

I. Introduction

Birds are a significant part of our nation's natural heritage as well as an important component of the fauna of our nation's natural areas. Bird species play a vital role in the complex functioning of our natural world. The presence or absence of some specific bird species or assemblages within particular natural communities can be an indicator of the overall ecological health of these communities. Therefore, an accurate baseline inventory of bird species is an important tool for use by natural resource managers when making land management and wildlife conservation decisions. Baseline bird inventory data is also important for use in educating the public about our natural areas. This study provides the results of an initial baseline inventory of the birds found at one unit of the national park system: Cowpens National Battlefield (COWP).

Cowpens National Battlefield is located in Cherokee County South Carolina, approximately 10 miles north of the town of Cowpens and approximately five miles south of the North Carolina border (Figure 1). The unit is approximately 341 hectares or 842 acres in size (Figure 2). The site was protected by the National Park Service due to its national historic significance as a decisive battle site of the American Revolution. Though protected for its cultural significance, the park unit protects many acres of natural resource significance.

The park unit is located within the Southern Piedmont physiographic region of South Carolina as designated by the national Partners in Flight program (Figure 3). The park

protects a diverse variety of habitats including: riparian / small stream floodplain forest, oak-hickory forest, mixed shortleaf-pine hardwood forest, abandoned loblolly pine plantation, and several stages of early successional habitats including: old field, shrubland, and maintained grass areas. Though the habitat at this park unit has been altered and impacted by man over time, a good diversity of breeding bird species still remains.

II. Methods

An inventory of the birds at this park unit was conducted during two breeding seasons and two winter seasons beginning in June 2004 and ending in February 2006. The primary goal of the inventory was to provide data on the presence, status and relative abundance of bird species during the winter season and the breeding season and to provide data that relates the distribution of breeding bird species to the various habitat types within the unit. An attempt was made to document 90% of the bird species present during each season. Data was collected on all incidental species encountered during each park visit and all data was utilized to prepare an updated checklist of birds for the park unit. Inventory methods utilized conform to priority items #1 and #2 as specified by the National Park Service in the "Scope of Work" for "Bird Inventories of National Parks in the Cumberland Piedmont and Appalachian Highlands Networks". Table 1 provides the dates of all work conducted as part of this inventory.

Breeding Season Point Counts

Breeding season point counts were conducted at sixteen 50 m radius circular plots placed at least 250 meters apart (Figure 4 and Figure 5). These plots were pre-established as 1 ha. plant community sampling plots for a detailed vegetation survey conducted by the University of Georgia. The plots represent an approximate grid density of 1 sample point per 21 ha. The plots were established in each major habitat type within the park unit. Plot locations were located with a Garmin eTrex GPS receiver during initial site visits each year. The center of each plot is identified by a numbered metal tag placed on a tree and the tagged trees were flagged once each year, when initially located, so they could be used for quick visual reference on data collection mornings. All flagging used was later removed. GPS coordinates and primary vegetation cover for all plots are shown in Figure 6. Note: Plot number 13 was not sampled because center point location data was not provided and the plot was not identified on the plot maps provided for the survey.

Plots were sampled at least twice during each of two breeding seasons: June 2004 and June 2005. Counts were conducted at least two weeks apart to provide for better sampling. Counts were conducted only under acceptable weather conditions. Count days began at sunrise and all required counts were completed before 10:15 am EST. Each count was conducted for a ten minute interval recording all birds heard or seen during three time periods: 0-3 minutes, 3-5 minutes, and 5-10 minutes. Each bird detection was recorded on a “bulls-eye” data sheet (Figure 7) and each individual’s distance was estimated from the point center and recorded. To provide better distance estimates from the center point,

initial 25m, 50m and 100m reference points were determined in the field using a Nikon Laser800 rangefinder (8x28) on points where the vegetation allowed. The sampling route was altered for the second count period each year to allow for better sampling. It was impossible for one person to conduct point counts at each of the 16 plots within the allotted time frame because the plots were located so far apart and there was no vehicle access to many of the points. Therefore, a two person team was used to collect point count data and the points were divided between them.

Winter Bird Inventory

Non-structured, unconstrained surveys were conducted for bird species during the winter seasons. At least one survey was conducted in December 2004, January 2005, February 2005, December 2005, January 2006 and February 2006. Observers explored each habitat type in the park and documented all bird species present. Optional transect methods recommended to survey for grassland bird species were not utilized due to the nature of the old-field habitats present at COWP.

III. Results

Breeding Season Summary

Several descriptive statistics were calculated from the point count data collected and the results are presented below. A detailed statistical analysis of the data was not performed as this was beyond the scope of this report. However, a large enough sample size was collected for a more in depth statistical analysis to be conducted. The descriptive statistics presented below are based on an unlimited radius but specific distance from center point data was collected and this data could be used to compare with data from future studies in order to help provide insight into changes in both species composition and relative abundance over time. It should be remembered that point count data is sampling data and as such these data are not meant to be equated with census data. Both species and individuals can be missed when the sample is taken.

Observed Versus Expected Species Diversity

A total of 37 point counts were conducted at COWP during the 2004 breeding season. A total of five additional counts (16%) were conducted beyond the 32 required counts to help provide additional breeding species data. A total of 32 point counts were conducted during the 2005 breeding season resulting in a total of 69 breeding season point counts conducted

during the two year sampling period. All additional “incidental” birds encountered away from point circles while traveling to and from the points were also recorded and these data were included in the observation data summary and added to the park checklist as needed. A total of 52 species and a total of 1097 individuals were documented during these breeding season point counts (Table 2).

According to the *South Carolina Breeding Bird Atlas* (John Cely, SCWMRD, 2003), 94 bird species are possible, probable or confirmed as breeders in Cherokee County. Of these 94 species, only 71 species may be expected to be documented as breeding species in this park unit. This is due to a variety of factors including an absence of specific breeding habitat, limitations in habitat type, size, or quality, or due to the species’ being an irregular or inconsistent breeder in this area. Refer to Table 2a for a complete list of all expected breeding bird species within this park unit. In addition to the 52 species documented on point counts, nine species were recorded as incidental species detections for a total of 61 species detected during the breeding season. The total of species observed represents 86% of the 71 breeding species expected at the park unit.

Detections by Plot

Plot data is summarized in Table 3. A comparison of overall plot sampling between the two sampling years appears to have yielded consistent results in both mean number of species and individuals. The total number of species detected at individual plots in 2004

ranged from 9 species detected at plot 10 to 21 species detected at plot 4. The total number of species detected at individual plots in 2005 ranged from 11 species detected at plot 7 to 22 species detected at plot 6. The mean number of species detected per plot (rounded to a whole number) was 17 in both 2004 and 2005. The mean number of individuals detected per plot (rounded to a whole number) was 17 in 2004 and 15 in 2005.

Detections by Species

Data showing the distribution of individual species by plot is presented in Table 4. The five most widespread species documented on 100% of the plots were: American Crow, Blue Jay, Carolina Wren, Northern Cardinal, and Tufted Titmouse. Eastern Towhee was a close second documented at 94% of the plots. Red-eyed Vireo, Indigo Bunting and Yellow-billed Cuckoo were detected on 88%, 75% and 75% of the plots respectively. Breeding and foraging habitat for each of these common species is abundant throughout the park unit.

Twelve species were only detected at one plot each: Barn Swallow, Barred Owl, Broad-winged Hawk, Eastern Phoebe, Eastern Wood-Pewee, Northern Flicker, Northern Parula, Prairie Warbler, Red-tailed Hawk, Turkey Vulture, White-breasted Nuthatch and Wild Turkey. Barn Swallow, Turkey Vulture and Red-tailed Hawk were flyovers and not necessarily associated with the plot sampled. Barred Owl and Wild Turkey are difficult to sample using point counts. Eastern Phoebe, Eastern Wood-Pewee, Northern Flicker, and

Prairie Warbler should be expected to have a wider distribution than this data suggests because there is plenty of quality breeding habitat available for these species within the park unit. Northern Parula was documented at one plot during the 2004 season only. The breeding habitat for this species is restricted within this park unit to the area along the riparian corridor around plot 9. This species may not successfully breed or may breed here only intermittently. White-breasted Nuthatch was a very good find for breeding season at this park unit. This species is area sensitive and prefers large expanses of hardwoods for successful nesting but it will nest in mixed woods as well. Broad-winged Hawk was an excellent find as well. It is a sporadic breeder in the Piedmont. Attention should be paid to this species during future breeding seasons. This bird may have been a late migrant and may not have been nesting.

Relative Association with Habitat Types

In Table 5, plots were assessed and grouped by their dominant plant community type and each bird species detected on a breeding season point count plot was ranked as to its relative association with each dominant plant community type within the park unit.

Overall, distribution of species and species assemblages was consistent with what is expected in the Piedmont. Statistical analysis of the distance data collected would help provide more precision to these species / habitat associations. While most associations are obvious, it is important to look at the data with an understanding of the habitats adjacent to each point and that many bird species detected on plots at 100m or more away from the

center point may have been primarily associated with adjacent habitats of a differing primary plant community type. One example of this is the Eastern Towhee. It was detected on 100% of the riparian plots but it is primarily associated with early successional habitats adjacent to these areas. It is important to also note that many of the plots sampled within this park unit are in successional transition.

Most breeding bird species were associated with the various successional forest communities present including short-leaf pine hardwood, loblolly pine and oak / tulip poplar communities.

Breeding species with 100% detection on early successional habitat plots included: Common Yellowthroat, Indigo Bunting, Field Sparrow, and Yellow-breasted Chat as well as many of the ubiquitous generalist species. The only detection of Prairie Warbler was within this habitat grouping, as would be expected, and Northern Bobwhite was detected here on 75% of the plots sampled. Also, as expected, forest associated species like Wood Thrush, White-breasted Nuthatch, Scarlet Tanager, and Hairy Woodpecker were not detected on any of the 4 early successional habitat plots.

Species primarily associated with mature oak forest and / or riparian forest habitats include: Red-eyed Vireo, Eastern Wood-Pewee, White-breasted Nuthatch, Barred Owl, Hairy Woodpecker and Wood Thrush.

Additional Results

Breeding species expected but not detected include: Cooper's Hawk, American Kestrel, American Woodcock, Rock Pigeon, Great Horned Owl, Whip-poor-will, Red-headed Woodpecker, White-eyed Vireo, Blue-headed Vireo, House Wren, Gray Catbird, Song Sparrow, Orchard Oriole, House Finch and House Sparrow. Special attention should be made to document the presence of these species in future breeding seasons.

Coopers' Hawk, Blue-headed Vireo, House Wren, Gray Catbird, Orchard Oriole and Song Sparrow all have good or marginal breeding habitat present and it is possible that they may periodically or regularly breed at COWP. House Finch and White-eyed Vireo were entirely missed. This is unexpected due to the abundance of habitat present for these species and the fact that they are easily detectable by sight and song in the field. These species should be present and breeding at COWP. Great Horned Owl and Whip-poor-will are poorly detected during point counts and they may be present and breeding at COWP. A night time survey should be conducted for these and other nocturnal species.

House Sparrow is a non-native species that has been declining in recent years. It is associated with human development and it may no longer be present at COWP due to habitat changes and population declines. Red-headed Woodpecker is an irregular breeder and it may be expected at future breeding seasons in the surrounding area or within the boundaries of COWP.

The presence of American Woodcock was reported by park staff and this species has been included on the park checklist. This bird has a unique call and sound made during its courtship flight and it would be hard to misidentify. Breeding habitat for Woodcock is present at the park although it is of limited distribution. Rock Pigeon breeds in the surrounding area (interstate overpasses etc.) and it should be infrequently sighted during breeding season at COWP. It most likely does not breed within the park boundaries.

Both Loggerhead Shrike and American Kestrel have been declining as a breeding species in the Piedmont. The American Kestrel is a cavity nesting species and it requires large expanses of open field and pasture for foraging. The Loggerhead Shrike requires similar habitat but with extensive hedgerows for impaling prey. Neither Kestrels nor Shrikes would currently have expanding breeding populations in the surrounding region and therefore it is doubtful that either of these species will become established as breeders at COWP at this time.

Breeding Season Abundance

The relative abundance of each species present during breeding season abundance was determined after referencing the maximum relative abundance of the species as tallied in the Observation Summary section. Relative abundance codes were established and were included on the final Checklist of Birds compiled for the park unit.

Winter Season Summary

Surveys to detect winter birds were conducted on December 14, 2004, January 15, 2005, February 12, 2005, December 3, 2005, January 8, 2006, and February 25, 2006. Data collected is presented in the Observation Summary section of this report. The diversity of winter bird species present is consistent with what is expected to be found in these habitat types in the Carolina Piedmont during the winter season.

Approximately 73 species of birds can be anticipated here during the winter. A total of 62 species were documented during the winter inventory. Therefore, 85% of the expected winter species were documented. Two species of waterfowl were documented as flyover species in addition to the 62 land birds. They were: Wood Duck and Canada Goose. Both of these species utilize ponds in the surrounding region. Great Blue Herons are also to be expected as flyovers during the winter at this park unit.

Very few species of birds were documented in the deep forest areas during the winter. The overwhelming majority of species were found along the forest edges and in the grass and shrub habitats present throughout the park unit. Winter Wren was documented in a forest patch along a stream to the west of the park tour road, about one-third of a mile past the visitor center parking area. Pileated Woodpecker was documented in both the center and edge of forest patches during the winter.

Mixed flocks of common species such as: Carolina Chickadee, Downy Woodpecker, Tufted Titmouse, Golden-crowned and Ruby Crowned Kinglets, and Yellow-rumped

Warblers were very common. Blue Jay, American Crow, Northern Cardinal, American Goldfinch American Robin, Eastern Bluebird, Cedar Waxwing, Common Grackle, Carolina Wren, Red-bellied Woodpecker and Northern Flicker were abundant as well.

Mixed sparrow flocks made up predominately of White-throated Sparrow, Song Sparrow, Chipping Sparrow, Field Sparrow, Dark-eyed Junco, and Eastern Towhee were common throughout the park unit. A pair of Fox Sparrows was confirmed on the last two surveys in 2006. One Swamp Sparrow was documented each winter season. This species may be more common than the data suggests. Other winter sparrows such as Savannah Sparrow may be expected as management activities increase the acreage of native grass habitat present.

Both Eastern Meadowlark and Loggerhead Shrike were documented on the edges of the park boundary near the trail parking area. Numerous fields surround the park and these species will use them for foraging during the winter. Large, mixed flocks of blackbirds including Red-winged Blackbird, Common Grackle, European Starling, and Brown-headed Cowbird frequently use these fields in winter as well.

Hermit Thrush, Brown Creeper, and White-breasted Nuthatch are present each winter in low numbers. One Blue-headed Vireo was documented wintering in the park unit in 2004.

IV. Discussion and Recommendations

A total of 96 species of birds have now been documented within the boundaries of Cowpens National Battlefield. This represents an increase of 20 species (~26%) from the original park list prepared by the Piedmont Audubon Society.

Species of Conservation Concern

Twenty-three species of birds of conservation concern have been documented at COWP (Table 6). The bulk of these conservation sensitive species should persist within the boundaries of this park unit with some attention by staff to their specific management concerns. Nine of these species: American Kestrel, Loggerhead Shrike, Northern Bobwhite, Prairie Warbler, Field Sparrow, Blue Grosbeak, Indigo Bunting, and Eastern Meadowlark would benefit from continuing the current vegetation management efforts being conducted that are designed to return the park to the landscape condition present at the time of the revolutionary war. The vegetation removal (fuel reduction) and prescribed burns being conducted will have a secondary result of assisting in the management of these important bird species but the final goal should be to provide native grassland areas not large agricultural fields.

As stated above, Kestrels and Shrikes do not currently breed at the park but they do utilize the park occasionally during the winter season or they are present nearby during breeding season. Breeding pairs may still be present in the surrounding region. It is recommended

that nest boxes be constructed and erected in open field areas in an attempt to attract a breeding pair of Kestrels. Perching poles topped with barbed wire and placed in open or shrubby fields may help attract a breeding pair of Loggerhead Shrikes.

Carolina Chickadee, Brown-headed Nuthatch and Chimney Swifts are three other cavity nesting species listed in Table 6 that would benefit from the placement of artificial nesting structures. Chickadee and Nuthatches require a standard box similar to those provided for Eastern Bluebirds whereas Chimney Swifts may benefit by leaving the Scruggs House chimney open for breeding or by erecting an artificial chimney to help attract a breeding pair.

Both Chuck-will's Widow and Whip-poor-will are ground nesting species. These species would be negatively impacted by the presence of egg eating predators such as skunks and raccoons as well as by the presence of fire ants. An excessive abundance of these and other egg predators will impact overall nesting success of these two bird species.

The remaining species on the list: Pine Warbler, Brown Thrasher, Wood Thrush, Yellow-billed Cuckoo, Northern Flicker, Eastern Wood-Pewee and Acadian Flycatcher would benefit primarily by leaving the mature forest areas and successional forest areas unfragmented to help reduce cowbird nest parasitism and by management intended to reduce or eliminate invasive exotic plant species that compete with native food sources.

Note: Common Grackle and Blue Jay are listed as being of conservation concern not because they need management attention, but because of the negative impacts they have on the species needing conservation assistance.

Problems Encountered

No major problems were encountered during this inventory. The weather did not significantly impact data collection although humid summer days always reduce bird activity. The only data gap evident for this breeding and winter season inventory is the lack of data on nocturnal bird species.

The inventory was limited in scope due to the limitations of the funding provided. More sampling days would provide for a better picture of the species present.

Recommendations for further study

In order for the inventory to be complete, fieldwork needs to be conducted during both spring and fall to add species that regularly use the park units as stopover habitat during migration. It is recommended that funding be procured for this field work so that a complete year round sample of the avifauna utilizing habitat within this park unit can be obtained.