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Final Report of the Bird Inventory: Big South Fork National River and Recreation Area, 2003-2005

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Executive Summary

Field work to inventory the birds of the BISO during the summers of 2003 and 2004, as well as the winters of 2003-2004 and 2004-2005, resulted in detection of 111 species, approximately 79% of the number (140) that might maximally be present in the park during two summers and two winters. Field work consisted of highly structured inventory methods—in particular, point counts conducted at 36 sites selected for habitat diversity and roadside surveys conducted at 100 points along park thoroughfares—and less structured methods designed to detect the maximum number of species possible during the inventory seasons—including night surveys and walking transects.

Weather conditions during the seasons when the inventory was conducted were generally conducive to obtaining good to excellent results from the field work conducted. It should especially be noted that weather conditions experienced during 2003 and 2004 appeared to affect the mast crop in the park differentially, with a good mast crop being produced for the winter of 2003-2004 and a poor one being produced for the winter of 2004-2005. The different quantity and quality of mast present during these winters resulted in different population numbers of many species found in the park during winter. The high degree of variability in the wintering avifauna population numbers in the park differs markedly from the fairly consistent avifauna population numbers found during summer (and during spring and fall migrations).

Changes in the park's forests resulting from an outbreak of pine beetles have perhaps degraded those forests sufficiently to discourage the presence of as many wintering Northern Saw-whet Owls as occurred prior to the beetle outbreak. Cerulean Warbler numbers in the park have undergone a reduction since the mid-1990s, but the causes of this reduction are not certain. The population of Swainson's Warbler in the park appears stable.

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Introduction

The Big South Fork National River and Recreation Area (BISO)--recommended in 2005 to be an Important Bird Area in Tennessee under the auspices of Partners in Flight--is located in north-central Tennessee and south-central Kentucky. Established in 1974, the park protects the Big South Fork of the Cumberland River, its major tributaries (Clear Fork and the New River), as well as many smaller tributaries, and lands on the adjacent Cumberland Plateau. The purpose of this study was to

- document at least 90% of the birds reasonably expected to occur in the Park during summer and winter;
- conduct structured inventories using a statistically valid study design involving 1-hectare circular plots placed in different vegetative community types;
- describe the distribution and, if possible, relative abundance of species of special concern at the Big South Fork NRRA; and
- provide baseline information on the distribution, abundance, and habitat associations of bird populations in the Park.

Description of Study Site

The BISO is located in five counties: McCreary County, Kentucky; and Fentress, Morgan, Pickett, and Scott counties, Tennessee (Figure 2). The park

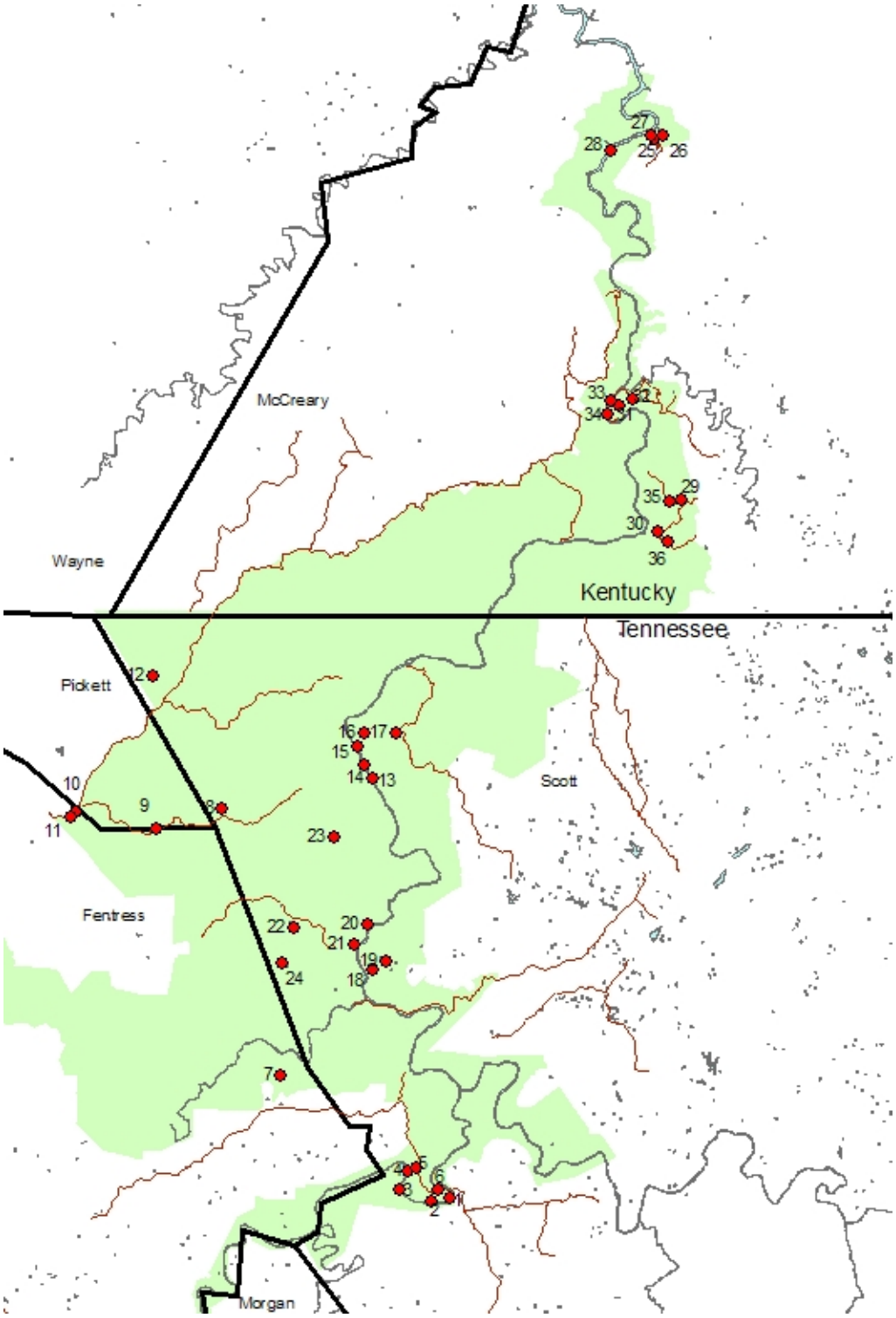

Figure 2. Locator map of BISO featuring locations of plots for point counts conducted during summers of 2003 and 2004.

comprises about 125,000 acres of which about 100,000 are currently under federal control. The park's northernmost boundary lies in the vicinity of Whitley City, Kentucky, while its southernmost boundary is located near Rugby, Tennessee; the distance between these sites is about 50 mi. The park is narrower east to west, being about 20-25 miles wide at its widest latitude; the towns of Jamestown, in Fentress County, Tennessee, and Oneida, in Scott County, Tennessee, lie west and east of the park, respectively. A variety of sites in the park have been studied for their bird populations; these sites are described in moderate detail by Stedman and Stedman (2002).

The park contains a variety of habitats, ranging from riparian forest along the shores of the park's rivers, to white pine-hemlock forests along the lower slopes of the gorge, to mixed mesophytic forest along lower and mid-slopes of the gorge, and, finally, to various deciduous and mixed forest types on the rim of the gorge and on the adjacent flatter lands of the Cumberland Plateau. Each forest habitat in the park supports a distinct bird community. Interspersed throughout the forests of the park, especially on flatter areas of the plateau, are many fields and forest openings, most of which date to the time prior to the establishment of the park when numerous small farms and communities dotted the landscape. The fields and openings of the park offer a wide range of habitats to birds, including mowed grass fields, native grass fields, cultivated fields, and fields that have grown up to the shrub-scrub stage or even young second growth. Almost all fields in the park are smaller than 25 hectares, affording little opportunity, because of their small size, for grassland obligate bird species to

breed or perhaps even to overwinter successfully in the fields of the park. However, the fields in the shrub-scrub stage are large enough to provide important breeding sites for species adapted to that habitat.

The rivers of the park, although harboring an extensive fish fauna, as well as various mussels and macro-invertebrates of conservation importance, harbor an extremely limited number of breeding or wintering bird species adapted to aquatic habitats. Probably their primary importance to the birdlife of park is to provide insect prey for a number of passerines that breed in the riparian zone adjacent to the rivers; of secondary importance is the ability of the rivers and streams of the park to function as brief stopover sites for small numbers of migratory waterfowl and shorebirds.

Methods--Bird Inventory Techniques

Point counts were the most regimented method of collecting bird data at this NPS unit. Thirty-six point counts were conducted during late May and June in each of two years (2003 and 2004). Twelve of the point counts were situated in the Kentucky portion of the park, while twenty-four were situated in Tennessee portion. The protocol for these counts entailed standing at the center of a 100-meter 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; birds were also 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 if the same individuals were also detected at an adjacent point. All birds seen or heard were recorded on a special point count data form. All point count data are provided in a supplemental Excel file included with this report. In addition, a description of the locations of plots used for point counts is also provided in a supplemental Word file included with this report, and a completed vegetation analysis form is provided for each of the plots.

The plots used for point counts were selected in a nonrandom manner, with six plots being sited (Appendix A: Figure 3) in each of six different habitat types found in the park, these being 1) grassland/shrub-scrub, 2) riparian, 3) mesic hardwood, 4) hemlock/white pine, 5) pine-hardwood, and 6) dry hardwood. Difficulty in locating the randomly sited NatureServe plots prevented the NatureServe plots from being used as plots for point counts, although several plots actually used for point counts were located within 100 m of NatureServe plots. The 36 plots used for point counts were located in such a manner as to allow four to seven of them to be conducted in a morning; within each group of four to seven plots, the individual plots were located at least 250 m apart, but usually somewhat farther, sometimes up to 2 km. The general locations of the groups of plots were in Kentucky--Yahoo Falls (4), Bear Creek (4), and Blue Heron (4); and in Tennessee--Burnt Mill Bridge (7), Leatherwood Ford (4), Bandy Creek (3), Station Camp (5), and Divide and Fork Ridge roads (5). Vegetation sheets were completed for each of the 36 point count plots; these will be mailed to NPS personnel. Some of the plots selected for point counts were located

along the same route that was followed by a breeding bird survey (see next paragraph), but in no case was a point count plot located at exactly the same site as a BBS stop although in several cases the 100-m circle of a point count plot included a BBS stop within it. Vegetation datasheets were prepared for each plot.

A second method for collecting bird data, closely related to the point count, is the roadside breeding bird survey, four of which were conducted during each summer of the inventory. Each roadside breeding bird survey consisted of 24-26 stops; collectively, the four routes totaled 100 stops. The protocol for conducting roadside breeding bird surveys (Robbins et al. 1986) is quite similar to the protocol for point counts except that birds are counted for five minutes, rather than 10 minutes, at each stop; additionally, there are but two distance intervals for roadside breeding bird surveys (> 50 m; < 50 m), rather than four; the BBS routes conducted in the BISO actually differ from standard BBS routes in these two respects, because standard BBS routes have three-minutes stops where all birds are counted at one distance interval, that being 0.25 mi for birds seen and unlimited distance for birds heard. One of the roadside breeding bird surveys conducted in the BISO lies in Kentucky; the remaining three lie in Tennessee. Habitat diversity among the 100 roadside surveys is lower than habitat diversity among the 36 point count plots.

A third method of collecting bird data involved walking transects. During summer 2003 thirteen such transects were conducted (data from them being provided in a supplemental Excel file), while during the winter of 2003-2004 and the winter of 2004-2005 seven such transects were conducted, with each group

of seven transects covering the same 65 km (40.5 mi) of park trails (mainly) and gravel roads (briefly). The following transects were walked at 1.5-2 km/hour during each winter of the inventory period: Burnt Mill Bridge Loop Trail; Honey Creek Loop Trail; Twin Arches Loop Trail; No Business Creek Loop Transect (not an official loop trail); John Muir Trail from Station Camp to Leatherwood Ford; Bear Creek/Huling Branch Loop Transect (not an official loop trail); and Yahoo Arch Loop Trail (just the portion in the BISO). All birds heard and seen at any distance were recorded on a field card during the walking transects. Data from the summer walking transects are provided in a supplemental Excel file submitted with this report; data from winter walking transects are also provided in supplemental Excel files, but data from these transects are also supplied below (Appendix A: Tables 4 and 5).

A fourth method of gathering bird data in this park was the night survey, a somewhat informal method entailing the use of tape-recorded owl calls to elicit responses from owls. Woodcocks, owls, and nightjars were detected during night surveys conducted in the summer, while woodcocks and owls were detected by night surveys during winter. All species seen or heard were recorded on a standard field card, usually in conjunction with data obtained using the following method. Data from night surveys were generally lumped with data obtained using the next method of obtaining bird data.

The fifth and last method of obtaining bird data in this park was the general inventory, involving less regimented efforts to visit many promising habitats within this NPS unit during the course of a day and to keep track of all

species sighted. During the breeding period for birds, which includes much of the spring, all of the summer, and a portion of the early fall, the general inventory included efforts to detect breeding evidence of for all species breeding in the unit. All species seen or heard and all breeding evidence observed were recorded on a standard field card during general inventory efforts (the data from general inventory lists are provided in separate Excel files included with this report).

Results

Expected Species List

About 180 species of birds have been recorded within the boundaries of the BISO (Stedman and Stedman 2002; S. Stedman and B. Stedman pers. data; see Appendix A: Table 1 for a complete list of these species). These species were detected as a result of field work conducted in the park since its inception. A large number of individuals have collected bird data in the park, but the efforts of D. and M. Bickford and S. Stedman outweigh all others. The Bickfords birded the park for six years in the late 1970s and early 1980s, compiling a list of about 130 species that is on file with the park. S. Stedman began volunteer field work in the park in 1993 and continued to conduct field work there through the period of the bird inventory, making about 350 trips to the park in the course of 12 years; Stedman walked most of the hiking trails in the park during that time, some of them many times, collecting data about the birds of the park during all hiking trips. As a result of the work of the Bickfords and Stedman, all of the common expected species using the park during summer and winter have been recorded,

though additional field work in the future is sure to turn up uncommon to rare species on a regular basis, since the avifauna of any site like the BISO is always changing.

Of the 180 species recorded in the park, about 40 are strictly transients (Appendix A: Table 1), not usually expected to occur during either summer or winter months, leaving about 140 species expected to occur during those seasons.

Total Species Inventoried

During the periods of the bird inventory (May-July 2003; December 2003-February 2004, May-June 2004; and December 2004-February 2005), S. Stedman made 54 visits to the unit--36 during summer and 18 during winter. In the course of these visits he observed 114 species by one or more of the methods described above (these species are bold-faced in Appendix A: Table 1); furthermore, he learned about a sighting of one additional species (Pine Siskin) from a visitor (Roseanna M. Denton) to the park. Four species recorded during the inventory were transient species—Double-crested Cormorant, Sandhill Crane, Swainson's Thrush, and Mourning Warbler—but the remaining 111 species were permanent residents, breeding species, and wintering species. The total of 111 non-transient species detected during the two-year inventory represents 79% of the 140 species that may reasonably be expected to occur within the park during two summers and two winters.

Breeding Species Inventoried

Evidence of breeding by species occurring in the unit was divided into three categories: possible evidence; probable evidence; and confirmed evidence. In all, 96 species (Appendix A: Table 1) were placed in one of these categories, including 19 (19.8 %) possible breeders, 24 (25.0 %) probable breeders, and 53 (55.2 %) confirmed breeders. Considerable breeding evidence used to place species in one of the three breeding categories was obtained prior to the start of the inventory during the time from 1993 to 2003 when S. Stedman was visiting the park on a regular basis, but for a fair number of species, evidence secured during the inventory was used either to place a species in a higher breeding category or to place a species in one of the breeding categories for the first time.

Point counts were conducted during the breeding period of many species. A total of 59 species was registered during point counts conducted during 2003, while 61 species were detected during point counts conducted in 2004. In all, the point count effort led to data for 68 species of birds, all of which may be considered to use BISO during the breeding season (Appendix A: Table 2). Detailed data from the point counts are provided in a supplemental Excel file submitted in conjunction with this report.

Roadside breeding bird surveys were also conducted during the breeding period of many species. A total of 58 species was registered during roadside breeding bird surveys conducted during 2003, while 62 species were detected during roadside breeding bird surveys in 2004. In all, the roadside breeding bird effort led to data for 66 species, all of which may be considered to use the BISO

during the breeding season (Appendix A: Table 3). Comparative data from roadside breeding bird surveys conducted in the BISO over a slightly different 100-stop route (70% overlap of stops) during 1994-1996 are presented by Stedman (1998), while comparative data from roadside breeding bird surveys conducted in the BISO over an identical 100-stop route during 1997-2001 are presented in Stedman and Stedman (2002); comparative data from roadside breeding bird surveys conducted in the BISO over an identical 100-stop route during 2002 and 2005 may be found at S. Stedman's website: http://iweb.tntech.edu/sstedman/BBSComparison.htm

Generally, results from point counts conducted 2003 and 2004 are concordant with results from roadside breeding bird surveys conducted in the same years. The 36 point counts were selected to represent a broader range of habitat types than are represented by the 100 stops of the roadside breeding bird surveys; however, the greater number of stops on the roadside breeding bird surveys somewhat compensated for the lesser habitat diversity they reflected. Thus, the two surveys ended up with almost equal species representation during the years of the inventory.

Wintering Species Inventoried

Results from walking transects, night surveys, and general inventories of the park during two winter seasons led to the registration of 66 species, 59 of which were recorded during the winter of 2003-2004 (Appendix A: Table 4) and 54 of which were recorded during the winter of 2004-2005 (Appendix A: Table 5).

Results from the two winters differ somewhat in terms of species diversity and remarkably in terms of bird abundance, with results from the winter of 2003-2004 revealing more species and a much greater abundance of birds than results from the winter of 2004-2005. Likely reasons for these differences directly involve the distinctly different abundance of wild food, including both hard and soft mast, produced during those winters and indirectly involve weather conditions present during the seasons just prior to those winters, as discussed under “Influence of Weather on Results” below.

Species Composition

Generally speaking, the larger and more diverse in habitat a discrete site is, the larger the number of bird species that will be found in it. This rule of thumb was generally borne out by the data obtained during this survey. I.e., the BISO is a large park, which would dictate that it harbor a large number of species. Habitat diversity in the park is high, but the total area of habitats that are not mature forest is quite small, dictating that the park should harbor a low number of species. The moderate number of species found within the park results from its large (mostly forested) area and its somewhat limited area devoted to diverse habitats.

While the BISO harbors a bird community that must be regarded as only moderately diverse overall, the summer bird community of the park possesses a high percentage (c. 50%) of breeding Neotropical migrants. The percentage of these species in the BISO is equal to the percentage of such species found in other relatively pristine forested sites in Kentucky and Tennessee, especially on

the Cumberland Plateau, and is higher than the percentage of these species found at sites whose quality has been degraded by development and other homogenic factors. The high percentage of breeding Neotropical migrants in the park undoubtedly results from the high quality forest habitats and resultant high quality food resources of the park. Also the park's forests have not been fragmented to any considerable degree by homogenic factors such as land clearing for development or agriculture; as a result, species that benefit from fragmentation and homogenic alteration of the landscape such as Blue Jay (an egg predator) and Brown-headed Cowbird (a nest parasite) are present in the park in minimal numbers (see results of point counts), benefiting the breeding productivity of Neotropical migrants in the park.

Discussion

Comparative Effectiveness of Survey Techniques

Each of the five survey techniques 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 inventory was probably the most effective, followed by the walking transect (for wintering species only) and the point count (for breeding species only). Due to its restricted emphasis, the night survey generated far fewer species per unit of time expended than the other methods of acquiring bird data, although the quality of species detected during night surveys was usually high.

Influence of Weather on Results

An effort was made to visit BISO during periods when the weather was conducive to registering the maximum number of species during general inventory work, transects, point counts, and night surveys, so the influence of weather on the results of the overall inventory was generally positive.

To a large extent, weather during the summers and falls of 2003 and 2004 was indirectly an important factor in determining the abundance of birds in the BISO during the winters of 2003-2004 and 2004-2005. Weather conditions during summer and fall 2003 promoted a plentiful crop of mast, which in turn supported a high density of birds in the park during the winter of 2003-2004 (Appendix A: Table 4). Conversely, weather conditions during the summer and fall of 2004 did not support production of much mast, which in turn led to a considerably lower density of birds in the park during the winter of 2004-2005 (Appendix A: Table 5).

Description of Bird Diversity in Terms of Estimated and Observed Species Richness

Good estimates of bird diversity in the park had been previously obtained (Stedman and Stedman 2002). Results of the bird inventory in the park confirmed these earlier estimates; i.e., the park's overall bird diversity is only moderate, but its diversity of breeding Neotropical migrants is good to excellent, no doubt as a result of the fairly mature forest covering about 80-90% of the park's area.

Unexpected Results

Perhaps the most unexpected result of the bird inventory in the BISO was provided by an observer—Frank Renfrow—not directly connected to the inventory. Renfrow discovered the first nest of Red-breasted Nuthatch for the park (and for the Cumberland Plateau in Tennessee) 7 June 2003 in Scott County, Tennessee. After being apprised of this nest by Renfrow, S. Stedman visited the nest site 9 June 2003 and obtained a photograph (Appendix A: Figure 1 [cover]) of one of the adult nuthatches at the entrance to cavity where this nest was placed. The discovery of this nest was considered noteworthy enough to be published (Renfrow and Stedman 2003).

During night surveys for owls and nightjars in June 2003, Chuck-will's-widows were heard at two sites of the BISO—Rugby Bridge (Fentress County, Tennessee) and West Bandy Rd. (Fentress County, Tennessee). These records were somewhat unexpected, as this caprimulgid is rare and local on the Cumberland Plateau, especially north of I-40 in Tennessee.

The presence of breeding Canada Geese at the sewage lagoons of the Bandy Creek Visitor Center during summer 2004 was another, somewhat less noteworthy, but also somewhat unexpected consequence of the inventory. Two adult geese and four large goslings at this site 15 June 2004 clearly confirmed the breeding of this species in the park, a status suspected from the presence of geese along Clear Fork in earlier years, but unconfirmed by evidence.

House Wrens are usually found in the park only during spring and fall migration. No breeding record of this species had occurred prior to the inventory,

and no breeding evidence was found during the inventory. Prior to the inventory, only one early winter record of this wren was known from the park, so the discovery of a House Wren 6 February 2005 in the Joe Branch area of the southern part of the park was somewhat unexpected.

Long suspected to breed along the main river between Yamacraw Bridge and Yahoo Falls but never detected after May in the park, a Prothonotary Warbler was found there 14 June 2004, providing evidence that this warbler probably breeds in the park, at least in some years. This finding was another somewhat unexpected result of the inventory effort.

The discovery of a Mourning Warbler in the park was yet another somewhat unexpected result of the bird inventory. Although not focused on detecting transient species, the inventory nonetheless produced a late record of this warbler, previously unrecorded in the park, when a singing male was found 6 June 2003 on the east side of the main river downstream from Station Camp.

Birds Not Found

Some species that were sought in the park but not found included wintering Short-eared Owl (not expected and not found during night surveys of field areas) and breeding Blue-winged and Golden-winged warblers (not found, but insufficient effort was focused on the power line right-of-ways in the park to say conclusively that they were not present). Additionally, Red-headed Woodpecker was sought during all seasons of the inventory, but the only

evidence of its presence in the park was a single primary feather found 4 June 2003 (Appendix A: Figure 3).

Recommendations for Management and Protection of Significant Habitats

Shrub-scrub habitat in the park is quite limited in extent, mainly occurring in fields that have been allowed to undergo succession; however, in these limited areas, shrub-scrub habitat is further limited by temporal pressures, because this habitat type generally occurs for only 5-10 years following the cessation of mowing or cultivating in a field; thereafter, if not maintained by periodic mowing or periodic controlled burns, the site becomes a second-growth forest unable to support species requiring early successional habitat in which to breed. Because of these considerations and because shrub-scrub habitat is important to the breeding success of many deep forest species that use it as a “nursery” for fledglings, it is recommended that as many of the park’s fields as possible be managed to remain in the early successional—i.e., shrub-scrub--state, usually considered to be 1-3 m in height, rather than managed to remain in mowed or climax grassland.

Nearly all fields in the park are smaller than the minimal area (25 hectares) likely to promote successful reproduction by grassland obligate bird species. The area around Rugby Bridge is probably large enough to promote successful reproduction by these species if managed as a native grassland, but elsewhere consideration should be given to promoting shrub-scrub habitat rather than grassland habitat in as many fields of the park as possible, as this habitat is likely to promote successful breeding by a wide variety of shrub-scrub obligates,

such as Prairie Warbler and Yellow-breasted Chat, and it is also important to birds of deep forest, as noted above. However, it is not recommended that forest habitat be cleared in order to increase the size of fields in the park, since older forest types are clearly the dominant and most important habitats of the park.

During late winter and early spring of 2005, controlled burns were conducted at several sites within the park. Results from the roadside breeding bird survey conducted during June 2005 suggested that the burn along Divide Road between the turnoff to Fork Ridge Rd. and northeastward for several miles led to an increase in the breeding density of several species that benefit from openings in the mid-canopy; among these species are Eastern Wood-Pewee, a rather scarce flycatcher in the park, and various vireos, including Blue-headed Vireo. Based on these admittedly somewhat limited results, it would seem advisable to continue a regimen of controlled burns at that site (and perhaps others). Should the long-term effect of such burns result in a more “park-like” appearance in that area (i.e., widely dispersed trees with little understory and much grassy cover), then species such as Bachman’s Sparrow might conceivably be induced to breed there.

Suitability of Habitat for Persistence of Sensitive Species

Changes wrought in the mixed forests of the park by the outbreak of southern pine beetles from 1999-2002 may have altered that habitat sufficiently to reduce the presence of Northern Saw-whet Owls in the park during winter. Night surveys for this owl were conducted at 100 roadside sites during January 2000, resulting in the detection of 10 owls; this survey occurred early in the

period of the pine beetle outbreak. During January 2001, 50 of the same sites were surveyed for owls without detection of any saw-whets. During January 2002, the entire set of 100 sites was again surveyed, with four owls being detected. As part of the bird inventory, about 30 of these sites were surveyed during February 2004, when two owls were detected; however, during early December 2004 about 60 of the same sites were surveyed without any owl detections. Absence of, or reductions in numbers of, owls detected in all winters following the winter of 1999-2000 suggest that the mixed forest habitat attractive to the owls has been degraded to an unknown but probably significant extent by beetle damage. Management of the park forests to encourage regrowth of mixed forest with a large component of pines would probably increase the suitability of the park forests for wintering Northern Saw-whet Owl in the future.

Most registrations of Cerulean Warblers during the bird inventory took place in the main river gorge in the Kentucky portion of the park. Cerulean Warbler habitat—older growth deciduous forests with tulip poplar as a co-dominant on the lower and mid-slopes of the gorge—in this part of the park still seems suitable, but populations of this warbler have definitely declined there since the mid-1990s, when, for instance, 13 individuals were counted during May 1995; whether this reduction is associated with changes in habitat (less likely) or with other, as yet undetermined, factors (more likely) remains unclear, as is true regarding the reduction in population numbers of this songbird throughout most of its breeding range.

The population of Swainson's Warbler in the park is thinly but fairly consistently distributed in most areas with an extensive rhododendron-dominated understory. This habitat in the park seems not to be in any danger of reduction in quality or extent, so Swainson's Warblers should be able to persist in the park for the indefinite future. Management to increase the extent of this habitat is probably unnecessary, but, if undertaken, must be viewed as a long-term (30+ years) venture requiring equally long-term commitment of park resources by park managers; management of rhododendron habitat by controlled burning (Watson 2004) strikes us as highly likely to affect the Swainson's Warbler population in the park in a negative manner.

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Appendix A

Table 1. Species, status, and seasonal abundance of birds observed in the Big South Fork National River and Recreation Area; this list incorporates all data from the bird inventory but also includes all other data available known to the authors. * = possible breeding evidence noted; ** = probable breeding evidence noted; *** = confirmed breeding evidence noted. Key to abbreviations: PR = permanent resident; SR = summer resident; TR = transient; VR = visitor; WR = winter resident; C = common; FC = fairly common; U = uncommon; VU = very uncommon; R = rare. Bold-faced species were recorded during the inventory; light-faced species were not recorded during that project.

Common Name	Scientific Name	Status	Sp	Su	F	Wi
Canada Goose * **	*Branta canadensis*	PR	VU	VU	R	R
Wood Duck * **	*Aix sponsa*	PR	U	U	U	VU
American Black Duck	*Anas rubripes*	WR			R	R
Mallard *	*Anas platyrhynchos*	WR				VU
Blue-winged Teal	*Anas discors*	TR	R		R	
Green-winged Teal	*Anas crecca*	TR	R			
Ring-necked Duck	*Aythya collaris*	TR			R	
Surf Scoter	*Melanitta perspicillata*	TR	R			
Hooded Merganser	*Lophodytes cucullatus*	TR			R	
Ruffed Grouse * **	*Bonasa umbellus*	PR	U	U	U	U
Wild Turkey * **	*Meleagris gallopavo*	PR	FC	FC	FC	FC
Northern Bobwhite	*Colinus virginianus*	former PR				
Common Loon	*Gavia immer*	VR		R		
Pied-billed Grebe	*Podilymbus podiceps*	WR	VU		VU	
Double-crested Cormorant	*Phalacrocorax auritus*	WR			R	
Great Blue Heron *	*Ardea herodias*	PR	U	U	U	U
Green Heron *	*Butorides virescens*	SR	VU	R	VU	
Black Vulture *	*Coragyps atratus*	PR	FC	U	U	FC
Turkey Vulture *	*Cathartes aura*	PR	FC	U	FC	FC

Osprey *	*Pandion haliaetus*	TR	VU		VU	
Bald Eagle *	*Haliaeetus leucocephalus*	WR	VU		VU	VU
Northern Harrier	*Circus cyanea*	TR	R		R	
Sharp-shinned Hawk ***	*Accipiter striatus*	PR	U	VU	VU	VU
Cooper's Hawk ***	*Accipiter cooperi*	PR	VU	VU	VU	VU
Red-shouldered Hawk ***	*Buteo lineatus*	PR	U	U	U	U
Broad-winged Hawk ***	*Buteo platypterus*	SR	U	U	U	
Red-tailed Hawk ***	*Buteo jamaicensis*	PR	U	U	U	U
American Kestrel	*Falco sparverius*	VR			R	
Peregrine Falcon	*Falco peregrinus*	former PR				
Merlin	*Falco columbarius*	former TR				
American Coot	*Fulica americana*	TR	VU			
Sandhill Crane	*Grus canadensis*	TR			VU	VU
**Killdeer ** **	*Charadrius vociferus*	VR			VU	VU
Spotted Sandpiper	*Actitis macularius*	TR	VU		VU	
Solitary Sandpiper	*Tringa solitaria*	former TR				
Greater Yellowlegs	*Tringa melanoleuca*	TR	R			
Wilson's Snipe	*Gallinago delicata*	WR			VU	R
American Woodcock ***	*Scolopax minor*	PR	VU	VU	VU	VU
**Rock Pigeon ** **	*Columba livia*	PR	VU	VU	VU	
Mourning Dove ***	*Zenaida macroura*	PR	FC	FC	FC	FC
Yellow-billed Cuckoo ***	*Coccyzus americanus*	SR	VU	U	VU	
Black-billed Cuckoo	*Coccyzus erythropthalmus*	TR		R		
**Eastern Screech-Owl ** **	*Megascops asio*	PR	U	U	U	U
**Great Horned Owl ** **	*Bubo virginianus*	PR	VU	VU	VU	VU
Barred Owl ***	*Strix varia*	PR	U	U	U	U
Short-eared Owl	*Asio flammeus*	former WR				
Northern Saw-whet Owl *	*Aegolius acadicus*	WR	VU	R	VU	VU
Common Nighthawk	*Chordeiles minor*	TR			VU	

Chuck-will's-widow *	*Caprimulgus carolinensis*	SR		R		
Whip-poor-will **	*Caprimulgus vociferus*	SR	FC	FC	VU	
Chimney Swift *	*Chaetura pelagica*	SR	U	U	U	
Ruby-throat. Hummingbird **	*Archilochus colubris*	SR	U	U	U	
Belted Kingfisher **	*Ceryle alcyon*	PR	U	U	U	U
Red-headed Woodpecker	*Melanerpes erythrocephalus*	VR	VU		VU	R
Red-bellied Woodpecker **	*Melanerpes carolinus*	PR	U	U	U	U
Yellow-bellied Sapsucker	*Sphyrapicus varius*	WR	U		U	U
Downy Woodpecker ***	*Picoides pubescens*	PR	FC	FC	FC	FC
Hairy Woodpecker **	*Picoides villosus*	PR	U	U	U	U
Red-cockaded Woodpecker	*Picoides borealis*	former PR				
Northern Flicker ***	*Colaptes auratus*	PR	U	U	U	U
Pileated Woodpecker ***	*Dryocopus pileatus*	PR	FC	FC	FC	FC
Olive-sided Flycatcher	*Contopus cooperi*	TR	R	R		
Eastern Wood-Pewee **	*Contopus virens*	SR	U	U	U	
Acadian Flycatcher ***	*Empidonax virescens*	SR	FC	FC	FC	
Least Flycatcher	*Empidonax minimus*	TR	R			
Eastern Phoebe ***	*Sayornis phoebe*	PR	FC	FC	FC	U
Great Crested Flycatcher **	*Myiarchus crinitus*	SR	U	U	U	
Eastern Kingbird **	*Tyrannus tyrannus*	SR	VU	VU		
Loggerhead Shrike	*Lanius ludovianus*	former PR				
White-eyed Vireo **	*Vireo griseus*	SR	FC	FC	FC	
Yellow-throated Vireo **	*Vireo flavifrons*	SR	U	U	U	
Blue-headed Vireo **	*Vireo solitarius*	SR	FC	FC	FC	
Philadelphia Vireo	*Vireo philadelphicus*	TR			VU	
Red-eyed Vireo **	*Vireo olivaceous*	SR	C	C	FC	
Blue Jay **	*Cyanocitta cristata*	PR	FC	FC	C	FC
American Crow **	*Corvus brachyrhynchos*	PR	C	C	C	C
Purple Martin *	*Progne subis*	SR	VU	VU		

Tree Swallow	*Tachycineta bicolor*	TR	R			
N. Rough-winged Swallow ***	*Stelgidopteryx serripennis*	SR	U	U	VU	
Barn Swallow ***	*Hirundo rustica*	SR	VU	R	VU	
Carolina Chickadee ***	*Poecile carolinensis*	PR	FC	FC	FC	FC
Tufted Titmouse ***	*Baeolophus bicolor*	PR	FC	FC	FC	FC
Red-breasted Nuthatch ***	*Sitta canadensis*	PR	VU	R	VU	U
White-breasted Nuthatch ***	*Sitta carolinensis*	PR	U	U	U	U
Brown Creeper	*Certhia americana*	WR	U		U	U
Carolina Wren ***	*Thryothorus ludovicianus*	PR	FC	FC	FC	FC
House Wren	*Troglodytes aedon*	TR	VU		VU	R
Winter Wren	*Troglodytes troglodytes*	WR	VU		VU	U
Marsh Wren	*Cistothorus palustris*	TR			R	
Golden-crowned Kinglet	*Regulus satrapa*	WR	U		U	C
Ruby-crowned Kinglet	*Regulus calendula*	WR	U		U	U
Blue-gray Gnatcatcher ***	*Polioptila caerulea*	SR	FC	FC	U	
Eastern Bluebird ***	*Sialia sialis*	PR	U	U	U	U
Veery	*Catharus fuscescens*	TR	R		VU	
Gray-cheeked Thrush	*Catharus minimus*	TR			R	
Swainson's Thrush	*Catharus ustulatus*	TR	U		U	
Hermit Thrush	*Catharus guttatus*	WR	U		U	U
Wood Thrush **	*Hylocichla mustelina*	SR	FC	FC	U	
American Robin ***	*Turdus migratorius*	PR	U	U	FC	FC
Gray Catbird *	*Dumetella carolinensis*	SR	U	VU	U	
Northern Mockingbird	*Mimus polyglottus*	VR			R	R
Brown Thrasher ***	*Toxostoma rufum*	PR	U	U	U	VU
European Starling ***	*Sturnus vulgaris*	PR	VU	U	FC	U
American Pipit	*Anthus rubescens*	TR			R	
Cedar Waxwing ***	*Bombycilla cedrorum*	PR	VU	VU	VU	VU
Blue-winged Warbler	*Vermivora pinus*	TR	VU		VU	

Golden-winged Warbler	*Vermivora chrysoptera*	TR	R		R	
Tennessee Warbler	*Vermivora peregrina*	TR	VU		U	
Orange-crowned Warbler	*Vermivora celata*	TR			R	
Nashville Warbler	*Vermivora ruficapilla*	TR	R			
Northern Parula ***	*Parula americana*	SR	U	U	VU	
Yellow Warbler	*Dendroica petechia*	TR	R			
Chestnut-sided Warbler *	*Dendroica pensylvanica*	SR	U	R	U	
Magnolia Warbler	*Dendroica magnolia*	TR	U		U	
Cape May Warbler	*Dendroica tigrina*	TR	VU		R	
Black-throated Blue Warbler	*Dendroica caerulescens*	TR			VU	
Yellow-rumped Warbler	*Dendroica coronata*	WR	U		FC	FC
Black-thr. Green Warbler ***	*Dendroica virens*	SR	FC	FC	FC	
Blackburnian Warbler	*Dendroica fusca*	TR	VU		U	
Yellow-throated Warbler ***	*Dendroica dominica*	SR	FC	FC	FC	
Pine Warbler ***	*Dendroica pinus*	PR	C	C	C	VU
Prairie Warbler ***	*Dendroica discolor*	SR	U	U	U	
Palm Warbler	*Dendroica palmarum*	TR	VU		U	
Bay-breasted Warbler	*Dendroica castanea*	TR	VU		U	
Blackpoll Warbler	*Dendroica striata*	TR	R			
Cerulean Warbler **	*Dendroica cerulea*	SR	R	R	R	
Black-and-white Warbler ***	*Mniotilta varia*	SR	FC	FC	U	
American Redstart **	*Setophaga ruticilla*	SR	VU	VU	U	
Prothonotary Warbler *	*Protonotaria citrea*	SR	VU	R		
Worm-eating Warbler ***	*Helmitheros vermivorum*	SR	FC	FC	U	
Swainson's Warbler ***	*Limnothlypis swainsonii*	SR	U	U		
Ovenbird ***	*Seiurus aurocapillus*	SR	C	C	U	
Northern Waterthrush	*Seiurus novaboracensis*	TR			R	

Louisiana Waterthrush ***	*Seiurus motacilla*	SR	FC	FC	VU	
Kentucky Warbler ***	*Oporornis formosus*	SR	U	U	VU	
Mourning Warbler	*Oporornis philadelphia*	TR		R		
Common Yellowthroat **	*Geothlypis trichas*	SR	U	U	U	
Hooded Warbler ***	*Wilsonia citrina*	SR	C	C	FC	
Canada Warbler	*Wilsonia canadensis*	TR	R		R	
Yellow-breasted Chat ***	*Icteria virens*	SR	U	U	VU	
Summer Tanager **	*Piranga rubra*	SR	U	VU	U	
Scarlet Tanager ***	*Piranga olivacea*	SR	FC	FC	U	
Eastern Towhee ***	*Pipilo erythrophthalmus*	PR	FC	FC	FC	U
American Tree Sparrow	*Spizella arborea*	VR				R
Chipping Sparrow ***	*Spizella passerina*	PR	U	U	U	
Field Sparrow ***	*Spizella pusilla*	PR	U	U	U	
Vesper Sparrow	*Pooecetes gramineus*	TR	VU		R	
Savannah Sparrow	*Passerculus sandwichensis*	WR			R	
Fox Sparrow	*Passerella iliaca*	WR	VU		VU	U
Song Sparrow **	*Melospiza melodia*	PR	VU	VU	U	U
Lincoln's Sparrow	*Melospiza lincolnii*	TR			R	
Swamp Sparrow	*Melospiza georgiana*	WR	VU		VU	VU
White-throated Sparrow	*Zonotrichia albicollis*	WR	U		U	FC
White-crowned Sparrow	*Zonotrichia leucophrys*	WR			VU	
Dark-eyed Junco	*Junco hyemalis*	WR	U		U	C
Northern Cardinal ***	*Cardinalis cardinalis*	PR	U	U	U	U
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	TR	U		U	
Blue Grosbeak *	*Passerina caerulea*	SR	R	R		
Indigo Bunting ***	*Passerina cyanea*	SR	FC	C	U	
Bobolink	*Dolichonyx oryzivorus*	former TR				
Red-winged Blackbird ***	*Agelaius phoeniceus*	PR	U	U	U	VU

Eastern Meadowlark *	*Sturnella magna*	VR	R	R	R	R
Common Grackle ***	*Quiscalus quiscula*	PR	VU	U	FC	VU
Brown-headed Cowbird ***	*Molothrus ater*	PR	VU	U		R
Orchard Oriole *	*Icterus spurius*	SR	R	R		
Baltimore Oriole *	*Icterus galbula*	VR	R			
Purple Finch	*Carpodacus purpureus*	WR	VU		VU	VU
House Finch	*Carpodacus mexicanus*	VR	VU		VU	VU
Red Crossbill	*Loxia curvirostra*	VR	R			
Pine Siskin	*Carduelis pinus*	VR	R		VU	VU
American Goldfinch *	*Carduelis tristis*	PR	U	U	FC	U
Evening Grosbeak	*Coocothrautes vespertinus*	WR			R	R
House Sparrow ***	*Passer domesticus*	PR	VU	VU	VU	VU

Table 2. Results of point counts conducted at 36 stops (10 minutes each) in the BISO during the summers of 2003 and 2004. Greater detail about the results of these point counts is provided in the Excel file that supplements this report.

Species	**2003**		**2004**	
	Stops	**Inds**	**Stops**	**Inds**
Wild Turkey	**2**	**2**	**1**	**1**
Great Blue Heron	**1**	**1**	**0**	**0**
Turkey Vulture	**3**	**4**	**0**	**0**
Red-shouldered Hawk	**0**	**0**	**5**	**6**
Broad-winged Hawk	**0**	**0**	**2**	**2**
Red-tailed Hawk	**0**	**0**	**1**	**1**
Killdeer	**1**	**1**	**1**	**1**
Mourning Dove	**6**	**6**	**3**	**3**

Yellow-billed Cuckoo	**21**	**31**	**16**	**17**
Whip-poor-will	**0**	**0**	**1**	**1**
Chimney Swift	**4**	**4**	**2**	**2**
Ruby-thr. Hummingbird	**1**	**1**	**4**	**4**
Belted Kingfisher	**2**	**2**	**1**	**2**
Red-bellied Woodpecker	**7**	**8**	**2**	**2**
Downy Woodpecker	**7**	**7**	**8**	**9**
Hairy Woodpecker	**3**	**3**	**2**	**3**
Northern Flicker	**1**	**1**	**3**	**3**
Pileated Woodpecker	**21**	**26**	**15**	**19**
Eastern Wood-Pewee	**1**	**1**	**0**	**0**
Acadian Flycatcher	**12**	**20**	**13**	**17**
Eastern Phoebe	**6**	**6**	**9**	**9**
Great Crested Flycatcher	**1**	**1**	**2**	**2**
White-eyed Vireo	**6**	**9**	**4**	**7**
Yellow-throated Vireo	**6**	**6**	**3**	**3**
Blue-headed Vireo	**8**	**9**	**4**	**4**
Red-eyed Vireo	**36**	**80**	**35**	**74**
Blue Jay	**9**	**11**	**8**	**10**
American Crow	**30**	**36**	**26**	**30**
Purple Martin	**0**	**0**	**1**	**1**
N. Rough-winged Swallow	**5**	**5**	**5**	**6**
Carolina Chickadee	**9**	**10**	**9**	**9**
Tufted Titmouse	**17**	**22**	**18**	**18**
White-breasted Nuthatch	**11**	**11**	**11**	**13**
Carolina Wren	**11**	**13**	**18**	**25**
Blue-gray Gnatcatcher	**12**	**12**	**15**	**15**
Eastern Bluebird	**0**	**0**	**2**	**2**
Wood Thrush	**8**	**8**	**8**	**11**
American Robin	**1**	**1**	**0**	**0**
Gray Catbird	**1**	**1**	**1**	**1**
Brown Thrasher	**2**	**3**	**1**	**1**
Cedar Waxwing	**2**	**2**	**1**	**1**
Northern Parula	**13**	**18**	**10**	**11**
Black-throat. Green Warbler	**20**	**32**	**21**	**33**

Yellow-throated Warbler	**11**	**13**	**7**	**7**
Pine Warbler	**7**	**8**	**8**	**9**
Prairie Warbler	**3**	**6**	**4**	**7**
Black-and-white Warbler	**21**	**25**	**4**	**5**
American Redstart	**1**	**1**	**0**	**0**
Worm-eating Warbler	**12**	**14**	**15**	**15**
Swainson's Warbler	**1**	**2**	**1**	**1**
Ovenbird	**24**	**46**	**23**	**52**
Louisiana Waterthrush	**4**	**4**	**2**	**2**
Kentucky Warbler	**3**	**3**	**5**	**5**
Common Yellowthroat	**5**	**9**	**7**	**11**
Hooded Warbler	**25**	**34**	**20**	**34**
Yellow-breasted Chat	**5**	**7**	**7**	**12**
Scarlet Tanager	**22**	**28**	**19**	**21**
Eastern Towhee	**6**	**7**	**10**	**11**
Chipping Sparrow	**1**	**1**	**0**	**0**
Field Sparrow	**4**	**6**	**3**	**3**
Song Sparrow	**1**	**1**	**0**	**0**
Northern Cardinal	**10**	**10**	**8**	**8**
Indigo Bunting	**18**	**31**	**16**	**24**
Red-winged Blackbird	**0**	**0**	**1**	**1**
Common Grackle	**0**	**0**	**1**	**1**
Brown-headed Cowbird	**2**	**2**	**1**	**1**
House Finch	**0**	**0**	**1**	**1**
American Goldfinch	**5**	**5**	**5**	**5**
Total Species		**59**		**61**

Table 3. Results of 100-stop roadside breeding bird surveys conducted in the BISO during the summers of 2003 and 2004 by Stephen J. Stedman. Species for which no registrations are listed are included to indicate that these species were registered on surveys conducted earlier (1997-2002) or later (2005) than during the period of the bird inventory.

Species	**2003**		**2004**	
	Stops	**Inds**	**Stops**	**Inds**
Ruffed Grouse	0	**0**	0	**0**
Wild Turkey	0	**0**	1	**1**
Great Blue Heron	0	**0**	0	**0**
Turkey Vulture	0	**0**	0	**0**
Sharp-shinned Hawk	0	**0**	0	**0**
Red-shouldered Hawk	4	**4**	5	**6**
Broad-winged Hawk	1	**1**	2	**2**
Red-tailed Hawk	0	**0**	0	**0**
Killdeer	1	**1**	0	**0**
Mourning Dove	8	**9**	9	**10**
Yellow-billed Cuckoo	18	**20**	46	**54**
Barred Owl *	1	**1**	0	**0**
Chuck-will's-widow *	0	**0**	0	**0**
Whip-poor-will *	1	**1**	2	**5**
Chimney Swift	0	**0**	3	**4**
Ruby-thr. Hummingbird	5	**8**	2	**2**
Belted Kingfisher	0	**0**	0	**0**
Red-bellied Woodpeck.	4	**4**	5	**7**
Downy Woodpecker	6	**6**	5	**5**
Hairy Woodpecker	6	**6**	5	**7**
Northern Flicker	0	**0**	4	**4**
Pileated Woodpecker	21	**24**	24	**27**
Eastern Wood-Pewee	5	**5**	8	**8**
Acadian Flycatcher	5	**7**	10	**11**
Eastern Phoebe	8	**10**	13	**13**
Great Crested Flycatcher	1	**1**	2	**2**

Eastern Kingbird	1	**1**	0	**0**
White-eyed Vireo	6	**6**	12	**14**
Yellow-throated Vireo	3	**3**	2	**2**
Blue-headed Vireo	4	**4**	10	**13**
Red-eyed Vireo	94	**191**	89	**190**
Blue Jay	12	**15**	12	**13**
American Crow	61	**76**	66	**77**
Purple Martin	0	**0**	0	**0**
N. Rough-winged Swall.	0	**0**	2	**3**
Barn Swallow	1	**3**	1	**2**
Carolina Chickadee	13	**15**	18	**21**
Tufted Titmouse	27	**32**	34	**36**
White-breasted Nuthatch	11	**14**	21	**24**
Carolina Wren	17	**18**	34	**40**
Blue-gr. Gnatcatcher	12	**12**	9	**9**
Eastern Bluebird	1	**3**	0	**0**
Wood Thrush	15	**17**	28	**31**
American Robin	1	**2**	1	**1**
Gray Catbird	0	**0**	0	**0**
Brown Thrasher	2	**2**	1	**1**
European Starling	2	**6**	2	**5**
Cedar Waxwing	3	**5**	1	**1**
Northern Parula	8	**11**	7	**10**
Chestnut-sided Warbler	0	**0**	2	**4**
Black-thr. Green Warbler	21	**33**	43	**68**
Yellow-throated Warbler	14	**18**	16	**17**
Pine Warbler	19	**22**	17	**22**
Prairie Warbler	7	**10**	11	**14**
Black-and-white Warbler	20	**21**	35	**38**
American Redstart	0	**0**	0	**0**
Worm-eating Warbler	17	**18**	40	**44**
Swainson's Warbler	1	**1**	1	**1**
Ovenbird	60	**110**	70	**173**
Louisiana Waterthrush	0	**0**	2	**2**
Kentucky Warbler	0	**0**	1	**1**

Common Yellowthroat	2	**2**	2	**2**
Hooded Warbler	58	**86**	67	**100**
Yellow-breasted Chat	10	**14**	12	**17**
Summer Tanager	1	**1**	1	**1**
Scarlet Tanager	36	**41**	50	**54**
Eastern Towhee	16	**23**	18	**21**
Chipping Sparrow	1	**1**	3	**3**
Field Sparrow	1	**1**	1	**1**
Northern Cardinal	5	**6**	15	**15**
Blue Grosbeak	0	**0**	0	**0**
Indigo Bunting	58	**86**	58	**81**
Red-winged Blackbird	2	**7**	2	**11**
Eastern Meadowlark	0	**0**	0	**0**
Common Grackle	1	**2**	3	**3**
Brown-headed Cowbird	3	**5**	2	**2**
Orchard Oriole	0	**0**	0	**0**
American Goldfinch	0	**0**	7	**7**
House Sparrow	1	**1**	1	**2**
Total Species		**58**		**62**

* Data from night surveys were also obtained for these species:

Species	**2003**		**2004**	
	(30 stops)		**(30 stops)**	
	Stops	**Inds**	**Stops**	**Inds**
Barred Owl	4	**4**	3	**5**
Chuck-will's-widow	2	**2**	0	**0**
Whip-poor-will	23	**37**	29	**60**

Table 4. Results of walking transects conducted in the BISO during winter 2003-2004. Key to abbreviations: BMB = Burnt Mill Bridge loop (TN); TA = Twin Arches Loop (TN); YA = portion of Yahoo Arch loop in park (KY); SC/LF = John Muir Trail from Station Camp to Leatherwood Ford (TN); HB/BC = an unofficial loop near Huling Branch and Bear Creek (KY); HC = Honey Creek loop (TN); and NBC = an unofficial loop near No Business Creek (TN).

Sites	**BMB**	**TA**	**YA**	**SC/LF**	**HB/BC**	**HC**	**NBC**	**Other**	**Total**
Date	1 Dec	3 Dec	12 Dec	16 Jan	23 Jan	13 Feb	21 Feb		
Start Time (EST)	0910	0929	1045	1052	1300	0957	0948		
End Time (EST)	1142	1259	1547	1558	1700	1342	1512		
Hours	2.5	3 [a]	4	5.1	4	3.75	5.4		**27.75**
Sky	0-2	2	0-1	1	0	0	1-2		
Wind (Beaufort)	0	0	0	0-1	1-2	0-1	1-2		
Temps (F)	30s	40s	30-40s	30-40s	30s	40s	40s		
Wood Duck	--	--	x	--	--	--	5		**5**
Ruffed Grouse	--	--	--	x	1	1	2		**4**
Wild Turkey	x	--	--	3	--	--	--		**3**
Black Vulture	--	--	--	--	1	--	--		**1**
Turkey Vulture	--	1	--	--	--	--	--		**1**
Bald Eagle	--	--	--	--	--	--	--		**x** [e]
Red-sh. Hawk	--	--	--	x	--	--	2		**2**
Red-tailed Hawk	--	--	1	3	--	--	--		**4**
[Sandhill Crane]	--	[b]	--	--	--	--	--		[b]
Killdeer	--	--	--	--	--	x	x		**x**
Am. Woodcock	--	--	--	--	--	--	x		**x**
Rock Pigeon	x	--	--	--	--	--	--		**x**
Mourning Dove	x	--	--	x	--	--	x		**x**
E. Screech-Owl	--	--	--	--	x	--	--		**x**

Great Horned Owl	--	--	--	x	--	--	--		**x**
Barred Owl	--	--	1	x	--	x	1		**2**
N. Saw-whet Owl	--	--	--	--	--	x	x		**x**
Belted Kingfisher	--	--	--	1	--	x	2		**3**
Red-bell. Woodp.	1	4	13	13	6	x	4		**41**
Yellow-bell. Saps.	--	2	3	5	2	--	2		**14**
Downy Woodp.	5	4	7	15	6	x	6		**43**
Hairy Woodp.	1	2	7	12	7	x	3		**32**
N. Flicker	2	2	9	5	--	--	2		**20**
Pileated Woodp.	7	3	7	23	21	5	10		**76**
E. Phoebe	--	3	1	5	--	--	x		**9**
Blue Jay	5	x	8	1	1	3	12		**30**
Am. Crow	6	3	6	8	3	1	1		**28**
Carolina Chickadee	27	9	10	15	14	19	23		**117**
Tufted Titmouse	14	12	11	20	7	13	13		**90**
Red-br. Nuthatch	2	x	--	x	--	--	--		**2**
White-br. Nuthatch	7	2	13	3	7	2	4		**38**
Brown Creeper	6	3	2	2	3	2	5		**23**
Carolina Wren	15	6	15	14	5	9	13		**77**
Winter Wren	5	4	3	10	4	3	8		**37**
Golden-cr. Kinglet	39	10	18	22	31	7	13		**140**
Ruby-cr. Kinglet	x	--	--	--	--	--	2		**2**
E. Bluebird	x	1	4	5	--	1	x		**11**
Hermit Thrush	2	2	1	2	7	--	5		**19**
Am. Robin	1	1	2	40	2	--	x		**46**
Brown Thrasher	x	--	--	x	--	--	2		**2**

Eur. Starling	--	--	--	x	--	--	--		**x**
Cedar Waxwing	--	--	2	x	--	--	--		**2**
Yellow-r. Warbler	x	x	1	28	--	x	18		**47**
Pine Warbler	--	--	--	x	--	--	1		**1**
Eastern Towhee	x	1	2	6	8	1	7		**25**
Field Sparrow	--	x	--	2	--	--	2		**4**
Fox Sparrow	2	x	x	x	1	--	--		**3**
Song Sparrow	2	1	x	6	--	x	7		**16**
Swamp Sparrow	--	x	--	x	--	--	3		**3**
White-thr. Sparrow	x	4	x	14	--	--	30		**48**
Dark-eyed Junco	25	9	2	x	45	18	x		**99**
N. Cardinal	1	3	x	2	4	3	14		**27**
Red-w. Blackb.	--	--	--	x	--	--	--		**x**
Common Grackle [c]	--	--	--	[1000]	[1100]	--	--		**x**
Br.-h. Cowbird	--	--	--	x	--	--	--		**x**
Purple Finch	2	x	--	4	--	--	1		**7**
House Finch	--	--	--	x	--	--	--		**x**
Pine Siskin	--	--	--	--	--	--	--		**x** [f]
Am. Goldfinch	2	2	7	6	2	1	4		**24**
House Sparrow	--	--	--	x	--	--	--		**x**
Total Individuals	**180**	**140**	**156**	**292**	**188**	**89**	**227**		**1272**
Hours	**2.5**	**3**	**4**	**5.1**	**4**	**3.75**	**5.4**		**27.75**
Ind./Hr.	**72.0**	**46.7**	**39**	**57.3**	**47**	**23.7**	**42.2**		**45.8**
Winter Resident	**23**	**29**	**26**	**31**	**24**	**16**	**33**		**44**

Species Registered on Transect									
Winter Resident Species Noted Same Day Elsewhere in Park	**9**	**7**	**5**	**17**	**1**	**9**	**8**		**13**
Total Winter Residents	**32**	**36**	**31**	**48**	**25**	**25**	**41**		**59**

x = not observed on transect but noted same day in BISO or observed during surveys of fields.

[ ] = not a winter resident of the park

[a] 0.5 hours not included when surveying the field at Charit Creek Hostel

[b] heard only; not counted in total of winter residents.

[c] grackle numbers not included in Total Individuals or Ind./Hr.

Table 5. Results of walking transects conducted in the BISO during winter 2004-2005. Key to abbreviations: BMB = Burnt Mill Bridge loop (TN); TA = Twin Arches Loop (TN); YA = portion of Yahoo Arch loop in park (KY); SC/LF = John Muir Trail from Station Camp to Leatherwood Ford (TN); HB/BC = an unofficial loop near Huling Branch and Bear Creek (KY); HC = Honey Creek loop (TN); and NBC = an unofficial loop near No Business Creek (TN).

Sites	**BMB**	**TA**	**YA**	**SC/LF**	**HB/BC**	**HC**	**NBC**	**Other**	**Total**
Date	28 Jan	3 Dec	4 Feb	12 Feb	30 Jan	6 Feb	18 Feb		
Start EST	1009	1306	0938	0905	0939	0927	0916		
End EST	1231	1606	1639	1305	1309	1247	1453		
Hours	2.3	3	5.5	4	3.5	3.3	5.6		**27.2**
Sky	0-1	0-1	0	0	2	1	0		

Wind (Beaufort)	0-1	?	4/1	0-1	0	0	0-1		
Temp (F)	30s	40-50s	20-40s	30s-50s	30s	30-40s	30s-40s		
Canada Goose	--	--	--	--	--	--	x		**x**
Wood Duck	--	--	--	--	--	--	--	x	**x**
Am. Black Duck	--	--	--	--	x	--	--		**x**
Mallard	--	--	--	--	x	--	--		**x**
Ruffed Grouse	--	--	--	--	--	1	--	x	**1**
Wild Turkey	--	x	1	5	1	--	x	x	**7**
Black Vulture	--	--	--	x	--	x	--		**x**
Turkey Vulture	--	1	--	x	--	x	--	x	**1**
Bald Eagle	--	--	1 ad	--	--	--	--		**1**
Red-sh. Hawk	--	--	2	1	x	x	1	x	**4**
Red-tailed Hawk	--	x	1	x	1	--	x	x	**2**
[Sandhill Crane]	--	--	--	--	--	--	--	x	**x**
Killdeer	--	--	--	--	--	--	x	x	**x**
Am. Woodcock	--	x	--	x	--	--	x	x	**x**
Rock Pigeon	--	--	--	--	--	--	--		**--**
Mourning Dove	x	--	x	x	--	x	1	x	**1**
E. Screech-Owl	--	--	--	x	-	--	--		**x**
Great Horned Owl	--	--	--	--	--	--	--		**--**
Barred Owl	--	x	--	--	--	--	--	x	**x**
N. Saw-whet Owl	--	--	--	--	--	--	--		**--**
Belted Kingfisher	1	--	2	1	--	--	1	x	**5**
Red-bell. Woodp.	1	1	x	--	2	x	--		**4**
Yellow-bell. Saps.	1	--	1	1	2	--	--	x	**5**
Downy Woodp.	5	1	4	3	14	4	3	x	**34**
Hairy Woodp.	2	--	2	4	3	x	4	x	**15**

N. Flicker	x	--	1	--	1	--	1	x	**3**
Pileated Woodp.	3	2	9	13	2	5	7	x	**41**
E. Phoebe	1	--	--	1	x	x	x		**2**
Blue Jay	x	--	1	--	--	--	--		**1**
Am. Crow	1	--	x	2	2	3	3	x	**11**
Carolina Chickadee	7	3	8	10	18	7	14	x	**67**
Tufted Titmouse	--	1	5	11	4	5	6	x	**32**
Red-br. Nuthatch	x	--	--	--	--	--	--		**x**
White-br. Nuthatch	3	--	3	2	8	2	3		**21**
Brown Creeper	1	--	2	4	--	3	1		**11**
Carolina Wren	5	2	4	16	11	3	14	x	**55**
House Wren	--	--	--	--	--	x	--		**x**
Winter Wren	4	4	3	5	2	4	7	x	**29**
Golden-cr. Kinglet	20	19	15	29	13	15	24	x	**135**
Ruby-cr. Kinglet	--	--	--	--	--	--	--		**--**
E. Bluebird	x	--	x	x	x	1	x	x	**1**
Hermit Thrush	--	1	x	1	--	--	1	x	**3**
Am. Robin	x	--	x	x	x	--	x	x	**x**
N. Mockingbird	--	--	--	x	--	--	--	x	**x**
Brown Thrasher	x	--	--	--	--	--	--		**x**
Eur. Starling	--	--	--	x	x	--	x	x	**x**
Cedar Waxwing	--	--	--	--	--	--	--		**--**
Yellow-r. Warbler	--	--	--	--	x	--	--	x	**x**
Pine Warbler	--	--	--	--	--	--	--		**--**
Eastern Towhee	x	--	--	--	x	x	--	x	**x**
Field Sparrow	--	--	x	x	x	x	1	x	**1**
Fox Sparrow	x	--	x	--	x	--	1	x	**1**
Song Sparrow	x	--	x	1	x	x	5	x	**6**
Swamp Sparrow	--	--	--	--	x	--	4	x	**4**

White-thr. Sparrow	x	2	x	4	x	x	6	x	**12**
Dark-eyed Junco	x	6	x	x	--	7	17	x	**30**
N. Cardinal	1	1	x	x	x	x	7	x	**9**
Red-w. Blackb.	x	--	--	x	--	--	x	x	**x**
E. Meadowlark	x	--	--	--	--	--	--		**x**
Common Grackle	--	--	--	--	--	--	--		**--**
Br.-h. Cowbird	--	--	--	--	--	--	--		**--**
Purple Finch	--	--	--	--	--	--	--		**--**
House Finch	--	--	--	--	--	--	--		**--**
Pine Siskin	--	--	--	--	--	--	--		**--**
Am. Goldfinch	1	1	--	--	x	--	--		**2**
House Sparrow	--	--	--	x	--	--	x	x	**x**
Total Individuals	**57**	**45**	**65**	**114**	**84**	**60**	**132**		**557**
Hours	**2.3**	**3**	**5.5**	**4**	**3.5**	**3.3**	**5.6**		**27.2**
Ind./Hr.	**24.8**	**15**	**11.8**	**28.5**	**24**	**18.2**	**23.6**		**20.5**
Winter Resident Species Registered on Transect	**16**	**14**	**18**	**19**	**15**	**13**	**23**		**34**
Winter Resident Species Noted Same Day Elsewhere in Park	**14**	**4**	**12**	**15**	**16**	**13**	**11**		**20**
Total Winter Residents	**30**	**18**	**30**	**34**	**31**	**26**	**34**	**39**	**54**

x = not observed on transect but noted same day in BISO.

Appendix A: Figures

Figure 3. Photograph of a primary from Red-headed 4 June 2003; photograph S. J. Stedman.

Figure 4. Photograph of a nest of Acadian Flycatcher found 3 June 2003; photograph S. J. Stedman.