

## THE DISTRIBUTION AND CONSERVATION STATUS OF RUFFED GROUSE IN INDIANA: 25 YEARS OF DECLINE

Steven E. Backs<sup>1</sup> and John S. Castrale: Indiana Division of Fish and Wildlife, 562 DNR Road, Mitchell, Indiana 47446 USA

**ABSTRACT.** The distribution of ruffed grouse (*Bonasa umbellus*) in Indiana has historically fluctuated with changing land use. Ruffed grouse require young hardwood forests composed of dense seedling to sapling size trees and shrubs. In 1931, ruffed grouse occurred in only 12 counties. Following reforestation, natural range expansion and successful restoration efforts, the grouse distribution expanded to 41 counties in 1983, the widest distribution since 1856. Population surveys indicate ruffed grouse breeding population levels have declined steadily the last 25 years and are now less than 2% of levels recorded during the peak years of 1979–81. A reassessment of the ruffed grouse distribution and relative conservation status was conducted in 2008. Preliminary data from the Indiana Breeding Bird Atlas (2005–2010) indicate ruffed grouse occurred in less than 1% of the priority blocks surveyed compared to 10% for the same blocks during the 1985–1990 assessment. Ruffed grouse appear to be extirpated from 15 counties, and this extirpation trend is likely to exceed 25 counties within a few years if no major forest disturbance occurs.

**Keywords:** *Bonasa umbellus*, distribution, Indiana, population status, ruffed grouse

The distribution of ruffed grouse in Indiana has historically fluctuated with changing land use. Ruffed grouse populations are dependent on young hardwood forests 5–25 years old, composed primarily of seedling to sapling-sized trees and shrubs at 20,000 to 25,000 woody stems/ha (Gullion 1984; Thompson & Dessecker 1997; Stoll et al. 1999; Dessecker & McAuley 2001). The Midwestern subspecies (*Bonasa umbellus mediana*) existed in the northwestern region of the state while the Appalachian subspecies (*Bonasa umbellus monticola*) occupied the southern two-thirds of Indiana (Aldrich 1963). In 1931, ruffed grouse occurred in only 12 counties (Leopold 1931). Following reforestation, natural range expansion and successful restoration efforts (Backs 1984a), the grouse distribution expanded to 41 counties in 1983, the widest distribution since 1856 (Backs 1984b). Since the early 1980s, ruffed grouse populations in Indiana have declined to very low levels (Fig. 1) based on roadside surveys of “drumming” males in the spring (Gullion 1966; Backs 2009). Our study objective was to reassess the current distribution and relative conservation status of ruffed grouse in Indiana.

### METHODS

A reassessment of the ruffed grouse distribution in Indiana was conducted in 2008 using methods similar to the 1983 assessment (Backs 1984b). Natural resource professionals were solicited for personal observations or reliable reports of ruffed grouse presence within the last five years. Unsolicited grouse occurrence data were gleaned from various publicly available bird observation records (e.g., Breeding Bird Surveys, Audubon Christmas Bird and May Day counts, and web-based birding list-servs) along with preliminary data from the ongoing Indiana Breeding Bird Atlas (2005–2010). Comparable blocks from the 1985–1990 Indiana Breeding Bird Atlas (Castrale & Keller 1998) were compared to similar blocks already surveyed during the ongoing 2005–2010 Atlas.

All observation reports were compiled and compared for any conflicting occurrence reports. Observer records, remarks, and drumming survey data were used to make a relative, subjective assessment of “conservation status” for ruffed grouse in Indiana adapted from Flather et al. (2008). The compilation of observation and relative population level information was then mapped. Analysis of variance (ANOVA) was used to compare grouse population trends (Analytical Software 2008).

<sup>1</sup> Correspondence: Steven Backs – sbacks@dnr.in.gov

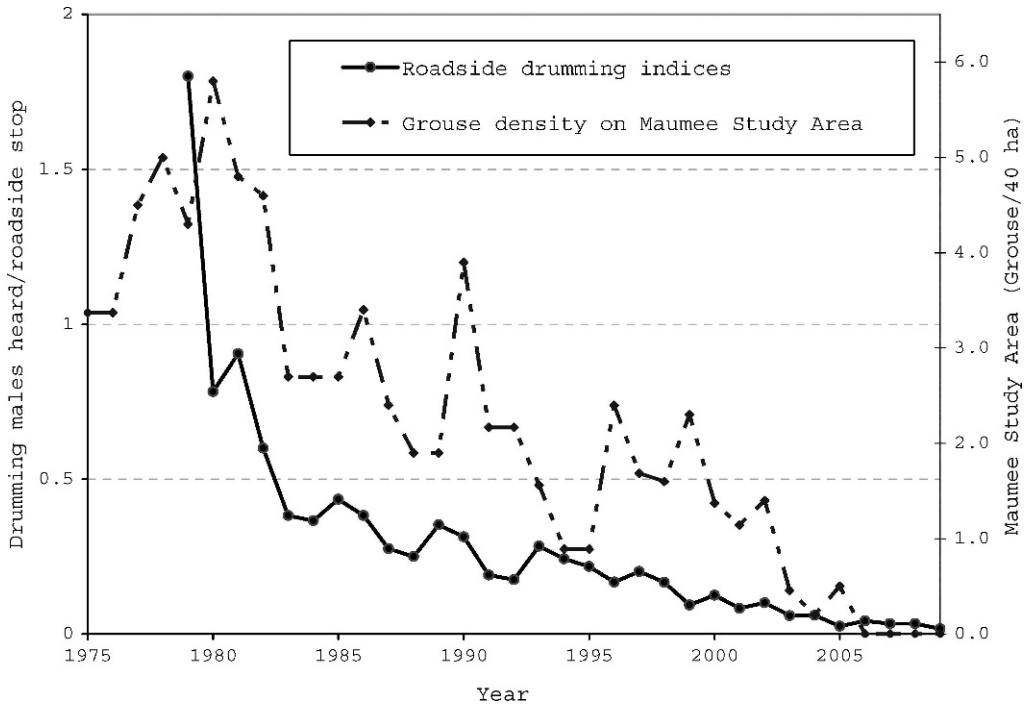


Figure 1.—Population trends of ruffed grouse based on spring surveys of drumming males heard along roadside routes (15 stops/route) in southern Indiana and male activity center counts at the 400-ha Maumee Grouse Study Area in Jackson and Brown counties (Backs 2009).

## RESULTS AND DISCUSSION

Nearly 200 grouse observation-distribution survey forms were sent with responses received from 144 natural resource professionals. “No-observation” reports were received from 51% of the respondents with 49% reporting “positive occurrence” observations either in their region of responsibility or other regions of the state. Queries of the public bird observation records and Breeding Bird Survey data did not yield any other reliable grouse observations outside the areas of known grouse occurrence.

Compared to the 1983 distribution (Backs 1984b: Fig. 4), it is highly probable that ruffed grouse are now extirpated from 15 of 41 counties, and extirpation is likely to exceed 25 counties (Fig. 2) within a few years if no major forest disturbance occurs to create critical young forest habitats, e.g., dense hardwood regeneration resulting from widespread tornadoes or extensive timber harvesting that reduces the overhead tree canopy cover by  $\geq 50\%$ . No areas of the state are considered to have “secure” or “apparently secure” populations of ruffed grouse, although that was likely not the

case 25–30 years ago. The best areas for ruffed grouse, classified as “vulnerable” represented grouse populations that have responded to habitat generally created within the prior 15 years by wind storms and subsequent timber salvage cuts. Preliminary data from the Indiana Breeding Bird Atlas (2005–2010) indicate ruffed grouse occur in less than 1% of the priority blocks surveyed compared to 10% for the same blocks during the 1985–1990 atlas effort. Similarly, the five-year (2005–2009) mean drumming index (DI) of 0.03 drummers per stop in the primary grouse range is 97% less than 25 years ago (DI = 0.89; 1979–1983;  $F_{1,8} = 12.6$ ,  $P \leq 0.01$ ) and is the lowest level recorded since the 1950s (Mumford 1957; Backs 1984a). During the same five-year periods, spring grouse densities estimated from male “activity center” counts went from 4.4 grouse/40 ha to 0.1 grouse/40 ha on the 400-ha Maumee Grouse Study Area in Jackson and Brown counties ( $F_{1,8} = 71.7$ ,  $P \leq 0.001$ ), with no birds detected the last four years (Backs 2009). Based on the 2008 reassessment, it appears that only the Appalachian subspecies

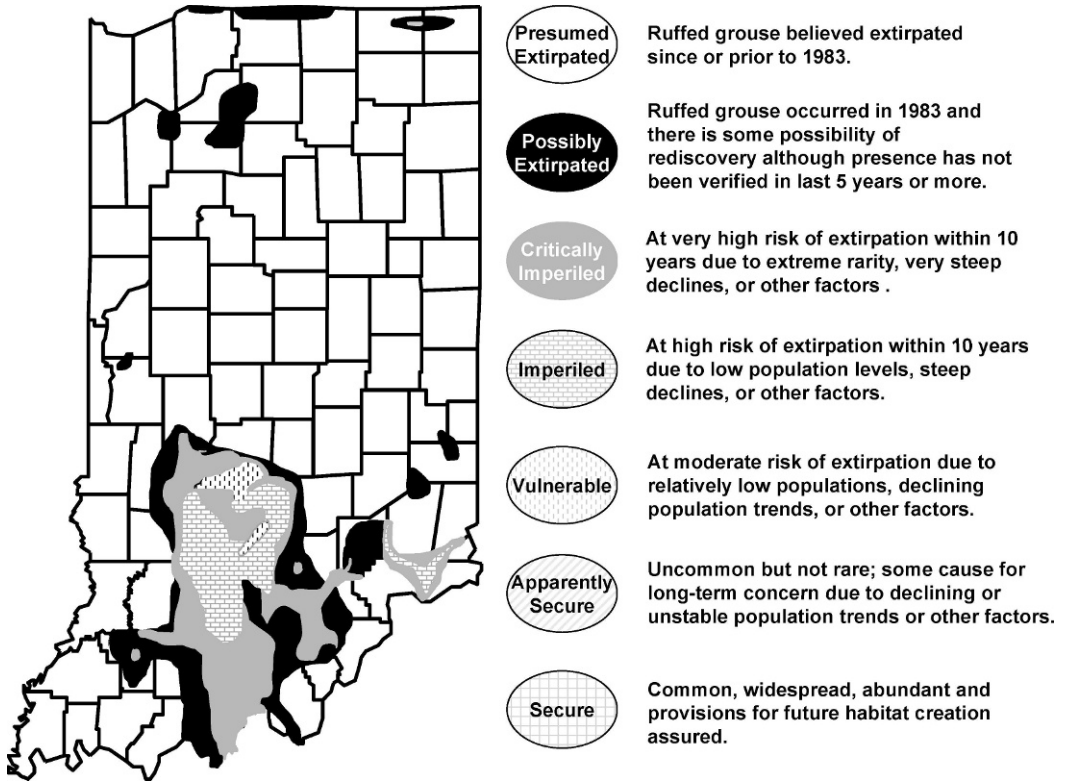


Figure 2.—The 2008 Distribution of ruffed grouse in Indiana 2008 and their relative conservation status (adapted from Flather et al. 2008).

of ruffed grouse now exists in Indiana, and the prospects for population recovery are poor given the continual advancement of forest succession.

Ruffed grouse breeding habitat is characterized by high woody stem densities found in young regenerating forests (Backs et al. 1985; Stoll et al. 1999; Dessecker & McAuley 2001). Habitat for ruffed grouse has diminished with advancing forest succession during the last 25 years that reduced the seedling-sapling component by  $\geq 65\%$  in the primary range of ruffed grouse in Indiana (Hanson & Golitz 1988; Woodall et al. 2009; also see historical forest inventory and analysis data (<http://fiatools.fs.fed.us/fido/index.html>). Based on population simulation models, ruffed grouse population levels are projected to drop below “viable population levels” within the next decade, or sooner, in portions of their existing range in south-central Indiana (McCreedy & Basile 2004) unless some sizable forest disturbance of sufficient intensity occurs to create young, early forest succession habitats across

the landscape. The decline in grouse populations and their distribution parallels declines in an array of wildlife dependent on early forest successional habitats (Thompson & Dessecker 1997; Askins 2000, 2001). Natural disturbances alone may no longer provide the needed habitat diversity and anthropogenic disturbance (e.g., timber harvests) will be required to assure the population viability of ruffed grouse, songbirds, and other forest wildlife dependent on young forest habitats (Askins 2001; Klaus et al. 2005).

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