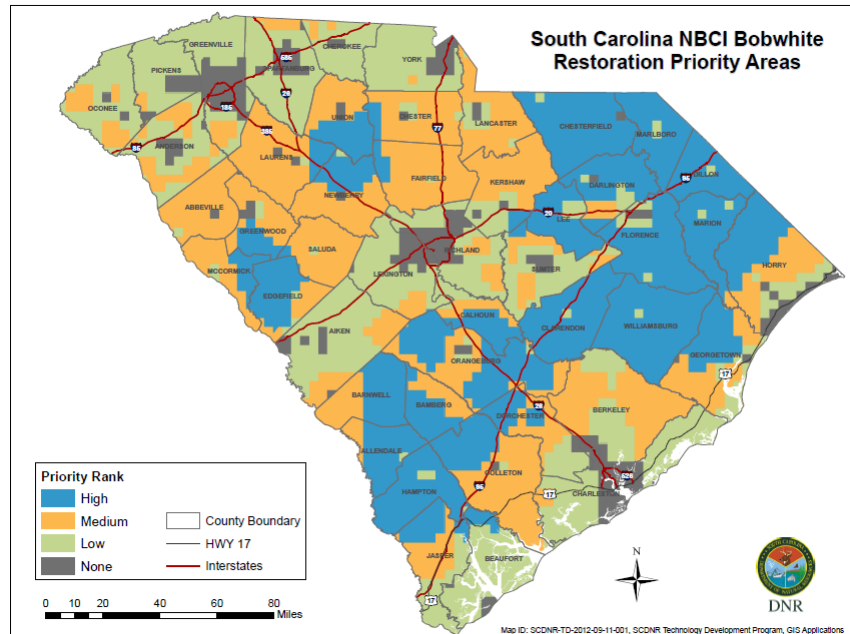


Figure 2: Northern Bobwhite habitat restoration potential as delineated through the NBCI's Biologist Ranking Information process. The BRI ranking process identified 9,150,594 acres as having medium or high potential as Bobwhite habitat in the State (NBCI 2013). (Ranking criteria and the plan in its entirety can be found online.)

## CONSERVATION RECOMMENDATIONS

- Increase acreage of volunteer early succession vegetation or native warm season grasses on agricultural landscapes in South Carolina.
- Apply appropriate site preparation techniques, selective thinning regimes, and prescribed fire rotations to forest lands in South Carolina.
- Include protection of farmland and other potential early successional habitat as a priority in land acquisition and habitat protection programs.
- Maximize wildlife benefits in USDA Farm Bill programs through regional and national involvement in planning processes and through direct involvement with local and farm-level conservation planning.
- Identify funding sources for state-level cost-share programs to assist landowners with implementation of beneficial management practices for quail and other early-successional species.

- Identify focal areas for quail habitat enhancement within the state based upon existing land cover and quail populations; strive to focus private lands technical assistance and encourage USDA conservation programs in those areas where habitat enhancement would be most beneficial. Also focus on areas where the potential for positive population response would be greatest utilizing guidance provided by the NBCI.
- Identify public lands with high potential for quail habitat enhancement and assist responsible agencies with planning efforts for habitat enhancement.
- Identify SCDNR lands with high potential for quail habitat enhancement; establish population goals based on “managed density” estimates in the NBCI; and implement management practices necessary to achieve the population goal.
- Develop predictive models of Bobwhite quail occurrence and density based on land cover types from remote imagery.
- Evaluate Bobwhite quail colonization rate and population response to habitat enhancement, particularly in forested landscapes.
- Evaluate effect of geographic isolation on Bobwhite quail population viability and persistence.
- Evaluate effects of patch size and configuration on Bobwhite quail nest success and brood survival.
- Develop improved census techniques for low to moderate densities of quail
- Identify limiting factors for quail populations in agricultural and forested landscapes in South Carolina.
- Increase number of survey routes in spring call count survey for better statewide coverage and to allow regional trend comparisons.
- Increase number of cooperators in statewide quail hunter survey.
- Document habitat enhancement accomplishments that occur as a result of USDA Farm Bill programs, private lands technical assistance, or quail focus area initiatives.
- Establish a statistically-valid, density-based monitoring program for Bobwhites at appropriate scales to evaluate effects of management and monitor annual population fluctuations.
- Train additional observers in the fall covey count technique and expand the technique to additional sites in the State.
- Complete a statewide quail management and recovery plan which incorporates population and habitat objectives of the NBCI.
- Expand existing partnerships and establish new partnerships to advance the cause of Bobwhite habitat restoration.
- Continue annual quail management seminars for private landowners and agency personnel.
- Develop additional technical literature on beneficial quail management practices.
- Utilize agency outlets and cooperative efforts to promote benefits of prescribed burning.
- Provide Bobwhite habitat recommendations and population status updates to private landowners through on-site technical assistance, fact sheets, management bulletins, and websites.
- Establish demonstration areas that illustrate successful quail management practices on public or cooperative private lands within each DNR Wildlife Region.

- Increase capacity for private lands technical assistance and increased coordination and participation in federal Farm Bill program delivery at the state level.
- Support the National Bobwhite Technical Committee through participation of staff in annual meetings, committee involvement, support of the NBCI Director position, and agency participation on the NBCI Management Board.
- Support efforts of non-governmental organizations in South Carolina that promote conservation of Bobwhites through directed management and research.
- Publicize successful quail management efforts on public or private lands through Agency outlets and the popular press.

## MEASURES OF SUCCESS

Development, implementation, and refinement of a statistically-valid, density-based monitoring technique will allow an assessment of Bobwhite population response to habitat management at various spatial scales. Managed density estimates, as provided in the NBCI, should be used as population targets in managed landscapes. Effects of landscape-level changes will be monitored using Breeding Bird Survey data and spring call count survey data. Management-oriented research projects will address emerging questions related to Bobwhite population dynamics and habitat enhancement techniques. SCDNR will strive to continue to respond to new data and adapt management actions once assumptions have been further tested.

## LITERATURE CITED

- Barnes, T.G., L.A. Madison, J.D. Sole and M.J. Lacki. 1995. An assessment of habitat quality for northern bobwhite in tall fescue dominated fields. *Wildlife Society Bulletin*. 23:231-237.
- Brennan, L.A. 1991. How can we reverse the northern bobwhite population decline? *Wildlife Society Bulletin*. 19: 544-555.
- Brennan, L.A. 1999. Northern Bobwhite (*Colinus virginianus*). *In: A The Birds of North America*, No. 397, . Poole and F. Gill, Editors. The Birds of North America, Inc. Philadelphia, Pennsylvania. 28 pp.
- Dimmick, R.W., M.J. Gudlin and D.F. McKenzie. 2002. The northern bobwhite conservation initiative. Miscellaneous publication of the Southeastern Association of Fish and Wildlife Agencies. South Carolina. 96 pp.
- Evans, K.O., W. Burger, M.D. Smith, and S. Riffell. 2009. Conservation reserve program: CP33 - habitat buffers for upland birds bird monitoring and evaluation plan 2006-2008 final report. U.S. Department of Agriculture and Mississippi State University. Mississippi State University. Starkville, MS. 55 pp.
- National Bobwhite Technical Committee (NBTC). 2011. Palmer, W.E., T.M. Terhune, and D.F. McKenzie (eds). The National Bobwhite Conservation Initiative: A range-wide plan for

recovering bobwhites. National Bobwhite Technical Committee Publication, ver. 2.0, Knoxville, TN. 212 pp.

National Bobwhite Technical Committee (NBTC). 2013. Northern Bobwhite Habitat Restoration in South Carolina: Challenges and Opportunities in the 21<sup>st</sup> Century. Version 2.3. 24 pp.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Inigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt and T.C. Will. 2004. Partners in Flight North American Landbird Plan. Cornell Lab of Ornithology. Ithaca, New York.

Rosene, W. 1984. The bobwhite quail – its life and management. Morris Communications Corp. Augusta, Georgia. 418 pp.

Sauer, J.R., J.E. Hines and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966-2003. Version 2004.1. USGS Patuxent Wildlife Research Center. Laurel, Maryland.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2009. Version 3.23.2011 *USGS Patuxent Wildlife Research Center*, Laurel, MD.

Stoddard, H.L. 1931. The bobwhite quail: its habits, preservation, and increase. Charles Scribner's Sons. USA. 564 pp.

Thackston, R. and M. Whitney. 2001. The bobwhite quail in Georgia: History, biology, and management. Georgia Department of Natural Resources.