

## BIRD INVENTORY AT RUSSELL CAVE NATIONAL MONUMENT 2003-2005

Stephen J. Stedman and Barbara H. Stedman

### INTRODUCTION

Russell Cave National Monument (RUCA), one of the most significant archaeological sites in the eastern United States, became part of the national park system on 11 May 1961, when the National Geographic Society donated 125 hectares (310 acres) to the federal government. Although RUCA is maintained by the National Park Service (NPS), no serious research has been conducted on the birdlife of the RUCA. Therefore, the primary objectives of this research were to determine the relative status and seasonal abundance of the bird species inhabiting RUCA and to collect evidence of breeding.

### METHODS

*Study Area.*— RUCA is located in Jackson County, Alabama, about 2 km south of the Alabama-Tennessee state line and about 10 km west of the Tennessee River (34°58'43 N, 85°48'03 W). The public entrance to the park intersects County Road 98. The park is composed primarily of low elevation (up to 520 m [1705 ft]) montane forest, mainly deciduous in composition in the old growth or near old growth stage. Some cedar thickets occur up to 300 m (1000 ft), and scattered short-needle pines occur to the summit of Montague Mountain where a number of private holdings lie immediately adjacent to park land. The understory in the forest is usually quite open with poison ivy being the dominant ground cover when any is present. The lowest portions (204 m [670 ft]) of the park lie along small, usually dry streambeds with some riparian vegetation. Slightly higher in elevation are the mowed grassy areas with scattered pines that are near the park entrance, visitor center, and picnic areas.

A 5-km (3-mi) jeep road allows access to the higher elevations of the mountain and its forest in the park. It crosses private property at several places and is gated to the general public. A TVA power line also crosses the entrance road about 100 m from the park entrance. About 500 m from County Road 98, the entrance road crosses a bridge over Dry Creek. A boardwalk leads from the visitor center to the cave entrance, and asphalt-paved and gravel paths lead around the base of Montague Mountain for a total of about 2 km (1.2 mi) up

to an elevation of 244 m (800 ft); these paths are surrounded by fairly mature deciduous forest. A famous mountain overlook, Russell Point (owned by The Nature Conservancy), is located along the northwest border of the park property on Montague Mountain. It is an obvious “sky island” that attracts migrating birds, bats and insects.

Several recent and historical occurrences affected the forests of the park during the bird inventory, including past mining activity near park property, weather events, and prescribed burns. For example, during the early to mid-20<sup>th</sup>-century a mining operation took place on land that now borders the park at the higher elevations of Montague Mountain. Some of the land that was mined near the park remains quite open and a hunting club whose members hunt on the mountain leases this land. Also, in June 2004, a tornado struck Montague Mountain, causing massive blowdowns and opening up many parts of the forest. By one estimate, 700 large trees in the park were upturned by the tornado and massive debris piles were created. Further, some forested areas on the mountain were burned by park service personnel during late April 2005, leaving much bare ground in the understory during the following breeding bird season.

*Inventory methods.*—Five methods were used to collect inventory data. Twelve point counts (locations selected by NatureServe) were conducted during late May and/or early June in each of two years, 2003 and 2005. Downed trees from a tornado prevented point counts in 2004. The Partners in Flight (PIF) protocol for these counts entailed standing at the center of a 100 m-diameter plot and counting all birds heard and seen for 10 minutes. Birds were recorded as occurring at one of four distance intervals (< 25 m; 25-50 m; 50-100 m; and >100 m) or as flyovers and were recorded as occurring within one of three temporal intervals (0-3 min; 3-5 min; 5-10 min) (Hamel 1992; Hamel et al. 1996). Any birds flushed during approach to the plot center were included among the birds recorded at the point. Birds counted at a one point were not counted at an adjacent point if the same individuals were detected.

In spring and fall, 1-2 hour walks of about 1.5 km were conducted 3-4 times per season and species seen or heard were noted. Raptor surveys were also undertaken during fall and early winter. Typically, these surveys lasted 2-4 hours during late morning. A route was driven by automobile along all the roads of the park, usually totaling about 4 km and all raptors and shrikes detected were counted. Owls were inventoried at night by using tape-recorded owl calls to elicit responses. Other species that were detected during owl surveys (e.g., woodcocks, nightjars) were also counted. In addition, general

surveys, which were less regimented, were conducted in many promising sites and habitats within the park. During the breeding season, which includes most of the spring and summer, the general surveys included efforts to detect breeding evidence for all species breeding in the park.

The breeding designations were based on the following criteria. "Confirmed breeding" was noted for a species if an individual was observed carrying nest material or food, constructing a nest, performing a distraction display, or incubating. Further, the discovery of a nest with eggs or young, a used nest, or dependent short-tailed young also confirmed breeding. "Probable breeding" was indicated for a species if a pair was found in suitable habitat, if courtship behaviors were observed or if agitation behaviors often associated with nest disturbance were noted. A "possible breeding" designation was given if a species was found in suitable habitat within safe dates determined by the Alabama Breeding Bird Atlas project (Rick West, pers. comm.).

## RESULTS

*Total species.*—During the inventory period (April 2003-May 2005), BHS made 24 visits to the park (6 days during spring; 6 days during summer; 5 days during fall; and 7 days during winter). In the course of these visits she observed 130 species (Table 1).

*Breeding Species.*—In the 79 species that were determined to be breeders, 16 (20.3%) were noted as possible breeders, 20 (25.3%) were probable breeders, and 43 (54.4%) were confirmed breeders (Table 1). Point counts were conducted during the breeding period of many species. A total of 46 species was registered during 12 point counts conducted during 2003, while 41 species were detected during 12 point counts conducted in 2005. In all, point count effort led to data for 47 species of birds (Table 2), all of which use RUCA during the breeding season.

## DISCUSSION

*Effectiveness of survey methods.*—Each of the five survey methods used for this inventory was effective for its purpose, but in terms of generating the largest number of species per unit of time expended, the general surveys were probably the most effective (resulting in detection of approximately 120 species), followed by the migration walks (approximately 90 species) and the point counts (47 breeding species). Due to their restricted emphasis, night surveys (approximately 10 species) and raptor surveys (approximately 12 species) generated fewer species per unit of time expended than the other survey

ALABAMA BIRDLIFE

TABLE 1. Species, status, seasonal abundance, breeding designations of birds observed at Russell Cave National Monument, Jackson Co., Alabama, 2003-2005.

Common Name	Status <sup>b</sup>	Sp <sup>c</sup>	Su	Fa	Wi
Wood Duck <sup>*a</sup>	PR	U	U		
Wild Turkey <sup>***</sup>	PR	U	U	U	
Northern Bobwhite <sup>*</sup>	PR	U	U		
Common Loon	TR	U		U	
Double-crested Cormorant	TR	U		U	
Great Blue Heron	PR	R	R	R	R
Green Heron <sup>*</sup>	VR	U	U		
Black Vulture <sup>*</sup>	PR	U	U	U	U
Turkey Vulture <sup>*</sup>	PR	FC	FC	U	U
Bald Eagle	VR				R
Northern Harrier	VR			R	R
Sharp-shinned Hawk <sup>*</sup>	VR		U	R	
Cooper's Hawk	VR			VU	U
Red-shouldered Hawk <sup>***</sup>	PR	U	U	U	U
Broad-winged Hawk <sup>**</sup>	SR	U	U	U	
Red-tailed Hawk <sup>*</sup>	PR	U	U	U	U
American Kestrel	VR				VU
Sandhill Crane	TR				R
Killdeer	VR	R	U	U	R
American Woodcock	WR				U
Ring-billed Gull	TR				VU
Mourning Dove <sup>*</sup>	PR	FC	FC	FC	FC
Yellow-billed Cuckoo <sup>**</sup>	SR	U	FC	VU	
Eastern Screech-Owl <sup>**</sup>	PR	U	U	U	U
Great Horned Owl <sup>**</sup>	PR	U	U	VU	VU
Barred Owl <sup>***</sup>	PR	U	U	U	U
Chuck-will's-widow <sup>*</sup>	VR	U	U		
Whip-poor-will <sup>**</sup>	SR	FC	FC		
Chimney Swift <sup>**</sup>	SR	U	U	FC	
Ruby-throat Hummingbird <sup>**</sup>	SR	U	U	U	
Belted Kingfisher <sup>***</sup>	PR	U	U	VU	U
Red-headed Woodpecker	VR	U	VU		VU
Red-bellied Woodpecker <sup>***</sup>	PR	U	U	U	FC
Yellow-bellied Sapsucker	WR	VU	U	U	U
Downy Woodpecker <sup>***</sup>	PR	U	U	FC	FC
Hairy Woodpecker <sup>***</sup>	PR	U	U	U	U
Northern Flicker	PR	U	U	U	FC
Pileated Woodpecker <sup>**</sup>	PR	U	U	U	U
Eastern Wood-Pewee <sup>**</sup>	SR	U	U	U	
Acadian Flycatcher <sup>**</sup>	SR	U	U	VU	
Least Flycatcher	TR	U			
Eastern Phoebe <sup>***</sup>	PR	FC	U	U	U
Great Crested Flycatcher <sup>***</sup>	SR	U	U		
Eastern Kingbird <sup>***</sup>	SR	U	U		
White-eyed Vireo <sup>**</sup>	SR	U	U	U	
Yellow-throated Vireo <sup>**</sup>	SR	U	U	U	
Blue-headed Vireo <sup>***</sup>	PR	FC	U	U	VU
Philadelphia Vireo	TR			R	
Red-eyed Vireo <sup>***</sup>	SR	FC	U	U	

TABLE 1. Continued

Common Name	Status	Sp	Su	Fa	Wi
Blue Jay ***	PR	FC	FC	FC	FC
American Crow ***	PR	FC	FC	FC	FC
Purple Martin *	VR	U	U		
N. Rough-winged Swallow ***	SR	U	U		
Cliff Swallow *	VR	VU	U		
Barn Swallow ***	SR	C	C	U	
Carolina Chickadee ***	PR	C	C	C	C
Tufted Titmouse ***	PR	C	C	C	C
Red-breasted Nuthatch	WR			VU	
White-breasted Nuthatch ***	PR	U	U	U	U
Brown-headed Nuthatch	VR			VU	
Brown Creeper	WR	VU		R	U
Carolina Wren ***	PR	C	C	C	C
House Wren	VR	U			R
Winter Wren	WR			U	U
Golden-crowned Kinglet	WR	VU		U	FC
Ruby-crowned Kinglet	WR	VU		U	FC
Blue-gray Gnatcatcher ***	SR	FC	FC	U	
Eastern Bluebird ***	PR	C	C	C	FC
Swainson's Thrush	TR			R	
Hermit Thrush	WR	VU		VU	
Wood Thrush ***	SR	FC	FC	R	
American Robin ***	PR	U	U	FC	
Gray Catbird ***	SR	U	U	U	
Northern Mockingbird ***	PR	U	U	U	
Brown Thrasher ***	PR	U	U	U	
European Starling ***	PR	FC	C	C	
American Pipit	VR				
Cedar Waxwing	VR		VU	U	
Tennessee Warbler	TR	U		U	
Northern Parula *	SR	U	U	U	
Yellow Warbler	TR	U			
Chestnut-sided Warbler	TR	U		U	
Magnolia Warbler	TR	U		FC	
Cape May Warbler	TR	R		R	
Yellow-rumped Warbler	WR	FC		FC	
Black-thr. Green Warbler	TR	U		U	
Blackburnian Warbler	TR	VU		U	
Yellow-throated Warbler ***	SR	FC	FC	U	
Pine Warbler ***	PR	FC	U	FC	
Prairie Warbler *	SR	U	U	U	
Palm Warbler	TR	U			
Bay-breasted Warbler	TR	VU		U	
Blackpoll Warbler	TR	U			
Cerulean Warbler	TR	U		U	
Black-and-white Warbler ***	SR	FC	U	U	
American Redstart	TR	U		U	

TABLE 1. Continued

Species	Status	Sp	Su	Fa	Wi
Worm-eating Warbler ***	SR	U	U	U	
Ovenbird **	SR	U	U	U	
Northern Waterthrush	TR			U	
Louisiana Waterthrush ***	SR	U	U	VU	
Kentucky Warbler **	SR	U	U	VU	
Common Yellowthroat *	SR	U	U	U	
Hooded Warbler **	SR	FC	U	U	
Yellow-breasted Chat *	SR	U	U	VU	
Summer Tanager ***	SR	FC	FC	FC	
Scarlet Tanager ***	SR	C	C	FC	
Eastern Towhee ***	PR	FC	FC	FC	U
Chipping Sparrow ***	PR	C	FC	FC	FC
Field Sparrow **	PR	U	U		FC
Savannah Sparrow	WR			R	R
Grasshopper Sparrow *	VR	VU	U		
Fox Sparrow	VR			VU	VU
Song Sparrow	WR	VU	VU	U	U
Swamp Sparrow	WR	VU			VU
White-throated Sparrow	WR	FC		FC	FC
White-crowned Sparrow	WR			VU	R
Dark-eyed Junco	WR	VU		VU	FC
Northern Cardinal ***	PR	FC	FC	FC	C
Rose-breasted Grosbeak	TR	U		U	
Blue Grosbeak **	SR	U	U	VU	
Indigo Bunting ***	SR	FC	FC	U	
Red-winged Blackbird ***	PR	U	U		U
Eastern Meadowlark **	PR	U	U	U	U
Common Grackle ***	PR	C	C	U	A
Brown-headed Cowbird **	PR	C	C	U	U
Orchard Oriole ***	SR	U	U		
Baltimore Oriole	TR	U	VU		
Purple Finch	WR			U	U
House Finch **	PR	U	U	U	U
American Goldfinch ***	PR	FC	FC	FC	FC

<sup>a</sup> \* = possible breeding, \*\* = probable breeding, \*\*\* = confirmed breeding.

<sup>b</sup> PR = permanent resident; SR = summer resident; TR = transient; VR = visitor; WR = winter resident.

<sup>c</sup> C = common; FC = fairly common; U = uncommon; VU = very uncommon; R = rare.

methods, although the quality of the species detected during these surveys was excellent.

*Weather influences.*—An effort was made to visit RUCA during periods when the weather was conducive for detecting the maximum number of species during general inventory work, migration walks, point counts, night surveys, and raptor surveys, so the influence of weather on the results of the overall inventory was generally positive. However, the mild winters that took place during the inventory probably prevented detection of some boreal irruptive species, such as Evening Grosbeak. Additionally, lack of powerful frontal passages during the spring and fall seasons of the inventory period probably

TABLE 2. Species and individuals counted at 12 points (10 minutes each) at unlimited distance during May and June, 2003 and 2005, at Russell Cave National Monument, Jackson County, Alabama.

Species	2003		2005	
	Points counted <sup>a</sup>	Individuals <sup>b</sup>	Points counted	Individuals
Wild Turkey	1	1	1	1
Red-shouldered Hawk	0	0	1	1
Broad-winged Hawk	1	1	0	0
Mourning Dove	3	3	7	11
Yellow-billed Cuckoo	7	8	4	4
Barred Owl	1	1	0	0
Chimney Swift	1	1	1	2
Red-bellied Woodpecker	3	5	8	11
Downy Woodpecker	3	5	3	5
Hairy Woodpecker	3	3	1	1
Pileated Woodpecker	4	4	2	4
Eastern Wood-Pewee	9	11	4	5
Acadian Flycatcher	4	5	3	3
Eastern Phoebe	5	6	4	4
Great Crested Flycatcher	5	7	1	1
Eastern Kingbird	1	1	1	1
Yellow-throated Vireo	3	3	2	4
Blue-headed Vireo	5	9	4	5
Red-eyed Vireo	12	36	12	36
Blue Jay	7	18	5	10
American Crow	5	13	5	10
Barn Swallow	1	1	2	7
Carolina Chickadee	8	12	6	11
Tufted Titmouse	9	19	8	16
White-breasted Nuthatch	8	16	4	8
Carolina Wren	7	15	10	29
Blue-Gray Gnatcatcher	3	6	0	0
Eastern Bluebird	1	1	1	2
Wood Thrush	9	11	10	17
American Robin	1	1	1	2
Gray Catbird	1	1	0	0
Yellow-throated Warbler	2	2	2	2
Pine Warbler	2	3	2	5
Worm-eating Warbler	6	9	2	2
Ovenbird	6	8	4	5
Louisiana Waterthrush	2	3	0	0
Kentucky Warbler	2	2	2	2
Common Yellowthroat	1	1	0	0
Hooded Warbler	6	9	4	4
Summer Tanager	6	16	5	11
Scarlet Tanager	8	14	9	15
Eastern Towhee	1	1	5	6
Chipping Sparrow	2	4	2	9
Northern Cardinal	9	25	9	21
Blue Grosbeak	2	2	0	0
Indigo Bunting	5	10	2	4
Brown-headed Cowbird	2	4	4	7

<sup>a</sup> = total number of points for which species was counted.

<sup>b</sup> = total number of individuals counted from all points.

also prevented major fall-outs from occurring; during such events, the likelihood of finding rare species is greater than during less agitated weather.

The species total (41) on point counts conducted in 2005 was lower than the species total (46) on point counts conducted in 2003. This difference may have been due to the tornado blowdown of 2004 and the clean-up efforts (including a prescribed burn) that occurred immediately before the point counts were conducted in 2005.

*Species richness.*—The small size of RUCA would lead one to estimate that a fairly low degree of bird diversity would be present within its boundaries. Further, the park is not located on one of the major migration flyways of North America, also decreasing the likelihood that it would harbor a rich diversity of bird species. Still further, Russell Cave is not directly connected to the chains of mountains running from the Northeast to northeastern Alabama; rather it is more of a “sky island” that would attract some birds to it, but not the great migration concentrations found, for example, along the Appalachian ridges. However, Russell Cave is endowed with fair diversity of habitats. These increase the likely richness of the avifauna present within a park of its size and location. Further, although the park is not located near the center of a major migration flyway, it is located not too far from the Tennessee River, which acts as a migration funnel; some species detected as flyovers in the park may have been present as a result of the flyway effect created by the Tennessee River. Finally, the forests of the park were not themselves greatly fragmented at the beginning of the inventory and they remained fairly unfragmented even after the tornado of 2004, leading one to predict that they would harbor many species associated with the forest interior, species that add overall richness to an avifauna.

The riparian areas of the park provided habitat for nesting Belted Kingfishers, while the stream at the cave entrance hosted Louisiana Waterthrush. Both Eastern Phoebes and Barn Swallows nested just inside the cave entrance and under the bridge over Dry Creek. A pair of Red-shouldered Hawks nested near the visitor center. The pasture and grassy areas at the low elevations of the park hosted a diversity of species with some—including White-eyed Vireo, Yellow-throated Vireo, Red-eyed Vireo, Eastern Phoebe, Great Crested Flycatcher, Eastern Kingbird, Barn Swallow, Eastern Bluebird, Yellow-throated Warbler, Summer Tanager, Eastern Towhee, Chipping Sparrow, and American Goldfinch—being present in very high densities compared to densities experienced at many other sites (B. Stedman, pers. observ.). In 2003, the higher, densely forested portions of the park harbored dense pop-



ulations of several woodland species—including Whip-poor-will, Acadian Flycatcher, Wood Thrush, and Scarlet Tanager; these densities were higher than those found in some more northerly populations of these species (B. Stedman, pers. observ.). Migrating raptors and nighthawks were found in lower than expected numbers during the inventory, as were some Neotropical migrant warblers, as noted below. Overall, species richness in the park exceeded our expectations.

*Unexpected Results.*— Besides some unexpected densities for a number of species, some other results of the inventory were unexpected. For instance, Ruffed Grouse were not expected to occur within the park, based on few observations of this species in the general area since the 1970s (Imhof 1976). Although no Ruffed Grouse were found at RUCA by BHS during the inventory, several hunters reported small groups of these birds on or near park property during fall 2004. Additionally, field workers on the Alabama Breeding Bird Atlas project reported grouse in the Skyline WMA about 16 km (10 mi) from the park during the period of the inventory. Somewhat unexpected was courtship of American Woodcocks regularly during winter in several of the park's open areas. During fall and winter inventory effort, Yellow-bellied Sapsuckers were noted in the park in very high numbers compared to numbers detected at many other sites in the southeastern U.S. (B. Stedman, pers. observ.).

*Birds not found.*— Neither Sharp-shinned nor Cooper's hawk was found during spring, so breeding by this species was unlikely; however, each of these accipiters was found during fall migration. Merlin and Peregrine Falcon were not found despite being regular, if rare, migrants through the Tennessee Valley. Few sightings of Brown-headed Nuthatch took place, despite the presence of suitable breeding habitat for this species in the park. Cerulean Warbler, a species of special concern, was found by field workers of the Alabama Breeding Bird Atlas project about 32 km (20 mi) from RUCA during the period of the bird inventory at RUCA, but no Ceruleans were located within RUCA boundaries during the breeding season despite the presence of very suitable habitat; this species should be searched for in the park during future breeding seasons.

Migrant warblers that prefer brushy habitats—such as Blue-winged, Golden-winged, Nashville, Mourning, Connecticut, and Canada warblers—were also not found in the park despite the presence of suitable, if limited and fragmented, brushy habitat.

*Habitat for declining species.*— Excellent habitat for Cerulean Warbler

appears to be present above Russell Cave itself and at several other locations on Montague Mountain. The log debris still remaining in the forests of the park is possible habitat for Bewick's Wren, so these and future debris piles that might be accumulated should not be burned where possible. Many species of Neotropical migrants considered to have declining continental populations, such as Wood Thrush and Kentucky Warbler, have excellent population numbers in the park due to its fine, largely unfragmented forest habitat.

If more shrub-scrub habitat is created and the present shrub-scrub habitat maintained, species that depend on this habitat, such as Prairie Warbler and Yellow-breasted Chat, would benefit; some of these species are undergoing long-term population declines on a continental level. This habitat also benefits many species that migrate through and winter in the park.

### ACKNOWLEDGMENTS

We thank John Bundy, Superintendent at Russell Cave National Monument, for support during the course of the bird inventory. Mary Shew, Resource Manager, was helpful and encouraging during the entire project. Jason Money assisted in locating and marking plots for point counts, and he checked to be sure the road up Montague Mountain was clear before visits were made to the monument. Tom Diggs also assisted in locating and marking plots for point counts. Linda Barnes and Shelia Reed in the park visitor center used information we provided to inform the visiting public about the birds of the park, and we thank them for their promotional work. We are greatly indebted to the staff of the Center for the Management, Utilization, and Protection of Water Resources at Tennessee Technological University for high quality management of the fiscal paperwork associated with this bird inventory. Director Dennis George, Sandra Pigg, Yvette Clark, Amy Knox and especially Glenda Sharks and Mary Williford, contributed much to our success. We are especially grateful to Teresa Leibfreid, Inventory and Monitoring Coordinator for the Cumberland Piedmont Network of the NPS, for her dedication and support throughout the duration of this bird inventory. The inventory was supported by a grant (TTU contract #H5000030200) from the National Park Service.

### LITERATURE CITED

AMERICAN ORNITHOLOGISTS' UNION. 1998. Check-list of North American

- Birds. 7<sup>th</sup> ed. American Ornithologists' Union, Washington, D. C.
- HAMEL, P. B. 1992. The Land Manager's Guide to Birds of the South. The Nature Conservancy and U.S. Forest Service, Atlanta, Georgia.
- HAMEL, P. B., W. P. SMITH, D. J. TWEDT, J. R. WOHR, E. MORRIS, R. B. HAMILTON, AND R. J. COOPER. 1996. A Land Manager's Guide to Point Counts of Birds in the Southeast. Gen. Tech. Rep. SO-120. New Orleans, LA: U.S.D.A. Forest Service, Southern Research Station. 39 pp.
- IMHOF, T. A. 1976. Alabama Birds, 2<sup>nd</sup> ed. University of Alabama Press, The University of Alabama, Tuscaloosa, Alabama.

**Stephen J. Stedman**, Department of English and Communications, Box 5053, Tennessee Technological University, Cookeville, TN 38505 (Email:SStedman@tntech.edu). **Barbara H. Stedman**, 2675 Lakeland Dr., Cookeville, TN 38506.