

INVENTORYING AND MONITORING
PROTOCOLS OF TERRESTRIAL VERTEBRATES IN
NATIONAL PARKS OF THE
EASTERN UNITED STATES:
Gettysburg National Military Park and Eisenhower National Historic Site

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Technical Report NPS/PHSO/NRTR-00/080

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December 1999

Cooperative Agreement 4000-9-8004
Supplemental Agreement No. 21

National Park Service
Philadelphia Support Office
Stewardship and Partnerships
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

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Acknowledgments

Funding for the project was provided by the National Park Service. We appreciate the cooperation of National Park Service personnel, especially Mr. John Karish. Thanks also are extended to those individuals who helped with field assistance and data collection and to Ms. Sherri Shawver for clerical assistance.

Executive Summary

We conducted a long-term project (1992-1996) designed to provide a comprehensive review of vertebrates (amphibians, reptiles, birds, and mammals) in four national parks in the eastern United States. We field tested select protocols at Gettysburg National Military Park (GETT), Eisenhower National Historic Site (EISE), Hopewell Furnace National Historic Site (HOFU), and Valley Forge National Historical Park (VAFO) to (1) determine the effectiveness of protocols for inventorying and monitoring terrestrial vertebrates in terms of time, labor, cost, and types of data obtained and (2) predict and document the number of terrestrial vertebrate species within the parks. This report summarizes our results from research conducted at GETT-EISE.

We tested four protocols for amphibians and reptiles (pitfall trapping, amphibian-call survey, coverboard survey, and natural-substrate survey), three protocols for birds (transects, point counts, and vehicular-road surveys), and three protocols for mammals (live-trapping, pitfall trapping, and vehicular-road surveys) from 1 July 1992 to 30 June 1996. We predicted that 27 amphibian species, 28 reptilian species, 232 bird species, and 59 mammal species occurred at the park. Based on the test of protocols, eight amphibians, four reptiles, 112 birds, and 13 mammals were detected. In addition to species documented with protocols, one amphibian species, six additional reptilian species, 21 bird species, and seven mammalian species were recorded by project researchers. Our research at the park increased the number of documented species to 10 (37% of predicted) amphibians, 16 (57% of predicted) reptiles, 155 (67% of predicted) birds, and 21 (36% of predicted) mammals.

Based on our field testing of protocols at GETT-EISE, we recommend use of the natural-substrate survey protocol for salamanders, snakes, and terrestrial turtles and the amphibian-call survey protocol for frogs. Most bird species were found using unlimited-radius point counts at old-field sites and forest sites, although this protocol required more time to conduct than transects. We observed the highest small mammal species richness using live-trapping. The vehicular-road survey protocol documented four mammal species with very little survey time. Additional study will be necessary to increase the number of species documented from certain taxa, such as amphibians and bats.

Introduction

We conducted a long-term project (1992-1996) designed to provide a comprehensive review of vertebrates (amphibians, reptiles, birds, and mammals, excluding white-tailed deer [*Odocoileus virginianus*] and black bear [*Ursus americanus*]) in four national parks in the eastern United States: Gettysburg National Military Park (GETT), Eisenhower National Historic Site (EISE), Hopewell Furnace National Historic Site (HOFU), and Valley Forge National Historical Park (VAFO). Information on presence, relative abundance, and distribution of terrestrial vertebrates on these public lands is important to National Park Service (NPS) personnel (hereafter referred to as resource management specialists) who are mandated to manage natural resources. As large tracts of public lands, such as national parks, become more insular with increased habitat fragmentation because of agriculture, urbanization, or other land uses, these public lands will be increasingly valuable for the long-term maintenance of faunal diversity and the functional integrity of landscapes and ecosystems in the eastern United States (Ambrose and Bratton 1990, Yahner 1995).

In years 1 and 2 of this long-term project, we surveyed the literature for protocols used in studies designed to inventory and monitor of terrestrial vertebrates. We also were interested in assessing cost-, labor-, and time-constraints associated with each protocol. Protocols were organized in a hierarchical fashion, depending on specific goals and types of data needed at a given park. We also intended that these protocols would be tested and applied in the eastern deciduous forest region so that trends in fauna could be monitored on a regional basis. A summary of these protocols is given in Technical Report NPS/MAR/NRTR-94/057 (Yahner et al. 1994a).

In years 1 and 2, we also conducted an extensive search of available databases on terrestrial vertebrates (i.e., published and unpublished species lists and range maps) that were predicted to occur or were documented in the four national parks. We combined land-use data for each park with known habitat requirements and geographic ranges of vertebrate species in the eastern deciduous forest to augment the list of species predicted to occur at the four parks. Furthermore, we determined primary and secondary habitat, occurrence status, residency status, legal population status, and types of inventory and monitoring protocols applicable to each predicted and documented species. A summary of vertebrate fauna associated with the four parks is presented in Technical Report NPS/MAR/NRTR-94/058 (Yahner et al. 1994b, 1994c).

We selected a subset of the inventorying and monitoring protocols identified in Technical Report NPS/MAR/NRTR-94/057 to test at GETT and EISE combined during years 2 and 3 of our study (Yahner et al. 1994a). Protocols selected for testing in the field were principally those conducted on taxa that were not well represented in the list of documented species (e.g., migratory birds, amphibians) (Yahner et al. 1994b). By testing these protocols at GETT-EISE, we obtained information on the feasibility of each protocol (amount of time, labor, and money required to conduct the protocol), vertebrate species documented by the protocol, and habitat use by vertebrate species in the park. This information on documented vertebrate species is important to resource management specialists who are mandated to manage native and nonnative species.

Information obtained from testing of protocols will allow resource management specialists to develop time-, labor-, and cost-efficient management plans that satisfy specific objectives for a given vertebrate species that may be documented or predicted to occur in a park.

This report can be used with Technical Report NPS/MAR/NRTR-94/057, which is entitled "Inventorying and Monitoring Protocols of Vertebrates in National Park Areas of the Eastern United States: The Bibliographic Report" (Yahner et al. 1994a), and Technical Report NPS/MAR/NRTR-94/058, which is entitled "Inventorying and Monitoring Protocols of Vertebrates in National Park Areas of the Eastern United States: The Faunal Report" (Yahner et al. 1994b, 1994c). When used together, these reports synthesize comprehensive information on inventorying and monitoring protocols, and ecological, biological, and legal data for vertebrates in the eastern deciduous forest.

In this report, we present information on our efforts to:

1. field test selected protocols to document terrestrial amphibians, reptiles, birds and mammals and habitats used by these species in Gettysburg National Military Park and Eisenhower National Historic Site;
2. determine the effectiveness of selected protocols for terrestrial vertebrates in terms of time, labor, cost, and types of data obtained; and
3. update the Faunal Database for GETT-EISE.

Study Area

Gettysburg National Military Park and Eisenhower National Historic Site are located in Adams County, south central Pennsylvania, comprising 1,511 ha and 279 ha, respectively. The town of Gettysburg (population = 7,025) is surrounded by GETT (Rand McNally 1993); EISE is southwest and contiguous with GETT. The parks are located within the Triassic Lowland Section of the Piedmont Province, which corresponds to the Carolinian Life Zone (Rhoads 1903, Genoways and Brenner 1985).

The topography of the parks is gentle, consisting mainly of rolling hills. There are two principal landforms that traverse GETT: Cemetery Ridge and Seminary Ridge. These two parallel ridges are 1.6-km apart and are oriented north-south. The mean elevation in the parks is 168 m, and the highest point is Big Round Top (240 m) (Yahner et al. 1991). There are 10 ponds, numerous small wetlands, and three predominant drainages: Rock Creek in the east, Plum Run in the center, and Willoughby Run in the west of the parks.

Fifty percent (756 ha) of GETT is agricultural land (cropland and pasture), and 36% (547 ha) is forestland. The remaining 14% is comprised of maintained areas, residential areas, or other types of human-dominated developed land (Yahner et al. 1991). Eighty-three percent (232 ha) of EISE is agricultural land, 3% is forestland, and 14% maintained areas, residential areas, and other developed land (Yahner et al. 1991). Crop species at the parks include barley, corn, hay (timothy, clover, alfalfa, and fescue), sorghum, oats, rye, soybeans, and winter wheat (Yahner et al. 1991). Forestland contain mature tree species that typify Appalachian forest types and are principally oak (*Quercus* spp.), hickory (*Carya* spp.), and tulip poplar (*Liriodendron tulipifera*) (Kuchler 1964, Yahner et al. 1991).

Study Sites Used for Protocol Testing

We divided habitats for vertebrate sampling into three types: grassland, old-field, and forest. Forest habitat was subdivided into upland sites and lowland sites associated with water. Ten study sites were selected randomly for vertebrate sampling (Table 1, Fig. 1). Two of these study sites were in upland-forest habitat (Big Round Top upland [BRU] and Little Round Top upland [LRU]); two were in lowland-forest habitat (Devil's Den Lowland [DDL] and Landfill Lowland [LFL]); four were in old-field habitat (Picnic Area Old-Field [POF], Devil's Den Old-Field [DOF], McMillan Old-Field [MOF], and Warfield Ridge Old-Field [WOF]); and two were in grassland habitat (Pennsylvania Monument Grassland [PMG] and Valley of Death Grassland [VDG]).

Within each of these 10 study sites, a transect was established in a random direction for the field testing of specific protocols. We arbitrarily selected a starting point 50 m into the habitat edge from a road, trailhead, or convenient parking area. Sampling points along each transect were placed at the starting point and thereafter at 150-m intervals. The transect length at each site depended upon the amount of habitat available. For example, because of the limited amount of

Table 1. Study sites, study site codes, habitat types, transect lengths (m), and number of sampling points for protocol testing at Gettysburg National Military Park and Eisenhower National Historic Site.

Study Site	Code	Habitat Type	Transect Length	No. Points
Pennsylvania Monument Grassland	PMG	Grassland	800	6
Valley of Death Grassland	VDG	Grassland (with marsh)	600	5
Warfield Ridge Old-Field	WOF	Old-Field	400	4
Picnic Old-Field	POF	Old-Field	200	2
McMillan Old-Field	MOF	Old-Field	350	3
Devil's Den Old-Field	DOF	Old-Field	300	3
Devil's Den Lowland	DDL	Lowland-Forest	600	5
Landfill Lowland	LFL	Lowland-Forest	600	5
Little Round Top	LRU	Upland-Forest	500	4
Big Round Top	BRU	Upland-Forest	750	6
Total			5100	43

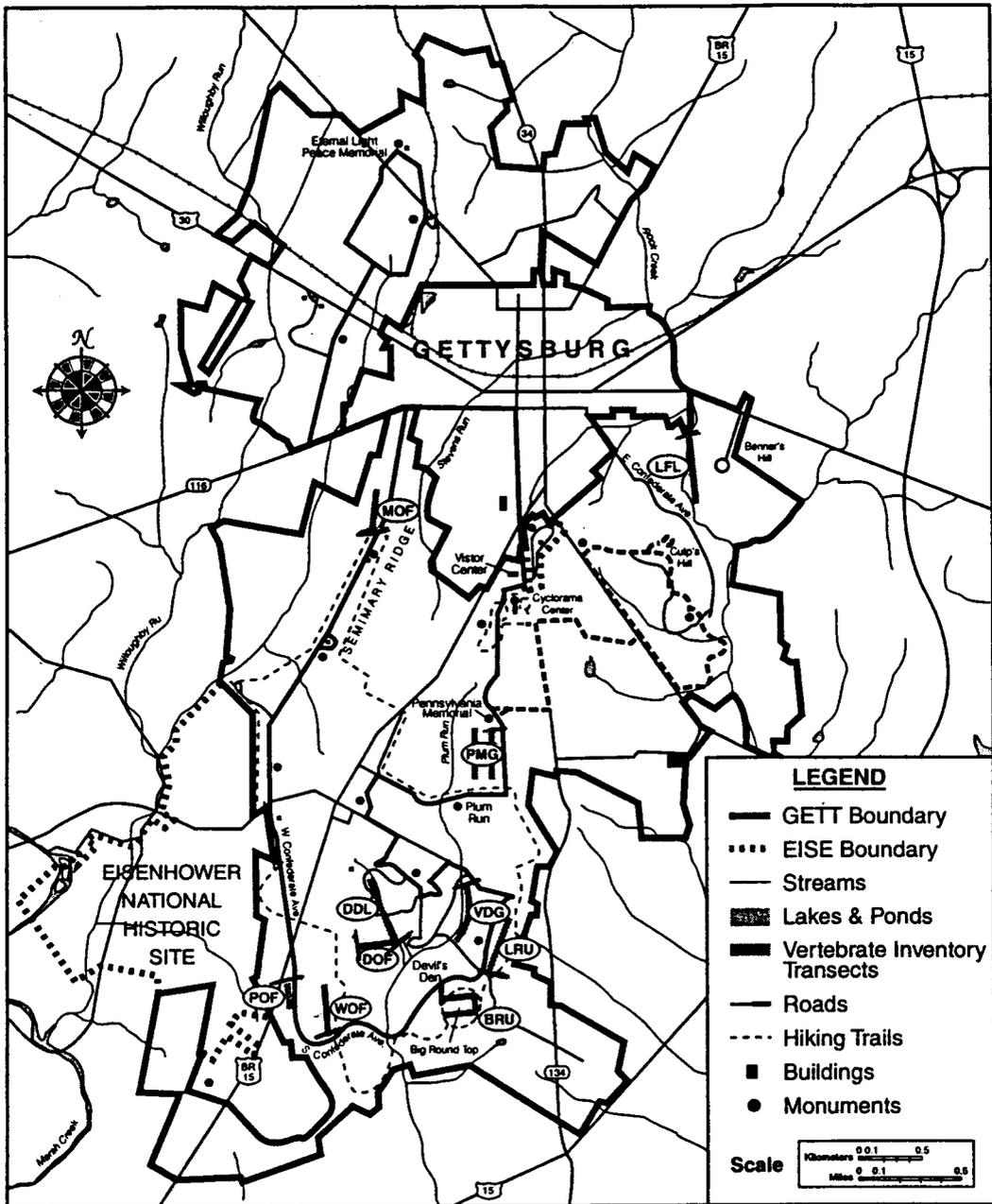


Figure 1. Locations of two grassland (PMG and VDG), four old-field (WOF, POF, MOF, and DOF), two lowland-forest (DDL and LFL), and two upland-forest (LRU and BRU) transects used for protocol testing at Gettysburg National Military Park and Eisenhower National Historic Site. Descriptions of codes are given in Table 1.

old-field habitat at Devil's Den, the DOF transect was only 300 m; the DDL transect, however, was 600 m because of the abundance of lowland-forest habitat at Devil's Den (Table 1).

For live-trapping only, the rock wall sites selected in 1993 included one grassland site (Pennsylvania Monument Rock Wall [PMR]), two grassland/forest-edge sites (Valley of Death Rock Wall [VDR] and Devil's Den Rock Wall [DDR]), one old-field/forest-edge site (Horse Path Rock Wall [HPR]), and one forest site (Sedgwick Avenue Rock Wall [SWR]) (Table 2, Fig. 2). In 1994, we selected two grassland sites (Red Rock Road Grassland [RRG] and Sedgwick Avenue Grassland [SAG]), one old-field site (Eisenhower Old-Field [EOF]), and two forest sites (South Confederate Lowland [SCL] and Culp's Hill Upland [CHU]) for live-trapping. The original PMG transect also was used in 1994 for live-trapping.

Vehicular-Road Survey Route

We established a 20.8 km (13-mile) vehicular road-survey route through the parks for use with the amphibian-call survey protocol and for the vehicular-road survey protocols for birds and mammals (Fig. 3). We selected secondary roads throughout the park that encompassed a variety of representative habitats.

Table 2. Study sites and year of trapping for additional live-trapping during July and August 1993 and 1994, study site codes, habitat types, transect lengths (m), and number of sampling points for live-trapping at Gettysburg National Military Park and Eisenhower National Historic Site.

Study Site (Year)	Code	Habitat Type	Transect Length	No. Traps
Pennsylvania Memorial Rock Wall (1993)	• PMR	Grassland	300	13
Valley of Death Rock Wall (1993)	• VDR	Grassland/ Forest	150	7
Devil's Den Rock Wall (1993)	• DDR	Grassland/ Forest	225	10
Horse Path Rock Wall (1993)	HPR	Old- Field/Forest	525	22
Sedgwick Ave. Rock Wall (1993)	• SWR	Lowland Forest	200	9
PA Monument Grassland (1994)	• PMG	Grassland	225	10
Red Rock Rd. Grassland (1994)	• RRG	Grassland	225	10
Sedgwick Ave. Grassland (1994)	• SAG	Grassland	225	10
Eisenhower Old-Field (1994)	• EOF	Old-Field	225	10
S. Confederate Lowland (1994)	• SCL	Lowland Forest	225	10
Culp's Hill Upland (1994)	• CHU	Upland Forest	225	10

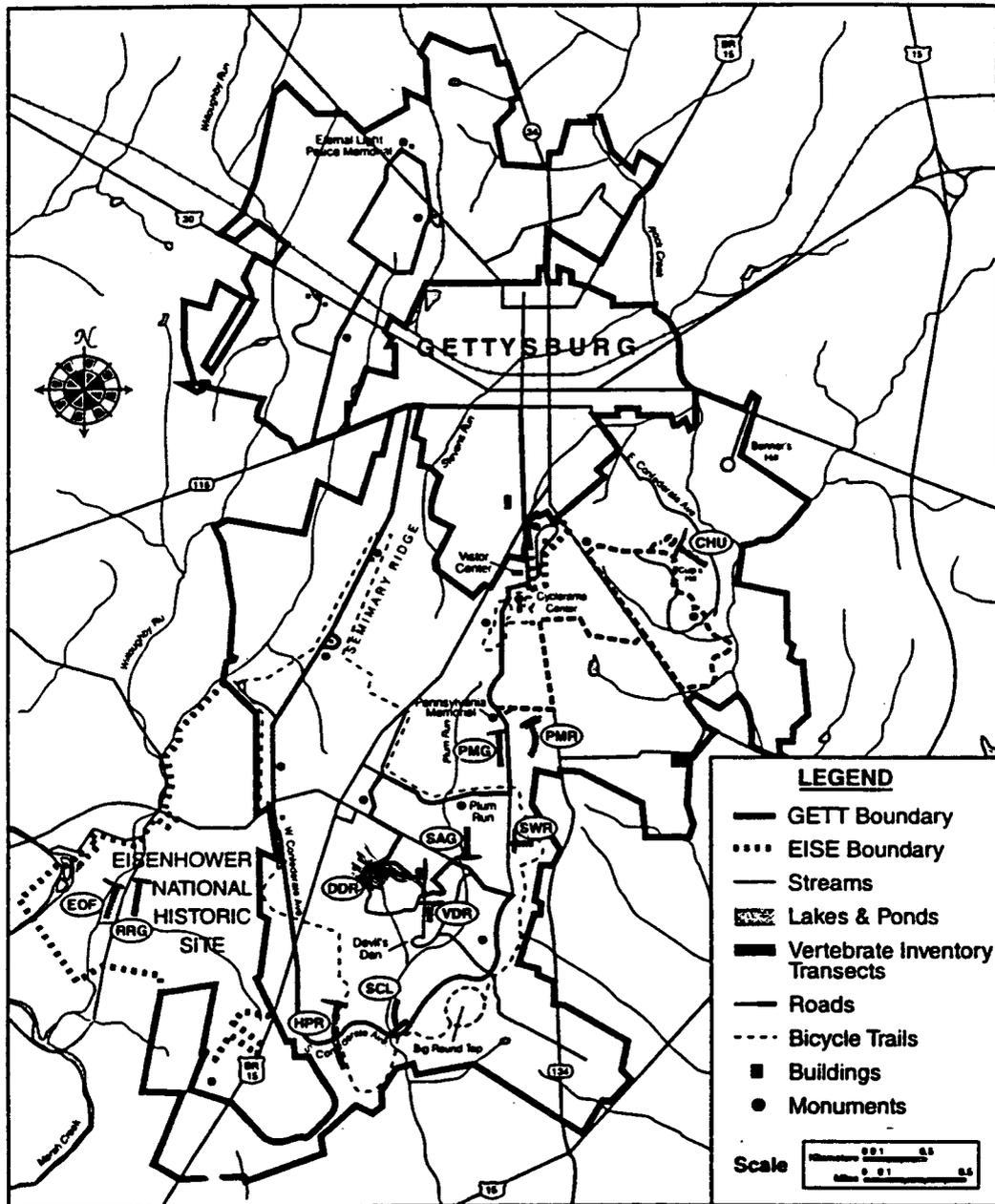


Figure 2. Locations of five rock wall (PMR, VDR, DDR, HPR, and SWR), three grassland (PMG, RRG, and SAG), one old-field (EOF), one lowland-forest (SCL), and one upland-forest (CHU) transects used for protocol testing at Gettysburg National Military Park and Eisenhower National Historic Site. Descriptions of codes are given in Table 2.

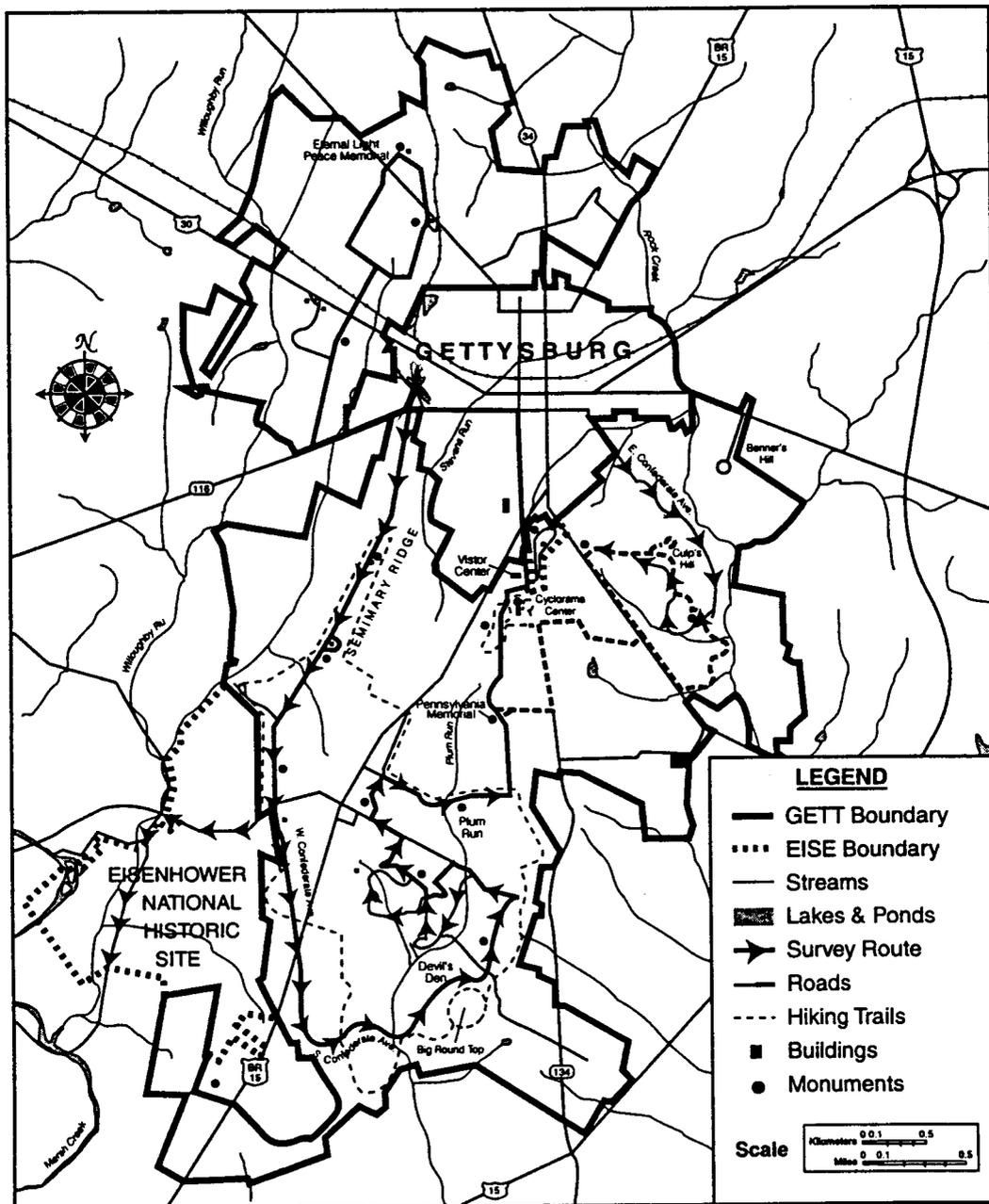


Figure 3. Location of the 20.8-km vehicular-road survey route at Gettysburg National Military Park and Eisenhower National Historic Site.

Methods

Amphibians and Reptiles

Natural-Substrate Survey Protocol

Amphibians and reptiles were surveyed using the natural-substrate survey protocol (also referred to previously as the rock- and log-turning protocol) (Aubrey et al. 1988, Dalrymple 1988, Herrington 1988, Ramotnik and Scott 1988) in spring 1994. We conducted this protocol at all forest sites and at one old-field site (POF).

Transects were walked by a group of observers ($n = 3-9$) spaced at 5-m intervals, with each observer surveying an area 5 m in width. All rocks and logs (≥ 7.5 cm in diameter) encountered within the width of the survey belt were turned over by observers and inspected for the presence of amphibians or reptiles. If an amphibian or a reptile were found, we recorded species, the type of substrate (e.g., rock or log), and the diameter (cm) of the substrate. We also noted all amphibians and reptiles observed on top of the leaf litter. In addition, on a standardized data form, we recorded starting time and ending time, temperature ($^{\circ}\text{C}$), wind velocity (kph), percent cloud cover, precipitation, and number of observers.

We calculated the relative density (no./ha) of amphibians and reptiles within each habitat type, based on the number of individuals observed along each survey belt and the area (ha) of coverage. We believe this was a relatively accurate, site specific estimate of density because we turned over all rocks and logs on the transect. Caution should be used, however, when comparing these density estimates with other areas because density may be a direct function of the number of rocks and logs contained within a given site (Geer 1997). Because the natural-substrate survey protocol may be conducted with any number of observers, we calculated the amount of time required for each observer to conduct this protocol per 100 m of transect.

Coverboard Protocol

We surveyed amphibians using the coverboard protocol (DeGraaf and Yamasaki 1992, Fellers and Drost 1994, Davis 1997) in spring and fall. Boards (2.5-cm x 20-cm x 3-m) were purchased and cut into 1-m lengths. We place three pine boards (2.5-cm x 20-cm x 1-m) at each sampling point along the transects at all study sites except PMG ($n = 37$ points and 111 coverboards). Coverboards were placed 5 m from the sampling point flush with the soil surface. Coverboards were placed in September and early October 1993 and inspected for amphibians in spring and fall 1994 and fall 1995. We recorded the number of each species found underneath the boards and the number of boards at each point that were missing. Relative abundance of each species per site was calculated as average number of individuals/point.

Amphibian-Call Survey Protocol

Amphibians were surveyed using the amphibian-call survey protocol (McKinstry et al. 1991) in spring 1994. Surveys were conducted between 3 and 6 hours after sunset on 11 and 18 April and 2 May 1994. Sampling points (13 points) were established along the road survey route; each point was at a location where the road was within 30 m of a water source (e.g., small stream, vernal pond). Surveys were conducted at the road edge. At a sampling point, we turned off the vehicle engine, we allowed a 1-minute equilibrium period to elapse, and then listened for calls of breeding amphibians for 3 minutes. We identified the calling species and estimated the number of each species present. We calculated the number of amphibian contacts made per hour, based on the amount of time spent surveying. In addition, on a standardized data form, we recorded starting time and ending time, temperature (°C), wind velocity (kph), percent cloud cover, and precipitation.

Pitfall-Trapping Protocol

We implemented the pitfall-trap protocol to survey amphibians and reptiles (Howard and Brock 1961, Boonstra and Krebs 1978, Gibbons and Semlitsch 1982, Walters 1989) at all sites during summer 1993 (13 July to 24 August) and spring 1994 (7 April to 13 May). At each sampling point along transects, we excavated a hole for a pitfall container at least 1 week prior to trapping in order to minimize the disturbance during the trapping period. One day prior to trapping, we placed a 1-gallon metal container in each hole with the opening oriented upward and flush with the soil surface. Pitfall traps were unbaited and checked every morning in 1993 and every third morning in 1994. For each capture, we recorded the number of individuals per species.

In summer 1993, pitfall traps were open 3-4 consecutive nights for a total of 13 nights. With a total of 43 sampling points for all sites combined and one pitfall trap at each point, we trapped 559 trapnights with pitfalls during 1993. We conducted additional pitfall trapping for amphibians and reptiles during spring 1994. We dug 10 additional pitfall traps near two small ponds (Fantasyland Ponds [FLP]) and opened the pitfall traps at all other study sites. The DOF, DDL, LFL, and FLP pitfall traps (n = 23) were opened 7 April 1994 and closed 12 May 1994 for a total of 35 nights each, and the MOF, POF, WOF, BRU, LRU, VDG, and PMG traps (n = 30) were opened 12 April 1994 and closed 12 May 1994 for a total of 30 nights each. This yielded a total of 1,705 trapnights for all areas combined during 1994.

Birds

Transect Protocol

Birds were surveyed using the transect protocol (Emlen 1971, Conner and Dickson 1980, Franzreb 1981, Hutto and Mosconi 1981) during the breeding (20 May-15 July 1993 and 1994), fall migration (1 September-10 October 1993), winter (1 November 1993-15 March 1994) and spring migration (15 April-20 May 1994) seasons. During the 1993 breeding and fall migration

seasons, only the LRU, LFL, MOF, POF, and PMG sites were surveyed by the transect protocol. However, during winter, spring migration, and breeding seasons in 1994, the transect protocol was used at all sites. Birds were surveyed along transects three times during the 1993 breeding, 1993 fall migration, 1993-94 winter, and 1994 spring migration seasons. During the 1994 breeding season, transects were conducted twice.

Following a 1-minute equilibrium period at the beginning of the transect, birds were surveyed along each transect by walking at a moderate pace (approximately 2-3 km/hr). Frequent stops were made to identify and record the species of each bird heard or seen. In addition, starting time and ending time, temperature (°C), wind velocity (kph), percent cloud cover, precipitation, and amount of snow cover (cm) were noted on a standardized data form. For each bird observed, its location along the transect and distance (m) perpendicular to the transect were recorded. Birds were surveyed in the morning (30 minutes after sunrise to 11 am) during spring migration and breeding seasons and throughout the day (30 minutes after sunrise to 30 minutes before sunset) during fall migration and winter seasons.

Data were analyzed using three lateral distances from transects: 30 m (TRAN-30), 50 m (TRAN-50), and unlimited distances (TRAN-UL). When using the TRAN-30 and TRAN-50 methods, bird observations were used only if they were ≤ 30 or ≤ 50 m from the transect, respectively. These methods of analysis affected numbers of observations and density estimates for each species by altering the area of the transect (i.e., 60-m wide for TRAN-30 versus 100-m wide for TRAN-50). Because birds detected within 30 m of the transect also were detected within 50 m and unlimited distance, birds observed with the TRAN-30 method were included in the observations obtained with TRAN-50 and TRAN-UL. Likewise, birds noted with the TRAN-50 method were included with the data obtained by the TRAN-UL method. For example, if an indigo bunting (scientific names are given in Appendix 1) were observed 20 m from the transect, it was included in the analysis for all three transect methods.

Species composition, species richness, species diversity (Shannon-Weiner Index), and density were calculated based on each of these three lateral distances from transects (Brower and Zar 1984). The Shannon-Weiner Index was calculated as

$$H' = - \sum p_i \log p_i$$

where p_i is the proportion of the total number of individuals of species i .

Point-Count Protocol

We surveyed birds using the point-count protocol at each sampling point along transects (International Bird Census Committee 1977, Fuller and Langslow 1984, Hutto et al. 1986, Verner and Ritter 1986) during the breeding (20 May-15 July 1993 and 1994), fall migration (1 September-10 October 1993), winter (1 November 1993-15 March 1994), and spring migration (15 April-20 May 1994) seasons. Point counts were conducted in the morning (30 minutes after sunrise to 11 am) during spring migration and breeding seasons and throughout the day (30 minutes after sunrise to 30 minutes before sunset) during fall migration and winter seasons.

Point counts were conducted at BRU, DDL, DOF, and WOF during the 1993 breeding and 1993 fall migration seasons and at all areas during 1993-94 winter, 1994 spring migration, and 1994 breeding seasons. Each point was visited three times during the 1993 breeding, 1993 fall migration, 1993-94 winter, and 1994 spring migration seasons; points were visited twice during the 1994 breeding season. Prior to all surveys, starting time, temperature (°C), wind velocity (kph), percent cloud cover, precipitation, and amount (cm) of snow cover were recorded.

When conducting a point-count survey, the investigator stopped at a sampling point for a 1-minute equilibrium period. Number and species of all birds seen or heard then were recorded for 5 minutes. Birds detected were divided into two groups for comparisons: those detected within a 30-m radius (PNTC-30) or an unlimited radius (PNTC-UL). As with the transect protocol, all species detected with the PNTC-30 method also were included within the data obtained by the PNTC-UL method. Species richness and diversity were calculated for the PNTC-30 and PNTC-UL methods.

In addition, during fall migration and winter seasons, the call of an eastern screech-owl was used at point counts during fall migration and winter seasons to determine if the call affected number of species or individuals detected. Following the 1-minute equilibrium period, the call was played for 15 seconds in each of the cardinal directions (total = 1 minute of playing time) at the odd-numbered points one day and at the even-numbered points the next day. Bird observations were recorded for a 5-minute period following the owl call. Because the call was used at half of the points each visit, we determined the effectiveness of the owl call by comparing the species composition, richness, and diversity at each area with and without the call.

In order to compare species richness and composition among the transect and point-count methods (TRAN-30, TRAN-50, TRAN-UL, PNTC-30, and PNTC-UL), we calculated a coefficient of community similarity (CC) for each pairwise combination of methods using the equation:

$$CC = 2c / s1 + s2$$

where c is the number of species shared between two methods, and s1 and s2 are the numbers of species detected with each of the two methods independently (Brower and Zar 1984). CC varied between 0 and 1; the higher the CC value, the greater the similarity of the two methods in terms of bird species richness and species composition.

Vehicular-Road Survey Protocol

Birds were surveyed using the vehicular-road survey protocol during the 1993-94 winter and 1994 spring migration seasons (Petraborg et al. 1953, Diem and Lu 1960, Hewitt 1967, Saunder et al. 1971). One observer drove survey route at a slow speed (15-25 km/hr) with the windows down and while another observer recorded the number and species of all birds seen or heard. Prior to each survey, starting time, temperature (°C), wind velocity (kph), percent cloud cover, precipitation, and amount (cm) of snow cover (winter season) were recorded. The number of observations of each bird species for each survey was standardized (no./km) for comparative

purposes. We conducted three vehicular-road surveys during March 1994 and one survey during May 1994.

Mammals

Pitfall-Trapping Protocol

We implemented the pitfall-trapping protocol to survey small mammals (Nixon et al. 1967, Cushwa and Burnham 1974, Lacki et al. 1990, Slade et al. 1993) at 10 study sites at GETT-EISE during summer 1993. At each sampling point along transects, we excavated a hole for a pitfall container at least 1 week prior to trapping in order to minimize soil disturbance during the trapping period. One day prior to trapping, we placed a 1-gallon metal container in each hole with the opening oriented upward and flush with the soil surface. Pitfall traps were unbaited and checked each morning. Each trap was open for 2-4 consecutive nights (each night termed a trapnight) for a total of 13 nights during 1993. We conducted 559 trapnights with pitfalls (43 sampling points during 13 nights).

Live-Trapping Protocol

We live-trapped small mammals (Nixon et al. 1967, Cushwa and Burnham 1974, Lacki et al. 1990, Slade et al. 1993) at 10 GETT-EISE study sites during summer 1993 and 1994. We placed two small Tomahawk live-traps (8 x 8 x 26 cm) a distance of 5 m from each sampling point and perpendicular to the transect (one on each side of the transect). Traps were baited with a mixture of peanut butter and rolled oats and supplied with a small piece of cotton for bedding. The treadle on each trap was set as sensitive as possible so that all small mammals, including small shrews, would spring the trap. Traps were checked each morning. Each trap was open two to four consecutive nights for a total of 13 nights in 1993. Traps were open for five consecutive nights during 1994. Based on two live-traps at each sampling point, we trapped 1118 trapnights during 1993 and 430 trapnights during 1994.

We conducted additional live-trapping to test a different live-trap arrangement and to increase the small mammals documented during July and August 1993 at five rock wall sites and during July 1994 at six study sites. We placed one small live-trap, which was baited with peanut butter and rolled oats and supplied with cotton for bedding, every 25 m along a given transect. We used 61 traps for 10 nights (3-4 consecutive nights at a time) for a total of 610 trapnights (19 July-6 August) at rock wall sites in 1993 and 60 traps for five consecutive nights for a total of 300 trapnights (12 July-16 July) at PMG, RRG, SAG, EOF, SCL, and CHU in 1994.

For each small mammal captured, we recorded species, sex (rodents only), weight (g), and condition (i.e., pregnant, lactating, scrotal, dead, or recapture). We then marked rodents with numbered, metal ear tags, released the animals, and rebaited and reopened the traps if trapping that night. Dead individuals in good pelage condition were collected, prepared as museum specimens, tagged with location of capture, and placed in the Terrestrial Vertebrate Museum, School of Forest Resources, The Pennsylvania State University.

Vehicular-Road Survey Protocol

We conducted vehicular-road surveys for mammals (Newman 1959, Rajala 1983) during August 1993 and July 1994. Surveys were conducted from 15 minutes before sunrise and 2 hours after sunrise. We drove the survey route at 15-25 km/hr and scanned all unobstructed habitat within a 100-m lateral distance of the road; all live mammals (excluding white-tailed deer) were noted. Temperature (°C), precipitation, percent cloud cover, wind velocity (kph), and starting and ending times were recorded for each survey. The number of each species of mammal observed was converted to a per km basis for standardization and comparison.

Description and Update of the Faunal Database

The comprehensive Faunal Database for each of the parks (GETT-EISE, HOFU, and VAFO) was presented and detailed directions on its use was given in Technical Report NPS/MAR/NRTR-94/058 (Yahner et al. 1994b, 1994c). The database, which is maintained on the computer program Microsoft Excel under the filename FAUNAL DATABASE.XLS, includes information on taxonomy, habitat use, residency status, legal status, and inventorying and monitoring protocols for all terrestrial vertebrate species (amphibians, reptiles, birds, and mammals) that were predicted or documented to occur in the parks. Scientific names for all vertebrate species mentioned in this report were given in the Faunal Database.

The database has been modified from that described in Yahner et al. (1994b, 1994c) to include amphibian, reptilian, avian, and mammalian species observed at the four parks from 1 July 1992 to 30 June 1996 by project researchers. Twelve variables are in the Faunal Database; these include the original 11 variables and a new variable (Field-tested Protocol, variable 12) that describes the protocol(s) field tested by us to document a given species at the parks. We also added a new code (PTC) to the Occurrence Status (variable 8) to note a species that was documented while field-testing one or more of the protocols.

The current Faunal Database is presented in Appendix 1 for GETT-EISE; this appendix gives information on variables 1, 2, 5, and 8-12. Appendices 2-5 include the codes for variables 5, and 8-10, respectively. Appendix 6 includes the codes for variables 11 and 12. Below is an example of a mammalian species, the Maryland shrew, entered in the database for GETT-EISE:

- (1) Common Name (i.e., Maryland Shrew)
- (2) Scientific Name (i.e., *Sorex fontinalis*)
- (3) Family Name (i.e., Soricidae)
- (4) Order (i.e., Insectivora)
- (5) *Pro-Cite* Group Name (i.e., Insectivora)
- (6) Primary Habitat (i.e., 41, 42, 43 [Forest])
- (7) Secondary Habitat (i.e., 51 [Wetlands])
- (8) Occurrence Status (i.e., PTC)

- (9) Residency Status (i.e., Permanent Resident)
- (10) Legal Population Status (i.e., Protected)
- (11) Protocol (i.e., STT [Snap-trapping])
- (12) Field-Tested Protocol (i.e., LTT [Live-trapping]).

The Faunal Database can be modified continually by adding recently documented species. For instance, the occurrence status (variable 8) of a vertebrate species can be updated if it were originally designated as "predicted" but is later documented within the park. Changes in taxonomic classification (variables 1-4) and legal status (variable 10) of each species can be updated. In addition, variable 11 (Protocol) and variable 12 (Field-Tested Protocol) in the Faunal Database can be modified as protocols are field tested or as new protocols are published for surveying terrestrial vertebrates in the eastern United States.

The Faunal Database is available in diskette or hard copy form from the National Park Service, Chief Scientist, Philadelphia Support Office, U.S. Custom House, 200 Chestnut Street, Philadelphia, PA 19106 (Appendix 7).

Results

We predicted that 27 amphibian species (15 salamanders, 12 frogs) and 28 reptilian species (nine turtles, two lizards, and 17 snakes) could probably be found at GETT-EISE (Yahner et al. 1994b, 1994c) (Table 3). Of these species, four amphibian (15%) and 11 (39%) reptilian species were documented previously within the park by various personnel on National Park Service Wildlife Observation Cards. Based on field tests of protocols in our study, we found eight species of amphibians and four species of reptiles predicted or previously documented to occur at GETT-EISE. Six amphibian and nine reptilian species were observed by us through personal observations, including one amphibian and six reptilian species not found by protocol testing. By field testing protocols and through personal observations of project researchers, we increased the number of documented species to 10 amphibians and 16 reptiles. We found one salamander, five frog, three snake, and two turtle species that officially had not been documented in the park. Most of these documented species were representatives of the Orders Salientia (six of 12 predicted), Testudines (six of nine predicted), and Serpentes (eight of 17 predicted).

We predicted that 232 avian species could probably be found at GETT-EISE (Yahner et al. 1994b, 1994c) (Table 4). Of these species, 97 (42%) species had been documented previously within the park by various personnel and noted on National Park Service Wildlife Observation Cards prior to our project. Based on field tests of protocols in our study, we found 112 (48%) avian species predicted or previously documented to occur at GETT-EISE. We also found 16 species by personal observations not found by protocol testing.

Based on the total number of species recorded by protocol testing and project researchers from 1 July 1992 to 30 June 1996, we increased the number of documented birds to 155 (67%) species. All (100%) of the predicted woodpeckers and predicted upland groundbirds were documented at the park, and 87% of the predicted raptors were documented. We found one wader, two raptors, one upland groundbird, two shorebirds, one woodpecker, and 51 passerines that had not been documented in the park.

We predicted that 59 mammalian species could probably be found at GETT-EISE (Yahner et al. 1994b, 1994c) (Table 5). Of these species, nine (15%) species had been documented previously within the park by various personnel and noted on National Park Service Wildlife Observation Cards. Based on field tests of protocols in our study, we found 13 mammalian species predicted or previously documented to occur at GETT-EISE. We also found 10 species by personal observations, including five species not found by protocol testing. By our field testing of protocols and personal observations of researchers, we increased the number of documented mammals to 21 species. Most of these documented species were representatives of the Orders Carnivora (46%) and Rodentia (41%).

Table 3. Number of amphibian and reptilian species predicted, number of species documented by WOC^a and during 1 May 1993 to 31 October 1994 by PO^b and PTC^c, total number of species documented, and percent of predicted species that was documented at Gettysburg National Military Park and Eisenhower National Historic Site.

	No. Pred.	Number Documented			Total	% Pred.
		WOC	PO	PTC		
Amphibia	27	4	6	8	10	(37%)
Caudata	15	3	2	4	4	(27%)
Salientia	12	1	4	4	6	(50%)
Reptilia	28	11	9	4	16	(57%)
Testudines	9	4	5	2	6	(67%)
Lacertilia	2	2	0	0	2	(100%)
Serpentes	17	5	4	2	8	(47%)

^a WOC = National Park Service Wildlife Observation Cards.

^b PO = Personal observations by study researchers.

^c PTC = Field testing of protocols by study researchers.

Table 4. Number of avian species predicted, number of species documented by WOC^a and during 1 May 1993 to 31 October 1994 by PO^b and PTC^c, total number of species documented, and percent of predicted species that was documented at Gettysburg National Military Park and Eisenhower National Historic Site.

	No. Pred.	Number Documented			Total	% Pred.
		WOC	PO	PTC		
Aves	232	97	85	112	155	(67%)
Waterfowl	29	13	3	4	13	(45%)
Wader	16	4	3	1	5	(31%)
Raptor	15	11	9	8	13	(87%)
Upland Groundbird	6	5	3	1	6	(100%)
Shorebird	9	3	4	3	5	(56%)
Owl	7	5	1	2	5	(71%)
Woodpecker	7	6	5	7	7	(100%)
Passerine	143	50	57	86	101	(71%)

^a WOC = National Park Service Wildlife Observation Cards.

^b PO = Personal observations by study researchers.

^c PTC = Field testing of protocols by study researchers.

Table 5. Number of mammalian species predicted, number of species documented by WOC^a and during 1 May 1993 to 31 October 1994 by PO^b and PTC^c, total number of species documented, and percent of predicted species that was documented at Gettysburg National Military Park and Eisenhower National Historic Site.

	No. Pred.	Number Documented				% Pred.
		WOC	PO	PTC	Total	
Mammalia	59	9	10	13	21	(36%)
Didelphimorphia	1	0	0	0	0	(0%)
Insectivora	8	1	1	2	3	(38%)
Chiroptera	11	0	2	0	2	(18%)
Carnivora	13	5	2	3	6	(46%)
Rodentia	22	3	4	7	9	(41%)
Lagomorpha	3	0	1	1	1	(33%)

^a WOC = National Park Service Wildlife Observation Cards.

^b PO = Personal observations by study researchers.

^c PTC = Field testing of protocols by study researchers.

Amphibians and Reptiles

Natural-Substrate Survey Protocol

Old-Field Sites: No amphibians or reptiles were observed at the POF site by the natural-substrate survey protocol. Other old-field sites were not checked for amphibians because of a lack of rocks and logs.

Approximately 2.25 person-hours were spent searching the POF site for amphibians and reptiles using the natural-substrate survey and coverboard protocols. Although the coverboards were checked for amphibians while conducting this protocol, no additional time was required to conduct the protocols together. Because the natural-substrate survey protocol may be conducted with any number of observers, we calculated the amount of time required for each observer to conduct this protocol per 100 m of transect length. This protocol required 7.5 minutes/100 m for each observer.

Lowland-Forest Sites: We observed 27 individuals of four amphibian species and 11 individuals of three reptilian species by turning over rocks and logs at the two lowland-forest sites (DDL and LFL sites) (Table 6). The total area of these sites was approximately 3.6 ha; thus, the combined density of amphibians and reptiles at the lowland-forest sites was 10.6/ha. Rocks and logs provided refugia for nine (33%) and 18 (67%) individuals, respectively. An additional 12 (31%) individuals were detected on the surface of the leaf litter.

We noted 28 amphibians of four species, including 24 red-backed salamanders, two northern two-lined salamanders, one pickerel frog, and one American toad at the lowland sites. The density of red-backed salamanders at the lowland sites was 6.7/ha. Fifteen and nine of the red-backed salamanders were discovered under logs and rocks, respectively. The northern two-lined salamander and the American toad were located under logs, whereas the pickerel frog was observed on the leaf litter.

We observed 11 reptiles of three species, including seven eastern box turtles, three spotted turtles, and one eastern garter snake. The density of eastern box turtles at the lowland-forest sites was 1.9/ha. All reptiles were observed on the leaf litter, and spotted turtles were typically observed near water (< 5 m).

Because of the disparity in time required to conduct the natural-substrate survey protocol based on the number of observers (i.e., 15.0 person-hours for DDL and 3.0 person-hours for LFL), we calculated the time per 100 m of transect length. We required an average of 13.4 minutes per observer to sample 100 m of transect length for amphibians and reptiles at lowland-forest sites.

Table 6. Number of individuals and, in parentheses, density (no./ha) of amphibians and reptiles observed under rocks, logs, and on the leaf litter while conducting the natural-substrate survey protocol during spring 1994 and the coverboard protocol during spring and fall 1994 at lowland-forest sites (DDL and LFL) and upland-forest sites (LRU and BRU). No species were found using the natural-substrate survey protocol at POF (other sites were not surveyed) and using the coverboard protocol at the VDG, WOF, MOF, and POF sites.

Lowland-Forest Sites:

Species	Substrate				Total
	Rock	Log	Litter	Coverboard	
Northern Two-lined Salamander	0 (0.00)	2 (0.56)	0 (0.00)	0 (0.00)	2 (0.56)
Red-backed Salamander	9 (2.50)	15 (4.17)	0 (0.00)	5 (1.39)	(29) 8.06/ha
Pickerel Frog	0 (0.00)	0 (0.00)	1 (0.28)	0 (0.00)	1 (0.28)
American Toad	0 (0.00)	1 (0.28)	0 (0.00)	0 (0.00)	1 (0.28)
Spotted Turtle	0 (0.00)	0 (0.00)	3 (0.83)	0 (0.00)	3 (0.83)
Eastern Box Turtle	0 (0.00)	0 (0.00)	7 (1.94)	0 (0.00)	7 (1.94)
Common Garter Snake	0 (0.00)	0 (0.00)	1 (0.28)	0 (0.00)	1 (0.28)
Total	9 (2.50)	18 (5.00)	12 (3.33)	5 (1.39)	44 (12.22)

Table 6. Number of individuals and, in parentheses, density (no./ha) of amphibians and reptiles observed under rocks, logs, and on the leaf litter while conducting the natural-substrate survey protocol during spring 1994 and the coverboard protocol during spring and fall 1994 at lowland-forest sites (DDL and LFL) and upland-forest sites (LRU and BRU). No species were found using the natural-substrate survey protocol at POF (other sites were not surveyed) and using the coverboard protocol at the VDG, WOF, MOF, and POF sites. (continued)

Upland-Forest Sites:

Species	Substrate				Total
	Rock	Log	Litter	Coverboard	
Eastern Newt (Red Eft)	3 (0.97)	0 (0.00)	0 (0.00)	0 (0.00)	3 (0.97)
Spotted Salamander	1 (0.32)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.32)
Red-backed Salamander	11 (3.55)	39 (12.58)	0 (0.00)	4 (1.29)	54 (17.42)
American Toad	0 (0.00)	1 (0.32)	1 (0.32)	0 (0.00)	2 (0.65)
Eastern Box Turtle	0 (0.00)	0 (0.00)	1 (0.32)	0 (0.00)	1 (0.32)
Ring-necked Snake	2 (0.65)	0 (0.00)	0 (0.00)	0 (0.00)	2 (0.65)
Common Garter Snake	0 (0.00)	0 (0.00)	2 (0.65)	0 (0.00)	2 (0.65)
Total	17 (5.48)	40 (12.90)	4 (1.29)	4 (1.29)	65 (20.97)

Upland-Forest Sites: We noted 61 individuals of seven species of amphibians and reptiles at the two upland-forest sites (LRU and BRU) (Table 6). The combined area of these two sites was 3.1 ha, and the total density of amphibians and reptiles at these sites was 21.3/ha. Seventeen (28%) and 40 (66%) individuals were found under rocks and logs, respectively; four (7%) individuals were located on the leaf litter.

Fifty-six of the individual amphibians observed at the upland-forest sites included 50 red-backed salamanders, three red-spotted newts, two American toads, and one spotted salamander. The density of red-backed salamanders at the upland sites was 18.1/ha. Thirty-nine and 11 red-backed salamanders were found under logs and rocks, respectively. Three red-spotted newts, in the terrestrial larval stage (red eft) were found under rocks. One American toad was observed under a rock and another on the surface of the leaf litter. The spotted salamander was observed under a log.

Five of the individual reptiles observed at the upland-forest sites included two eastern garter snakes, two northern ring-necked snakes, and one eastern box turtle. Two eastern garter snakes and the eastern box turtle were found on the leaf litter, and the northern ring-necked snakes were observed under rocks.

We conducted the natural-substrate survey protocol with 16.5 person-hours at LRU and 5.0 person-hours at BRU. Standardized for the number of observers and transect length, we required an average of 19.3 minutes per observer to sample 100 m of transect length for amphibians and reptiles at upland-forest sites.

Coverboard Protocol

Old-Field Sites: We found no amphibians or reptiles under the coverboards at the VDG, MOF, WOF, POF, and DOF sites during spring and fall 1994. Ten coverboards were missing, all from the VDG site.

Lowland-Forest Sites: Although eight coverboards were missing from the lowland-forest sites, we observed five red-backed salamanders under the remaining 25 coverboards (Table 6). One was found during spring and one during fall under different coverboards at DDL, two during spring, and one during fall under different coverboards at LFL. The average observation rate of salamanders was 0.20/coverboard for the lowland-forest sites.

Upland-Forest Sites: Although seven coverboards were missing from the two upland-forest sites, we found four red-backed salamanders under 23 coverboards (Table 6). One was observed during spring and three during fall at LRU, and one during spring at BRU. This resulted in an average observation rate of 0.17 salamanders/coverboard.

Coverboard Labor and Cost: Lumber for the coverboard protocol (three boards at 37 sampling points) cost \$220 and required 2.5 person-hours to cut into 1-m lengths. We spent 6.5 person-

hours placing coverboards at the sampling points and 3.5 person-hours checking the coverboards for amphibians at all sites. Therefore, the coverboard protocol required \$5.95/sampling point to purchase, 0.19 person-hours/sampling point to place, and 0.09 person-hours/sampling point to check the coverboards.

Amphibian-Call Survey Protocol

We heard 142 amphibians of five species during the three amphibian-call surveys conducted in April-May 1994 (Table 7). These included 91 (64%) spring peepers, 23 (16%) pickerel frogs, 22 (15%) American toads, five (3%) upland chorus frogs, and one (1%) wood frog. The average number of spring peepers, pickerel frogs, American toads, and upland chorus frogs heard per survey was 30.33, 7.67, 7.33, and 1.67, respectively. The single wood frog was observed during the second survey. The average number of spring peepers, pickerel frogs, American toads, and upland chorus frogs observed per hour of stationary survey time was 46.7, 11.8, 11.3, and 2.6, respectively. Greater than 90% of the amphibians were observed during the two surveys conducted in April.

The survey route required 2.5 hours to establish. However, the same route was used for all vehicular-road survey protocols conducted at the park. The time required to conduct the amphibian-call survey averaged 70 minutes per survey (13 stopping points along the 20.8 km route).

Pitfall-Trapping Protocol

We captured six American toads and one red-spotted newt in pitfall traps during summer 1993 at GETT and EISE (Table 8). All American toads were found at forest sites (DDL and BRU), and the red-spotted newt was captured at a grassland site (VDG). We captured only one reptile, a box turtle, in pitfall traps during summer 1993. The average rate of capture was 1.42 amphibians/100 trapnights and 0.20 reptiles/100 trapnights in pitfall traps.

We noted three amphibian species and four individuals in pitfall traps during April-May 1994, including two red-backed salamanders, one American toad, and one spotted salamander (Table 9). The capture rate was 0.26 amphibians/100 trapnights. We found no reptiles using pitfall traps during this trapping period.

We required 20.5 person-hours to dig 43 pitfall traps (0.47 person-hours/pitfall trap) during summer 1993 and 3.0 person-hours to dig 10 additional pitfall traps (0.3 person-hours/pitfall trap) during spring 1994. This included time to dig the traps and travel time between sites. Approximately 9.5 person-hours were required daily to check 43 pitfall traps during summer 1993. We spent 5.5 person-hours per day checking 53 pitfall traps for captures during spring 1994. Four additional hours were required during summer 1993 because we also checked live-traps at the same time.

Table 7. Number of individuals and, in parentheses, relative abundance (number/hour of stationary time) of amphibians observed during the amphibian-call survey protocol during three surveys in spring 1994 at Gettysburg National Military Park and Eisenhower National Historic Site.

Species	GETT-EISE
Pickerel Frog	23 (11.8)
Wood Frog	1 (0.5)
American Toad	22 (11.3)
Gray Treefrog	5 (2.6)
Spring Peeper	91 (46.7)
Number of sampling points	13
Total stationary survey time	1.95 hours
Total individuals	142 (72.8)

Table 8. Total number of individuals and, in parentheses, average number of individuals (no./100 trapnights) of three amphibian and reptilian species captured in pitfall traps at two grassland (PMG and VDG), four old-field (MOF, POF, WOF, and DOF), two lowland-forest (DDL and LFL), and two upland-forest (LRU and BRU) sites in summer 1993 at Gettysburg National Military Park and Eisenhower National Historic Park. Descriptions of site codes are given in Table 1.

Species	Grassland	Old-Field	Lowland-Forest	Upland-Forest	Total
Red-spotted Newt	1 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.2)
American Toad	0 (0.0)	0 (0.0)	5 (3.8)	1 (0.8)	6 (1.1)
Box Turtle	0 (0.0)	1 (0.6)	0 (0.0)	0 (0.0)	1 (0.2)
Trapnights	143	156	130	130	559
Total	1 (0.7)	1 (0.6)	5 (3.8)	1 (0.8)	8 (1.4)

Table 9. Total number of individuals and, in parentheses, average number of individuals (no./100 trapnights) of three amphibian species captured in pitfall traps at one pond (FLP), two grassland (PMG and VDG), four old-field (MOF, POF, WOF, and DOF), two lowland-forest (DDL and LFL), and two upland-forest (LRU and BRU) sites in spring 1994 at Gettysburg National Military Park and Eisenhower National Historic Park. Descriptions of site codes are given in Table 1.

Species	Pond	Grassland	Old-Field	Lowland-Forest	Upland-Forest	Total
Red-backed Salamander	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.6)	0 (0.0)	2 (0.1)
Spotted Salamander	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	1 (0.1)
American Toad	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	1 (0.1)
Trapnights	385	330	375	350	300	1740
Total	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.6)	2 (0.7)	4 (0.2)

Birds

Transect and Point-Count Protocols

1993 Breeding Season:

Grassland Site: We recorded 33 individuals of 11 species of birds at PMG during the 1993 breeding season, yielding a bird diversity of 0.82 (Appendix 8). The five most abundant species, averaged for all three transect methods, were the grasshopper sparrow (2.6/ha), eastern meadowlark (1.1/ha), European starling (0.6/ha), mourning dove (0.5/ha), and northern mockingbird (0.2/ha). The indigo bunting was the only species documented by TRAN-50 and TRAN-UL methods but not by the TRAN-30 methods. The coefficient of community similarity (CC) value between TRAN-30 and TRAN-50 and between TRAN-30 and TRAN-UL was 0.95 (Table 10).

Old-Field Sites: We found 185 individuals of 35 species at all four old-field sites (WOF, POF, MOF, DOF) combined during the 1993 breeding season (Appendix 10). The gray catbird, northern cardinal, and rufous-sided towhee were observed at all four sites, whereas red-bellied woodpecker, house wren, and house finch were observed at three of the four sites. The five most abundant species, averaged across methods and sites, included the house wren (7.9/ha), gray catbird (7.3/ha), northern cardinal (5.3/ha), American goldfinch (5.1/ha), and field sparrow (4.9/ha). Bird diversity for old-field sites during the 1993 breeding season was 1.34.

All three transect methods documented the same species, except TRAN-30 did not document the downy woodpecker; the CC value was 0.97 between TRAN-30 and TRAN-50 and between TRAN-30 and TRAN-UL (Table 11). We calculated a CC value of 0.95 with PNTC-30 and PNTC-UL because three additional species were found with the PNTC-UL sampling method. PNTC-UL documented 13 species more than TRAN-UL, and we found 17 species in common with both methods. The CC value for TRAN-UL and PNTC-UL was 0.64.

Forest Sites: We detected 254 individuals of 29 species at the forest sites (DDL, LFL, LRU, BRU) during the 1993 breeding season, giving a bird diversity of 1.32 (Appendix 8). Nine species were noted at all four sites, including the red-bellied woodpecker, northern flicker, eastern wood-pewee, black-capped chickadee, tufted titmouse, house wren, wood thrush, scarlet tanager, and northern cardinal. The five most abundant species, averaged across methods and sites, were the blue jay (6.9/ha), wood thrush (5.1/ha), gray catbird (4.2/ha), tufted titmouse (3.3/ha), and American crow (3.24/ha).

We found two species with TRAN-50 and TRAN-UL not detected with TRAN-30 and three species with PNTC-UL not detected with PNTC-30. These differences resulted in CC values of 0.96 between TRAN-30 and TRAN-50, 0.96 between TRAN-30 and TRAN-UL, and 0.94 between PNTC-30 and PNTC-UL (Table 12). We detected 25 species with TRAN-UL and 27 species with PNTC-UL; however, 19 species were common to both methods, resulting in a CC value of 0.73.

Table 10. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), and unlimited-distance transects (TRAN-UL) conducted at the grassland site during the 1993 breeding season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 10 spp.	TRAN-50 11 spp.	TRAN-UL 11 spp.
TRAN-30 10 spp.	--	--	--
TRAN-50 11 spp.	0.95	--	--
TRAN-UL 11 spp.	0.95	1.00	--

Table 11. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at old-field sites during the 1993 breeding season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 19 spp.	TRAN-50 20 spp.	TRAN-UL 20 spp.	PNTC-30 30 spp.	PNTC-UL 33 spp.
TRAN-30 19 spp.	--	--	--	--	--
TRAN-50 20 spp.	0.97	--	--	--	--
TRAN-UL 20 spp.	0.97	1.00	--	--	--
PNTC-30 30 spp.	0.65	0.64	0.64	--	--
PNTC-UL 33 spp.	0.65	0.64	0.64	0.95	--

Table 12. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at forest sites during the 1993 breeding season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 23 spp.	TRAN-50 25 spp.	TRAN-UL 25 spp.	PNTC-30 24 spp.	PNTC-UL 27 spp.
TRAN-30 23 spp.	--	--	--	--	--
TRAN-50 25 spp.	0.96	--	--	--	--
TRAN-UL 25 spp.	0.96	1.00	--	--	--
PNTC-30 24 spp.	0.72	0.73	0.73	--	--
PNTC-UL 27 spp.	0.72	0.73	0.73	0.94	—

1993 Fall Migration Season:

Grassland Site: We observed seven individuals of four species during the 1993 fall migration season at the PMG site (Appendix 8). These species were the northern mockingbird, grasshopper sparrow, eastern meadowlark, and American goldfinch. The CC value for all comparisons of methods was 1.0 (Table 13).

Old-Field Sites: We noted 480 individuals of 38 species during the 1993 fall migration season at four old-field sites (WOF, POF, MOF, and DOF) (Appendix 8). The black-capped chickadee, tufted titmouse, and chipping sparrow were observed on all four sites, whereas the red-bellied woodpecker, northern flicker, blue jay, house wren, American robin, and northern cardinal occurred on three of four sites. The five most abundant species averaged across methods and sites were the common grackle (26.1/ha), blue jay (25.6/ha), cedar waxwing (18.6/ha), gray catbird (18.1/ha), and field sparrow (14.9/ha). Bird diversity was 1.21 at old fields during fall migration.

We detected the same species using TRAN-30, TRAN-50, and TRAN-UL, giving us CC values of 1.0 in pairwise comparisons (Table 14). The value also was 1.0 between PNTC-30 and PNTC-UL. All coefficients between transects and point counts, however, were 0.62. Thirteen more bird species were detected with point counts than with transects, and 17 species were common to both transects and point counts.

Forest Sites: We observed 286 individuals of 42 species at the four forest sites (DDL, LFL, LRU, and BRU) during the 1993 fall migration season (Appendix 8), giving a bird diversity of 1.28. The red-bellied woodpecker, tufted titmouse, and northern cardinal were observed on all four sites, whereas the downy woodpecker, northern flicker, blue jay, black-capped chickadee, white-breasted nuthatch, wood thrush, American robin, and magnolia warbler were observed at three of four sites. The five most abundant species averaged across methods and sites were the blue jay (10.2/ha), black-capped chickadee (7.5/ha), tufted titmouse (5.6/ha) red-bellied woodpecker (4.9/ha), and wood thrush (5.9/ha). Because the eastern screech-owl call did not increase the number of species or the number of individuals detected in fall, we combined the point counts with and without the owl call for all analyses.

The same 27 species were observed with TRAN-50 and TRAN-UL (CC = 1.0) at the forest sites during the 1993 fall migration season (Table 15); however, we detected two fewer species, the Canada goose and American crow, with the TRAN-30 protocol. This resulted in a coefficient value of 0.96 when compared to TRAN-50 and TRAN-UL. The coefficient for PNTC-30 and PNTC-UL was 1.0. PNTC-30 and PNTC-UL had 21 species in common with TRAN-50 and TRAN-UL and a coefficient of community similarity of 0.69. Point counts detected nine more species than TRAN-30 and seven more than TRAN-50 and TRAN-UL.

Table 13. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), and unlimited-distance transects (TRAN-UL) conducted at the grassland site during the 1993 fall migration season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 4 spp.	TRAN-50 4 spp.	TRAN-UL 4 spp.
TRAN-30 4 spp.	--	--	--
TRAN-50 4 spp.	1.00	--	--
TRAN-UL 4 spp.	1.00	1.00	--

Table 14. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at old-field sites during the 1993 fall migration season, at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 21 spp.	TRAN-50 21 spp.	TRAN-UL 21 spp.	PNTC-30 34 spp.	PNTC-UL 34 spp.
TRAN-30 21 spp.	--	--	--	--	--
TRAN-50 21 spp.	1.00	--	--	--	--
TRAN-UL 21 spp.	1.00	1.00	--	--	--
PNTC-30 34 spp.	0.62	0.62	0.62	--	--
PNTC-UL 34 spp.	0.62	0.62	0.62	1.00	--

Table 15. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at forest sites during the 1993 fall migration season, at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 25 spp.	TRAN-50 27 spp.	TRAN-UL 27 spp.	PNTC-30 34 spp.	PNTC-UL 34 spp.
TRAN-30 25 spp.	--	--	--	--	--
TRAN-50 27 spp.	0.96	--	--	--	--
TRAN-UL 27 spp.	0.96	1.00	--	--	--
PNTC-30 34 spp.	0.65	0.69	0.69	--	--
PNTC-UL 34 spp.	0.65	0.69	0.69	1.00	--

1993-94 Winter Season:

Old-Field Sites: We observed 386 individuals of 37 species of birds at the four old-field sites (WOF, POF, MOF, and DOF) during the 1993-94 winter season (Appendix 8). Species occurring at all four sites included red-bellied woodpecker, blue jay, black-capped chickadee, tufted titmouse, northern mockingbird, northern cardinal, and dark-eyed junco. The five species exhibiting the highest densities, averaged across methods and sites, were the dark-eyed junco (9.0/ha), black-capped chickadee (2.5/ha), northern cardinal (2.4/ha), northern mockingbird (2.1/ha), and blue jay (2.1/ha).

Using the TRAN-30 method, we detected a total of 160 individuals of 28 (76%) of the 37 species observed by all methods combined (Appendix 8). The turkey vulture, killdeer, mourning dove, Carolina chickadee, Carolina wren, golden-crowned kinglet, eastern bluebird, brown-headed cowbird, and American goldfinch were not detected by the TRAN-30 method. Bird diversity at old-field sites using the TRAN-30 method during winter was 1.25. The same species were detected using TRAN-30, TRAN-50, and TRAN-UL (CC = 1.0) (Table 16).

Based on the PNTC-30 method, we noted a total of 220 individuals of 31 (84%) of the 37 species observed by all methods combined; bird diversity was 1.25 (Appendix 8). The barred owl, fish crow, brown creeper, cedar waxwing, rufous-sided towhee, and American tree sparrow were not detected by the PNTC-30 method. The coefficient of community similarity was 0.75 between transect and point-count protocols. PNTC-UL yielded the same species as PNTC-30 (Table 16). Because the eastern screech-owl call did not enhance the number of species or the number of individuals detected in the winter, we combined the point counts with and without the owl call for all analyses.

Forest Sites: The four forest sites (DDL, LFL, LRU, and BRU) contained 521 individuals of 36 species during the 1993-94 winter season (Appendix 8). Only five species were observed at all four sites: red-bellied woodpecker, downy woodpecker, American crow, tufted titmouse, and white-breasted nuthatch. The species with the highest density, averaged across methods and sites, were the dark-eyed junco (5.1/ha), black-capped chickadee (2.2/ha), song sparrow (1.2/ha), American crow (1.1/ha), and red-headed woodpecker (0.9/ha).

We noted 297 individuals of 26 (72%) species at forest sites using the TRAN-30 method (Appendix 8). Species not detected by TRAN-30 were the red-tailed hawk, killdeer, northern flicker, blue jay, common raven, Carolina chickadee, red-breasted nuthatch, golden-crowned kinglet, eastern bluebird, and pine siskin. Bird diversity was 1.06 in forest sites during winter 1993-94, using the TRAN-30 method. Using TRAN-50 and TRAN-UL, we detected the blue jay, which was not found with TRAN-30 (CC = 0.94) (Table 17).

Table 16. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at old-field sites during the 1993-94 winter season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 28 spp.	TRAN-50 28 spp.	TRAN-UL 28 spp.	PNTC-30 31 spp.	PNTC-UL 31 spp.
TRAN-30 28 spp.	--	--	--	--	--
TRAN-50 28 spp.	1.00	--	--	--	--
TRAN-UL 28 spp.	1.00	1.00	--	--	--
PNTC-30 31 spp.	0.75	0.75	0.75	--	--
PNTC-UL 31 spp.	0.75	0.75	0.75	1.00	--

Table 17. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at forest sites during the 1993-94 winter season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 26 spp.	TRAN-50 27 spp.	TRAN-UL 27 spp.	PNTC-30 29 spp.	PNTC-UL 29 spp.
TRAN-30 26 spp.	--	--	--	--	--
TRAN-50 27 spp.	0.98	--	--	--	--
TRAN-UL 27 spp.	0.98	1.00	--	--	--
PNTC-30 29 spp.	0.69	0.71	0.71	--	--
PNTC-UL 29 spp.	0.69	0.71	0.71	1.00	--

We detected 213 individuals of 29 (81%) species using the PNTC-30 method, yielding a bird diversity of 1.24. Species not detected by PNTC-30 included the sharp-shinned hawk, belted kingfisher, Carolina wren, winter wren, cedar waxwing, common grackle, and white-throated sparrow. All species found with PNTC-30 were also found with PNTC-UL (CC = 1.0) (Table 17). Coefficients of community similarity between point counts and TRAN-50 and TRAN-UL were 0.71 with 20 species in common.

1994 Spring Migration Season:

Grassland Site: We recorded 17 individuals of six species of birds at PMG during the 1994 spring migration season, yielding a bird diversity of 0.82 (Appendix 8). The three most abundant species, averaged for all three transect methods, were the eastern meadowlark (0.97/ha), grasshopper sparrow (0.72/ha), and European starling (0.54/ha). The coefficient of community similarity (CC) value between TRAN-30 and TRAN-50 and between TRAN-30 and TRAN-UL was 1.0 (Table 18).

Old-Field Sites: We detected 431 individuals of 53 species at four old-field sites (WOF, POF, MOF, and DOF) during the 1994 spring migration (Appendix 8). The blue jay, tufted titmouse, house wren, gray catbird, northern cardinal, rufous-sided towhee, field sparrow, white-throated sparrow, common grackle, and house finch occurred at all four sites. The five most abundant species, averaged across methods and sites, were the rufous-sided towhee (2.5/ha), American robin (2.4/ha), field sparrow (2.1/ha), common grackle (2.1/ha), and mourning dove (1.9/ha).

Using the TRAN-30 method, we detected 208 individuals of 39 (74%) species, with a bird diversity of 1.48 (Appendix 8). Species not detected by the TRAN-30 protocol included the double-crested cormorant, red-tailed hawk, killdeer, barred owl, chimney swift, acadian flycatcher, American tree swallow, cedar waxwing, white-eyed vireo, chestnut-sided warbler, black-throated blue warbler, black-and-white warbler, and eastern meadowlark.

Using the PNTC-30 method, we noted 214 individuals of 36 (68%) species, giving a bird diversity of 1.50. Species not detected by the PNTC-30 method included the Canada goose, yellow-billed cuckoo, red-headed woodpecker, downy woodpecker, great crested flycatcher, ruby-crowned kinglet, yellow-rumped warbler, prairie warbler, dark-eyed junco, and red-winged blackbird.

We found 42 species with TRAN-50 and TRAN-UL for a CC value of 0.96 when both were compared to TRAN-30 (Table 19). We found eight more species with PNTC-UL than with PNTC-30; this difference resulted in a CC value of 0.90. TRAN-UL and PNTC-UL documented 33 of the same species, although we found two additional species with PNTC-UL. The CC value for TRAN-UL and PNTC-UL was 0.77.

Table 18. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), and unlimited-distance transects (TRAN-UL) conducted at the grassland site during the 1994 spring migration season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 6 spp.	TRAN-50 6 spp.	TRAN-UL 6 spp.
TRAN-30 6 spp.	--	--	--
TRAN-50 6 spp.	1.00	--	--
TRAN-UL 6 spp.	1.00	1.00	--

Table 19. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at old-field sites during the 1994 spring migration season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 39 spp.	TRAN-50 42 spp.	TRAN-UL 42 spp.	PNTC-30 36 spp.	PNTC-UL 44 spp.
TRAN-30 39 spp.	--	--	--	--	--
TRAN-50 42 spp.	0.96	--	--	--	--
TRAN-UL 42 spp.	0.96	1.00	--	--	--
PNTC-30 36 spp.	0.75	0.74	0.74	--	--
PNTC-UL 44 spp.	0.75	0.77	0.77	0.90	--

Forest Sites: We recorded 553 individuals of 72 species at the four forest sites (DDL, LFL, LRU, and BRU) during the 1994 spring migration season surveys (Appendix 8). The downy woodpecker, great crested flycatcher, blue jay, tufted titmouse, white-breasted nuthatch, wood thrush, northern cardinal, and common grackle were observed at all four sites. The five most abundant species, averaged across methods and sites, included the house wren (3.1/ha), northern cardinal (1.9/ha), wood thrush (1.9/ha), blue-gray gnatcatcher (1.5/ha), and tufted titmouse (1.4/ha).

We detected 253 individuals of 57 (79%) species using the TRAN-30 method (Appendix 8). This resulted in a bird diversity of 1.56. Fifteen species were not found by TRAN-30: Cooper's Hawk, red-shouldered hawk, spotted sandpiper, yellow-billed cuckoo, eastern phoebe, gray-cheeked thrush, cedar waxwing, European starling, white-eyed vireo, Philadelphia vireo, prairie warbler, hooded warbler, rufous-sided towhee, field sparrow, and purple finch.

Using the PNTC-30 method, we detected 273 individuals of 55 (76%) species, with a bird diversity of 1.41. Seventeen species were not detected by PNTC-30: Cooper's hawk, red-shouldered hawk, broad-winged hawk, yellow-billed cuckoo, red-headed woodpecker, fish crow, eastern bluebird, chestnut-sided warbler, blackburnian warbler, hooded warbler, black- and-white warbler, rose-breasted grosbeak, indigo bunting, field sparrow, eastern meadowlark, brown-headed cowbird, and house finch.

We detected eight species more with TRAN-UL than with TRAN-30 ($CC = 0.91$) (Table 20). We found 54 species with PNTC-UL, 10 species more than with PNTC-30 ($CC = 0.90$). TRAN-UL and PNTC-UL detected 42 of the same species, and TRAN-UL yielded three species more than PNTC-UL. The CC value for TRAN-UL and PNTC-UL was 0.75.

1994 Breeding Season:

Old-Field Sites: We observed 300 individuals of 46 species of birds were observed at the four old-field sites (WOF, POF, MOF, and DOF) during the 1994 breeding season (Appendix 8). Species noted at all four sites were the blue jay, black-capped chickadee, tufted titmouse, house wren, wood thrush, gray catbird, northern cardinal, rufous-sided towhee, and brown-headed cowbird. The five most abundant species, averaged across methods and sites, were the cedar waxwing (2.5/ha), American goldfinch (2.0/ha), field sparrow (1.9/ha), gray catbird (1.6/ha), and rufous-sided towhee (1.4/ha).

Using the TRAN-30 method, we detected 86 individuals of 31 (67%) species, yielding a bird species diversity of 1.36 (Appendix 8). Fifteen species were not detected with the TRAN-30 method: the Canada goose, mourning dove, black-billed cuckoo, yellow-billed cuckoo, red-headed woodpecker, downy woodpecker, eastern wood-pewee, great crested flycatcher, American tree swallow, blue jay, brown creeper, wood thrush, red-eyed vireo, scarlet tanager, and common grackle.

Table 20. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at forest sites during the 1994 spring migration season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 49 spp.	TRAN-50 57 spp.	TRAN-UL 58 spp.	PNTC-30 44 spp.	PNTC-UL 54 spp.
TRAN-30 49 spp.	--	--	--	--	--
TRAN-50 57 spp.	0.92	--	--	--	--
TRAN-UL 58 spp.	0.91	0.99	--	--	--
PNTC-30 44 spp.	0.73	0.69	0.69	--	--
PNTC-UL 54 spp.	0.74	0.74	0.75	0.90	—

Using the PNTC-30 method, we observed 91 individuals of 28 (61%) species (Appendix 8). This resulted in a bird diversity of 1.28. Eighteen species were not detected by PNTC-30: Canada goose, red-tailed hawk, black-billed cuckoo, yellow-billed cuckoo, American tree swallow, white-breasted nuthatch, northern mockingbird, brown thrasher, European starling, blue-winged warbler, chestnut-sided warbler, magnolia warbler, black-throated blue warbler, blackpoll warbler, American redstart, scarlet tanager, chipping sparrow, and brown-headed cowbird.

TRAN-50 and TRAN-UL detected the same 35 species ($CC = 1.0$) and four species more than TRAN-30 ($CC = 0.94$) (Table 21). We found nine more species with PNTC-UL than with PNTC-30, which resulted in a CC value of 0.86. We found 26 of the same species with TRAN-UL and PNTC-UL, and we found two additional species with PNTC-UL ($CC = 0.72$).

Forest Sites: We observed 479 individuals of 50 species of birds at the four forest sites (DDL, LFL, LRU, and BRU) during the 1994 breeding season (Appendix 8). The downy woodpecker, northern flicker, eastern wood-pewee, great crested flycatcher, blue jay, wood thrush, scarlet tanager, and northern cardinal were observed at all four sites. Averaged across methods and sites, the five most abundant species were the cedar waxwing (1.8/ha), house wren (1.7/ha), great crested flycatcher (1.5/ha), wood thrush (1.4/ha), and white-breasted nuthatch (1.2/ha).

We noted 153 individuals of 36 (72%) species using the TRAN-30 method during the 1994 breeding season, which gave a bird diversity of 1.40 (Appendix 8). Species not detected by TRAN-30 included the turkey vulture, mourning dove, barred owl, belted kingfisher, red-headed woodpecker, red-bellied woodpecker, northern flicker, pileated woodpecker, American crow, cedar waxwing, magnolia warbler, black-throated green warbler, indigo bunting, and song sparrow.

We recorded 152 individuals of 35 (70%) species using the PNTC-30 method, resulting in a bird diversity of 1.40 (Appendix 8). The Canada goose, mourning dove, pileated woodpecker, acadian flycatcher, American crow, red-breasted nuthatch, eastern bluebird, wood thrush, veery, yellow warbler, magnolia warbler, Cape May warbler, American redstart, song sparrow, and blue-winged warbler were not detected by PNTC-30.

We detected four fewer species with TRAN-30 than with TRAN-50 or TRAN-UL ($CC = 0.95$) and seven species less with PNTC-30 than with PNTC-UL ($CC = 0.90$) (Table 22). Although we detected 40 species with TRAN-UL and PNTC-UL, we found 30 of the same species with both methods. This resulted in a CC value of 0.75.

Time Required for Transect Protocol and Point-Count Protocol: We calculated the amount of time required to conduct the transect and point-count protocols for grassland sites, old-field sites, and forest sites separately per season (Table 23). Because transect length varied among study sites, we standardized length of transects and number of points for comparisons among habitats and between protocols. Time per survey is presented for 600 m and for five points.

Table 21. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at old-field sites during the 1994 breeding season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 31 spp.	TRAN-50 35 spp.	TRAN-UL 35 spp.	PNTC-30 28 spp.	PNTC-UL 37 spp.
TRAN-30 31 spp.	--	--	--	--	--
TRAN-50 35 spp.	0.94	--	--	--	--
TRAN-UL 35 spp.	0.94	1.00	--	--	--
PNTC-30 28 spp.	0.61	0.70	0.70	--	--
PNTC-UL 37 spp.	0.65	0.72	0.72	0.86	--

Table 22. Coefficients of bird community similarity for 30-m fixed-width transects (TRAN-30), 50-m fixed-width transects (TRAN-50), unlimited-distance transects (TRAN-UL), 30-m fixed-radius point counts (PNTC-30), and unlimited-radius point counts (PNTC-UL) conducted at forest sites during the 1994 breeding season at Gettysburg National Military Park and Eisenhower National Historic Site. The total number of species detected for each method also is given.

	TRAN-30 36 spp.	TRAN-50 40 spp.	TRAN-UL 40 spp.	PNTC-30 33 spp.	PNTC-UL 40 spp.
TRAN-30 36 spp.	--	--	--	--	--
TRAN-50 40 spp.	0.95	--	--	--	--
TRAN-UL 40 spp.	0.95	1.00	--	--	--
PNTC-30 33 spp.	0.78	0.71	0.71	--	--
PNTC-UL 40 spp.	0.68	0.75	0.75	0.90	—

Table 23. Average time (minutes) required to conduct a 600-m transect and five point counts for birds at grassland, old-field, and forest sites during five seasons at Gettysburg National Military Park and Eisenhower National Historic Site.

	600-m Transect	Five Point Counts
Breeding 1993		
Grassland	18.8 minutes	
Old-Field	37.5 minutes	38.5 minutes
Forest	24.5 minutes	43.3 minutes
Fall 1993		
Grassland	11.3 minutes	
Old-Field	37.0 minutes	49.8 minutes
Forest	34.4 minutes	48.0 minutes
Winter 1993-94		
Old-Field	28.2 minutes	35.6 minutes
Forest	22.9 minutes	43.3 minutes
Spring 1994		
Old-Field	21.2 minutes	34.5 minutes
Forest	20.4 minutes	34.5 minutes
Breeding 1994		
Old-Field	21.6 minutes	38.0 minutes
Forest	20.0 minutes	40.0 minutes
Grassland Average	15.1 minutes	
Old-field Average	29.1 minutes	39.3 minutes
Forest Average	24.4 minutes	41.8 minutes

Table 23. Average time (minutes) required to conduct a 600-m transect and five point counts for birds at grassland, old-field, and forest sites during five seasons at Gettysburg National Military Park and Eisenhower National Historic Site. (continued).

	600-m Transect	Five Point Counts
Overall Average (old-field and forest)	26.8 minutes	40.6 minutes

For all seasons and habitats combined, a 600-m transect required an average of 26.8 minutes to survey, whereas five point counts required an average of 40.6 minutes to conduct, including the equilibrium period (1 minute/point), survey period (5 minutes/point), and travel time between points. For old-field sites, surveying birds with a 600-m transect required an average of 10.2 minutes less than surveying with five point counts. The difference between transects and point counts was largest in forest sites. Five point counts required an average of 17.4 minutes more to conduct compared to a 600-m transect. The average time required to survey grasslands with a transect was 17.8 minutes.

Vehicular-Road Survey Protocol

We observed 181 individuals of 24 bird species during two road surveys conducted in winter (March) 1994 (Appendix 9). The average number of Canada geese, European starlings, American crows, American robins, and ring-billed gulls per survey (20.8 km length) was 34.5, 14.0, 7.0, 6.0, and 3.5, respectively, and the average number observed per km was 1.67, 0.67, 0.34, 0.29, and 0.17, respectively. Other common species included the turkey vulture, black-capped chickadee, tufted titmouse, eastern bluebird, song sparrow, and dark-eyed junco.

We noted 132 individuals of 37 bird species during a road survey conducted in spring (May) 1994. The most common species included 16 Canada geese (0.77/km), 10 European starlings (0.48/km), 10 cedar waxwings (0.48/km), nine American robins (0.43/km), and eight eastern wood-pewees (0.38/km). Other common species included the northern cardinal, white-breasted nuthatch, great crested flycatcher, house wren, and wood thrush.

The survey route (20.8 km length) required 2.5 hours to establish (i.e., map and test-run). We required 60 minutes to conduct each of the winter surveys and 65 minutes to conduct the spring survey.

Mammals

Pitfall and Live-Trapping Protocols

Grassland Site: We captured 16 individuals of three species at the two grassland sites (Appendix 10). These included 12 (75%) deer mice, three (19%) meadow voles, and one (6%) meadow jumping mouse (Table 24). We captured 2.8 deer mice/100 trapnights; the rate of recapture was 58% for deer mice. All individuals were captured in live-traps with the exception of the meadow jumping mouse, which was captured in a pitfall trap.

Old-Field Sites: We observed 51 individuals of five species of small mammals at four old-field sites (Appendix 10). Old-field sites contained five (10%) Maryland shrews, one (2%) northern short-tailed shrew, 39 (77%) white-footed mice, three (6%) meadow voles, and three (6%) eastern chipmunks (Table 25). Two (40%) of the five Maryland shrews were captured in pitfall traps, and we captured 1.2 Maryland shrews/100 trapnights. For old-field sites, all of the Maryland shrews and meadow voles were found at the WOF site. The northern short-tailed shrew was captured in a pitfall trap at the POF site. We captured 9.1 white-footed mice/100

Table 24. Total number of individuals captured and, in parentheses, average number of captures (no./100 trap-nights) of three small mammal species at two grassland sites during summer 1993 at Gettysburg National Military Park and Eisenhower National Historic Site. Abbreviations of study sites are given in Table 1.

Species	Study Site		Total
	PMG	VDG	
Deer Mouse	12 (5.1)	0 (0)	12 (2.8)
Meadow Vole	0 (0)	3 (1.5)	3 (0.7)
Meadow Jumping Mouse	1 (0.4)	0 (0)	1 (0.2)
Total	13 (5.5)	3 (1.5)	16 (3.7)

Table 25. Total number of individuals captured and, in parentheses, average number of captures (no./100 trap-nights) of five small mammal species at three old-field sites during summer 1993 at Gettysburg National Military Park and Eisenhower National Historic Site. Abbreviations of study sites are given in Table 1.

Species	Study Site				Total
	POF	WOF	MOF	DOF	
White-footed Mouse	13 (16.7)	6 (3.8)	9 (7.7)	11 (14.1)	39 (9.1)
Meadow Vole	0 (0)	3 (1.9)	0 (0)	0 (0)	3 (0.7)
Maryland Shrew	0 (0)	5 (3.2)	0 (0)	0 (0)	5 (1.2)
Eastern Chipmunk	1 (1.3)	0 (0)	1 (0.8)	1 (1.3)	3 (0.7)
Northern Short-tailed Shrew	1 (1.3)	0 (0)	0 (0)	0 (0)	1 (0.2)
Totals	15 (19.2)	14 (9.0)	10 (8.6)	12 (15.4)	51 (11.9)

trapnights, and the rate of recapture for this species was 56%. No white-footed mice were captured in pitfall traps.

Forest Sites: We captured 242 individuals of six species of small mammals at the four forest sites (Appendix 10), including 222 (92%) white-footed mice, 10 (4%) northern short-tailed shrews, five (2%) eastern chipmunks, three (1%) Maryland shrews, one (0.5%) meadow jumping mouse, and one (0.5%) meadow vole (Table 26). We observed 27.1 white-footed mice/100 trapnights; the rate of recapture for this species was 59%. No white-footed mice were found using pitfall traps. Five of the 10 northern short-tailed shrews were captured at the LRU site, and three of 10 northern short-tailed shrews were captured in pitfall traps. We observed 1.2 northern short-tailed shrews/100 trapnights. Four of the five eastern chipmunks were found at the DDL site, and all five chipmunks were captured in live-traps. Maryland shrews were found in pitfall traps at the DDL and the BRU sites, whereas the meadow jumping mouse and meadow vole were found in live-traps at the DDL and the LFL sites, respectively.

Rock Wall Trapping Sites: We captured 153 individuals of three species at the five rock wall sites (Appendix 10). These captures included 149 white-footed mice, two prairie deer mice, and two northern short-tailed shrews (Table 27). One-hundred thirty-eight (92%) of the white-footed mice were captured at the HPR, DDR, and PMR sites, combined. We captured 24.4 white-footed mice/100 trapnights, and the rate of recapture was 59%. We found two northern short-tailed shrews in live-traps at the HPR site and two deer mice in live-traps at the PMR site.

Additional 1994 Trapping:

Grassland and Old-Field Sites: We captured 31 individuals of two species in live-traps at the three grassland (PMG, RRG, and SAG) and one old-field (EOF) sites in 1994 (Table 28). Most of the individuals captured at grassland and old-field sites were meadow voles (12.0 individuals/100 trapnights), followed by white-footed mice (3.5 individuals/100 trapnights).

Forest Sites: At the two forest sites (SCL and CHU), we captured 17 individuals of two species in 100 trapnights during 1994 (Table 28). All but one of the captures were white-footed mice (16.0 individuals/100 trapnights). The other capture was a northern short-tailed shrew.

Time Required for Trapping: We required 20.5 person-hours to dig 43 pitfall traps (0.47 person-hours/pitfall trap) during summer 1993. We required approximately 8.0 person-hours to open and bait 147 live-traps and 9.5 person-hours to check 43 pitfall traps and 147 live-traps, to tag, measure, and release all captures, and to rebait live-traps during summer 1993.

Vehicular-Road Survey Protocol

We observed 57 mammals of four species while conducting five road surveys during summers 1993 and 1994. We observed 45 (79%) eastern chipmunks, 10 (18%) gray squirrels, one (2%) woodchuck, and one (2%) eastern cottontail. The average number of eastern

Table 26. Total number of individuals captured and, in parentheses, average number of captures (no./100 trap-nights) of six small mammal species at four forest sites during summer 1993 at Gettysburg National Military Park and Eisenhower National Historic Site. Abbreviations of study sites are given in Table 1.

Species	Study Site				Total
	DDL	LFL	LRU	BRU	
White-footed Mouse	73 (31.2)	72 (36.9)	29 (18.6)	48 (20.5)	222 (27.1)
Northern Short-tailed Shrew	1 (0.4)	1 (0.5)	5 (3.2)	3 (1.3)	10 (1.2)
Eastern Chipmunk	4 (1.7)	0 (0)	0 (0)	1 (0.4)	5 (0.6)
Maryland Shrew	1 (0.4)	0 (0)	0 (0)	2 (0.9)	3 (0.4)
Meadow Jumping Mouse	1 (0.4)	0 (0)	0 (0)	0 (0)	1 (0.1)
Meadow Vole	0 (0)	1 (0.5)	0 (0)	0 (0)	1 (0.1)
Total	88 (34.2)	74 (37.9)	34 (21.8)	54 (23.1)	242 (29.5)

Table 27. Total number of individuals captured and, in parentheses, average number of captures (no./100 trap-nights) of two small mammal species at five rock wall sites during summer 1993 at Gettysburg National Military Park and Eisenhower National Historic Site. Abbreviations of study sites are given in Table 2.

Species	Study Site					Total
	PMR	VDR	DDR	SWR	HPR	
White-footed Mouse	37 (28.5)	2 (2.9)	32 (32.0)	9 (10.0)	69 (31.3)	149 (24.4)
Prairie Deer Mouse	2 (1.5)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.3)
N. Short-tailed Shrew	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.9)	2 (0.3)
Total	39 (30.0)	2 (2.9)	32 (32.0)	9 (10.0)	71 (32.3)	153 (25.1)

Table 28. Total number of individuals captured and, in parentheses, average number of captures (no./100 trap-nights) of four small mammal species at three grassland (PMG, RRG, and SAG), one old-field (EOF), and two forest (SCL and CHU) sites during summer 1994 at Gettysburg National Military Park and Eisenhower National Historic Site. Abbreviations of study sites are given in Table 2.

Species	Grassland/Old-Field Sites	Forest Sites	Total
White-footed Mouse	7 (3.5)	16 (16.0)	23
N. Short-tailed Shrew	0 (0)	1 (1.0)	1
Meadow Vole	24 (12.0)	0 (0)	24
Number of Trapnights	200	100	300
Total	31 (15.5)	17 (17.0)	48

chipmunks and gray squirrels observed per survey (20.8 km length) was 9.0 and 2.0, respectively; the average number of eastern chipmunks and gray squirrels observed per km was 0.56 and 0.12, respectively. The survey route required 2.5 hours to set-up and test-run, and each survey required an average of 65 minutes to traverse.

Discussion and Recommendations

Amphibians and Reptiles

Of the four survey protocols tested at GETT and EISE for amphibians and reptiles, the vehicular-road survey required the least amount of time (fewest person-hours), money, and materials to conduct. We heard five frog species; three of which, the chorus frog, spring peeper, and wood frog, were previously not documented at the parks using other protocols or by wildlife observation cards. We also noted the highest number of individuals (142) using the vehicular-road survey compared to the other protocols. Because this protocol can be standardized by distance and number of stopping points along the route, results obtained can be compared to other parks and survey periods. This protocol also was advantageous because it enabled us to survey much of the park in a relatively short amount of time (approximately 1 hour).

As at HOFU and VAFO, we observed the greatest number of amphibian and reptilian species ($n = 10$) with the natural-substrate survey protocol (Yahner et al. 1999). Three of these species, the northern two-lined salamander, spotted turtle, and ring-necked snake, were not documented by other protocols. This protocol may be standardized based on transect length. Furthermore, the number of observers conducting the natural-substrate survey protocol depends on the availability of personnel. However, comparisons of results to other parks may not be appropriate because of potential differences in abundance of rocks and logs as habitat for amphibians and reptiles.

We found only nine red-backed salamanders using the coverboards at GETT-EISE (Table 6). Although we found more species at HOFU and VAFO than at GETT-EISE by using coverboards, number of species detected with coverboards was still low compared to other protocols (Yahner et al. 1999). Additionally, several factors decrease the effectiveness of this protocol. The coverboard protocol may require several months between placement of coverboards and checking the coverboards for weathering (DeGraaf and Yamasaki 1992), and the boards need to be replaced after 2-3 years because they decompose rapidly. In other studies, however, salamanders used coverboards within 1 month of placement (R. H. Yahner, personal observation). Coverboards also are a relatively expensive protocol and require significant time to place and check. In addition, coverboards may be lost or, along riparian habitats, washed away during spring thaw. However, a major advantage of this protocol is that observations may be standardized by number of coverboards, which allows sites, habitat types, and parks to be compared directly. Coverboards also can be placed in precise locations for comparisons among sites, habitats, and parks.

Although pitfall trapping yielded captures of five species and 12 individuals, the traps had to be emptied at least once every 3 days to reduce mortality of captured amphibians and reptiles. Because of the amount of time to dig the pitfall traps (20.5 person-hours/43 pitfall traps) and check the traps (5.5 person-hours every third day), the number of observations relative to surveying time was low compared to other protocols.

Birds

Surveys of birds with transects versus point counts differed in species richness and time required to conduct the survey. More species were detected with PNTC-30 (average = 31.8) or PNTC-UL (average = 35.8) than with TRAN-30 (average = 27.6), TRAN-50 (average = 29.2), or TRAN-UL (average = 29.2) at old-field sites for all seasons combined. Although point counts resulted in higher species richness, they required 10.2 minutes longer to complete than transects per equivalent linear distance. However, the considerable average difference in species richness between PNTC-UL and all other methods (range = 4.0-8.2 species) may compensate for this time difference. Therefore, the method selected for surveying birds at old-field sites will depend on specific goals and available personnel at a given park. If the required labor and expertise are available to a resource management specialist whose goal is to document the highest number of bird species at old-fields, unlimited-radius point counts (PNTC-UL) should be selected as the appropriate survey method.

More species were observed at forest sites than at old-field sites for all methods; however, PNTC-UL still resulted in the highest species richness (36.8) when averaged for all seasons compared to TRAN-30 (31.8 species), PNTC-30 (32.8 species), TRAN-50 (35.2 species), and TRAN-UL (35.4 species). The difference in time required to survey birds with point counts and transects at forest sites was larger than at old-field sites: point counts required an average of 17.4 minutes more to survey a site for the standard length (5 point counts and 600 m). Therefore, because average differences in species detected among TRAN-50, TRAN-UL, and PNTC-UL were relatively small (maximum difference = 1.6 species) and because point counts required considerably more time to conduct, TRAN-50 and TRAN-UL were more time- and labor-efficient methods for surveying birds at forest sites. These results are similar to those found at HOFU (Yahner et al. 1998).

Although we detected more species at old-field and forest sites with the PNTC-UL method, a combination of transect and point-count methods may be better than PNTC-UL only. For example, although we documented 40 species each with TRAN-UL and PNTC-UL during breeding season 1994 at forest sites, only 30 species were common between the two methods ($CC = 0.75$). Use of a single method would have resulted in the omission of 10 species. Because the maximum coefficient of community similarity value between PNTC-UL and TRAN-UL was 0.77 for both old-field and forest sites, a significant number of species would not be observed using a only one protocol. Therefore, surveying birds with both TRAN-UL and PNTC-UL may be the approach recommended to identify a representative species richness. Because an owl call played during point counts did not increase species richness or abundance, this protocol should not be used to survey birds during fall migration and winter seasons. The danger of drawing nesting birds off of the nest precluded the use of this protocol during both spring migration and breeding seasons.

The vehicular-road survey for birds allowed us to survey much of the park and several habitats but required little time to set up and to conduct. Furthermore, of the 24 species observed during

winter surveys and 37 species during the spring migration survey, only the rock dove, eastern kingbird, northern rough-winged swallow, purple martin, and house sparrow were not documented with another protocol. Therefore, this protocol may be an efficient alternative when little time is available to survey birds with transects or point counts.

Mammals

All seven mammal species documented with trapping protocols were captured with live-traps. Only the Maryland shrew was found more often in pitfall traps than in live-traps. Whereas pitfall traps required no maintenance but 20.5 hours to dig the 43 trap locations, live-traps required more maintenance (e.g., 40 hours checking and rebaiting 147 live-traps) but only 8.0 hours to set 143 traps. Because live-traps provided considerably more captures and higher species richness with less set-up time, this protocol is advantageous to pitfall trapping to survey small mammals. However, if the goal for a park is to survey all terrestrial vertebrates, pitfalls have the advantage of sampling amphibians, reptiles, and small mammals concurrently. Although we captured a higher number of species using pitfall traps at HOFU compared to GETT-EISE, the number of captures with live-traps was consistently higher than with pitfall traps (Yahner et al. 1997).

Although we documented only four species with the vehicular-road survey protocol for mammals, three species, including the gray squirrel, woodchuck, and eastern cottontail, were not found with other protocols. However, we did not test other protocols that emphasized these medium-sized mammals. The vehicular-road survey required little time to conduct, and the same survey route was used for vertebrates other than mammals.

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Appendix 1.

Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site

(see Appendices 2-6 for definitions of codes
used in the Faunal Database)

Appendix 1.

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
HELLBENDER	<i>Cryptobranchus alleganiensis</i>	Caudata	R	R		MAR TRS LTT NIG TSE	
RED-SPOTTED NEWT	<i>Notophthalmus viridescens</i>	Caudata	PTC PO	R		LTR DFE MAR TRS LTT PFT TSE CVB	PFT LTR
JEFFERSON SALAMANDER	<i>Ambystoma jeffersonianum</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
SPOTTED SALAMANDER	<i>Ambystoma maculatum</i>	Caudata	PTC WOC	R		LTR DFE MAR TRS LTT PFT TSE CVB	PFT LTR
MARbled SALAMANDER	<i>Ambystoma opacum</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
NORTHERN DUSKY SALAMANDER	<i>Desmognathus fuscus</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
MOUNTAIN DUSKY SALAMANDER	<i>Desmognathus ochrophaeus</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
NORTHERN TWO-LINED SALAMANDER	<i>Eurycea bislineata</i>	Caudata	PTC WOC	R		LTR DFE MAR TRS LTT PFT TSE CVB	LTR CVB
LONG-TAILED SALAMANDER	<i>Eurycea longicauda</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
NORTHERN SPRING SALAMANDER	<i>Gyrinophilus porphyriticus</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
FOUR-TOED SALAMANDER	<i>Hemidactylium scutatum</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
RED-BACKED SALAMANDER	<i>Plethodon cinereus</i>	Caudata	PTC PO WOC	R		LTR DFE MAR TRS LTT PFT TSE CVB	PFT LTR CVB
SLIMY SALAMANDER	<i>Plethodon glutinosus</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
VALLEY AND RIDGE SALAMANDER	<i>Plethodon hoffmani</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
NORTHERN RED SALAMANDER	<i>Pseudotriton ruber</i>	Caudata	R	R		LTR DFE MAR TRS LTT PFT TSE CVB	
EASTERN SPADEFoot	<i>Scaphiopus holbrookii</i>	Salientia	R	R		DFE LTT TSR V&C PFT TSE RCE	
BULLFROG	<i>Rana catesbeiana</i>	Salientia	R	R		DFE LTT TSR V&C PFT TNE TSE RCE	
GREEN FROG	<i>Rana clamitans</i>	Salientia	PO	R		DFE LTT TSR V&C PFT TNE TSE RCE	
NORTHERN LEOPARD FROG	<i>Rana pipiens</i>	Salientia	R	R		DFE LTT TSR V&C PFT TNE TSE RCE	
PICKEREL FROG	<i>Rana palustris</i>	Salientia	PTC PO	R		DFE LTT TSR V&C PFT TNE TSE RCE	RCE
WOOD FROG	<i>Rana sylvatica</i>	Salientia	PTC	R		DFE LTT TSR V&C PFT TNE TSE RCE	RCE
AMERICAN TOAD	<i>Bufo americanus</i>	Salientia	PTC PO	R		DFE LTT TSR V&C PFT TSE RCE	PFT LTR RCE
FOWLER'S TOAD	<i>Bufo woodhousei</i>	Salientia	R	R		DFE LTT TSR V&C PFT TSE RCE	
NORTHERN CRICKET FROG	<i>Acris crepitans</i>	Salientia	R	R		TRS V&C RCE TNE PFT LTT DFE TSE	
GRAY TREEFROG	<i>Hyla versicolor</i>	Salientia	PTC	R		DFE LTT TSR V&C PFT TNE TSE RCE	RCE
NORTHERN SPRING PEEPER	<i>Hyla crucifer</i>	Salientia	PTC PO WOC	R		DFE LTT TSR V&C PFT TNE TSE RCE	RCE
WESTERN CHORUS FROG	<i>Pseudacris triseriata</i>	Salientia	R	R		DFE LTT TSR V&C PFT TNE TSE RCE	
COMMON SNAPPING TURTLE	<i>Chelydra serpentina</i>	Testudines	PO WOC	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	
STINKPOT	<i>Stemotherus odoratus</i>	Testudines	PO WOC	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	
PAINTED TURTLE	<i>Chrysemys picta</i>	Testudines	PO WOC	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	
SPOTTED TURTLE	<i>Clemmys guttata</i>	Testudines	PTC PO	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	LTR
WOOD TURTLE	<i>Clemmys insculpta</i>	Testudines	WOC	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
BOG TURTLE	<i>Clemmys mullenbergi</i>	Testudines	R	R	SE	CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	
MAP TURTLE	<i>Graptemys geographica</i>	Testudines	R	R		CRE DFE LTT BTR SOU TRA TRS PFT MAR TSE	
EASTERN BOX TURTLE	<i>Terrapene carolina</i>	Testudines	PTC PO	R		RCE CRE DFE LTT SOU TRA TRS PFT MAR TSE	LTT PFT LTR
RED-BELLIED TURTLE	<i>Chrysemys rubrivertis</i>	Testudines	R	R	SE	TRS TRA SOU BTR PFT LTT DFE MAR CRE TSE	
NORTHERN FENCE LIZARD	<i>Sceloporus undulatus</i>	Lacertilia	R	R		CRE DFE TRS SNR LTT STT PFT MAR TSE	
NORTHERN COAL SKINK	<i>Eumeces anthracinus</i>	Lacertilia	WOC	R		CRE DFE TRS SNR LTT STT PFT MAR TSE	
FIVE-LINED SKINK	<i>Eumeces fasciatus</i>	Lacertilia	WOC	R		CRE DFE TRS SNR LTT STT PFT MAR TSE	
EASTERN WORM SNAKE	<i>Carphophis amoenus</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
NORTHERN BLACK RACER	<i>Coluber constrictor</i>	Serpentes	PO	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
RING-NECKED SNAKE	<i>Diadophis punctatus</i>	Serpentes	PTC WOC	R		LTT STT TRS PFT MAR TRA TSE RCE AS	LTR
BLACK RAT SNAKE	<i>Elaphe obsoleta</i>	Serpentes	PO WOC	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
EASTERN HOGNOSE SNAKE	<i>Heterodon platyrhinos</i>	Serpentes	WOC	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
EASTERN MILK SNAKE	<i>Lampropeltis triangulum</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
NORTHERN WATER SNAKE	<i>Nerodia sipedon</i>	Serpentes	PO	R		LTT TRS PFT MAR SNA TSE	
SMOOTH GREEN SNAKE	<i>Opheodrys vernalis</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
QUEEN SNAKE	<i>Regina septemvittata</i>	Serpentes	R	R		LTT TRS PFT MAR SNA TSE	
NORTHERN BROWN SNAKE	<i>Storeria dekayi</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
NORTHERN RED-BELLIED SNAKE	<i>Storeria occipitomaculata</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
EASTERN RIBBON SNAKE	<i>Thamnophis sauritus</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
EASTERN GARTER SNAKE	<i>Thamnophis sirtalis</i>	Serpentes	PTC PO	R		LTT STT TRS PFT MAR TRA TSE RCE AS	LTR LTT CVB
SMOOTH EARTH SNAKE	<i>Virginia valeriae</i>	Serpentes	R	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
NORTHERN COPPERHEAD	<i>Agkistrodon contortrix</i>	Serpentes	WOC	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
TIMBER RATTLESNAKE	<i>Crotalus horridus</i>	Serpentes	WOC	R		LTT STT TRS PFT MAR TRA TSE RCE AST	
COMMON LOON	<i>Gavia immer</i>	Waterfowl	R	B	PR	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
PIED-BILLED GREBE	<i>Podilymbus podiceps</i>	Waterfowl	R	M/S	PR - C2	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
HORNED GREBE	<i>Podiceps auritus</i>	Waterfowl	WOC CBC	M	PR	TRS PCO SMA NCO FLC NIG REC BTR AER NET BAN CRE	
DOUBLE-CRESTED CORMORANT	<i>Phalacrocorax auritus</i>	Waterfowl	PTC WOC	M	PR	TRS PCO SMA NCO FLC NIG REC BTR AER NET BAN CRE	FPCO UPCHO

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI- DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
AMERICAN BITTERN	<i>Botaurus lentiginosus</i>	Wader	R	S	ST - T	TRS VCP SMA V&C IRE COR NIG BTR	
LEAST BITTERN	<i>Ixobrychus exilis</i>	Wader	R	S	ST - T	TRS VCP SMA V&C IRE COR NIG BTR	
GREAT BLUE HERON	<i>Ardea herodias</i>	Wader	PTC PO BBA BBS	S	PR	TRS VCP SMA V&C IRE COR NIG BTR	VTRS FTRS
GREAT EGRET	<i>Casmerodius albus</i>	Wader	PO WOC	S	ST - T	TRS VCP SMA V&C IRE COR NIG BTR	
LITTLE BLUE HERON	<i>Egretta caerulea</i>	Wader	R	S	PR	TRS VCP SMA V&C IRE COR NIG BTR	
TRICOLORED HERON	<i>Egretta tricolor</i>	Wader	R	A	PR	TRS VCP SMA V&C IRE COR NIG BTR	
CATTLE EGRET	<i>Bubulcus ibis</i>	Wader	R	S	PR - C3	TRS VCP SMA V&C IRE COR NIG BTR	
GREEN-BACKED HERON	<i>Butorides striatus</i>	Wader	PO WOC BBA BBS	S	PR	TRS VCP SMA V&C IRE COR NIG BTR	
BLACK-CROWNED NIGHT-HERON	<i>Nycticorax nycticorax</i>	Wader	R	S	PR	TRS VCP SMA V&C IRE COR NIG BTR	
YELLOW-CROWNED NIGHT-HERON	<i>Nyctanassa violacea</i>	Wader	WOC	S	ST - T	TRS VCP SMA V&C IRE COR NIG BTR	
GLOSSY IBIS	<i>Plegadis falcinellus</i>	Wader	R	M	PR	TRS VCP SMA V&C IRE COR NIG BTR	
BLACK VULTURE	<i>Coragyps atratus</i>	Raptor	PTC PO WOC BBA	R	PR	TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
TURKEY VULTURE	<i>Cathartes aura</i>	Raptor	PTC PO WOC BBA	R	PR	TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
TUNDRA SWAN	<i>Olor columbianus</i>	Waterfowl	WOC CBC	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
MUTE SWAN	<i>Cygnus olor</i>	Waterfowl	WOC	R	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
SNOW GOOSE	<i>Chen caerulescens</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
CANADA GOOSE	<i>Branta canadensis</i>	Waterfowl	PTC PO WOC BBA	R	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	FPCO UPCO VTRS FTRS RCE
WOOD DUCK	<i>Aix sponsa</i>	Waterfowl	PTC PO WOC BBA	S	GM	TRS PCO SMA NCO FLC NIG RCR BTR AER NET BAN CRE NBT ROC	FPCO UPCO VTRS FTRS
GREEN-WINGED TEAL	<i>Anas crecca</i>	Waterfowl	CBC	S	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
AMERICAN BLACK DUCK	<i>Anas rubripes</i>	Waterfowl	WOC CBC	R	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
MALLARD	<i>Anas platyrhynchos</i>	Waterfowl	PTC PO WOC BBA	R	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE FSV	FPCO UPCO VTRS FTRS RCE
NORTHERN PINTAIL	<i>Anas acuta</i>	Waterfowl	CBC	M	GM - C3	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
BLUE-WINGED TEAL	<i>Anas discors</i>	Waterfowl	WOC	S	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
NORTHERN SHOVELER	<i>Anas clypeata</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
GADWALL	<i>Anas strepera</i>	Waterfowl	WOC	M	GM - C3	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
AMERICAN WIGEON	<i>Anas americana</i>	Waterfowl	WOC CBC	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
CANVASBACK	<i>Aythya valisineria</i>	Waterfowl	CBC	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
REDHEAD	<i>Aythya americana</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
RING-NECKED DUCK	<i>Aythya collaris</i>	Waterfowl	R	W	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
GREATER SCAUP	<i>Aythya marila</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
LESSER SCAUP	<i>Aythya affinis</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
OLDSQUAW	<i>Clangula hyemalis</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
COMMON GOLDENEYE	<i>Bucephala clangula</i>	Waterfowl	R	W	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
BUFFLEHEAD	<i>Bucephala albeola</i>	Waterfowl	WOC	W	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
HOODED MERGANSER	<i>Lophodytes cucullatus</i>	Waterfowl	WOC CBC	S	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE NBT	
COMMON MERGANSER	<i>Mergus merganser</i>	Waterfowl	R	R	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
RED-BREADED MERGANSER	<i>Mergus serrator</i>	Waterfowl	R	M	GM	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
RUDDY DUCK	<i>Oxyura jamaicensis</i>	Waterfowl	CBC	M	GM - C3	TRS PCO SMA NCO FLC NIG RCE BTR AER NET BAN CRE	
OSPREY	<i>Pandion haliaetus</i>	Raptor	WOC	S	SE - E	BTR TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	
BALD EAGLE	<i>Haliaeetus leucocephalus</i>	Raptor	WOC CBC	R	FE - E	BTR TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	
NORTHERN HARRIER	<i>Circus cyaneus</i>	Raptor	PO WOC BBA CBC R		PR	TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	
SHARP-SHINNED HAWK	<i>Accipiter striatus</i>	Raptor	PTC PO WOC BBA R		PR	TRS PCO SMA IRE COR OPI NCO RCE AER NET BCT BAN CRE	VTRS FTRS
COOPER'S HAWK	<i>Accipiter cooperii</i>	Raptor	PTC PO CBC	R	PR	TRS PCO SMA IRE COR OPI NCO RCE	FPCO UPCO VTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
NORTHERN GOSHAWK	<i>Accipiter gentilis</i>	Raptor	R	R	PR - C2	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	FTRS
RED-SHOULDERED HAWK	<i>Buteo lineatus</i>	Raptor	PTC PO WOC BBA	R	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	VTRS FTRS
BROAD-WINGED HAWK	<i>Buteo platypterus</i>	Raptor	PTC PO BBA	S	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	VTRS FTRS
RED-TAILED HAWK	<i>Buteo jamaicensis</i>	Raptor	PTC PO WOC BBA	R	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	IRE FPCO UP VTRS FTRS
ROUGH-LEGGED HAWK	<i>Buteo lagopus</i>	Raptor	CBC	W	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	
GOLDEN EAGLE	<i>Aquila chysaetos</i>	Raptor	WOC	M	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	
AMERICAN KESTREL	<i>Falco sparverius</i>	Raptor	PTC PO WOC BBA	R	PR	RCE AER NET BCT BAN CRE NBT TRS PCO SMA IRE COR OPI NCO	RCE
MERLIN	<i>Falco columbarius</i>	Raptor	WOC CBC	M	PR	AER NET BCT BAN CRE TRS PCO SMA IRE COR OPI NCO RCE	
RING-NECKED PHEASANT	<i>Phasianus colchicus</i>	Groundbird	WOC BBA BBS CB	R	GM	AER NET BCT BAN CRE TRS VCP PCO SMA V&C COR TRA NCO FLC NIG RCE NET SNR BAN CRE LTT	
RUFFED GROUSE	<i>Bonasa umbellus</i>	Groundbird	PO WOC BBA BBS	R	GM	FLC NIG RCE NET SNR BAN CRE LTT TRS VCP PCO SMA V&C COR TRA NCO	
WILD TURKEY	<i>Meleagris gallopavo</i>	Groundbird	WOC BBA CBC	R	GM	NCO FLC NIG RCE NET SNR BAN CRE LTT ROC TRS VCP PCO SMA V&C COR TRA	
NORTHERN BOBWHITE	<i>Colinus virginianus</i>	Groundbird	WOC BBA BBS CB	R	GM - C3	FLC NIG RCE NET SNR BAN CRE LTT TRS VCP PCO SMA V&C COR TRA NCO	
KING RAIL	<i>Rallus elegans</i>	Wader	R	S	SE - E	TRS VCP SMA V&C IRE COR NIG BTR	
VIRGINIA RAIL	<i>Rallus limicola</i>	Wader	R	S	GM	TRS VCP SMA V&C IRE COR NIG BTR	
SORA	<i>Porzana carolina</i>	Wader	R	S	GM	TRS VCP SMA V&C IRE COR NIG BTR	
COMMON MOORHEN	<i>Gallinula chloropus</i>	Wader	R	S	GM	TRS VCP SMA V&C IRE COR NIG BTR	
AMERICAN COOT	<i>Fulica americana</i>	Wader	WOC	R	GM	TRS VCP SMA V&C IRE COR NIG BTR	
KILLDEER	<i>Charadrius vociferus</i>	Shorebird	PTC PO WOC BBA	S	PR	TRS V&C NCO NIG BTR AER NET BAN C	FPCO UP RCE
SPOTTED SANDPIPER	<i>Actitis macularia</i>	Shorebird	PTC BBA	S	PR	TRS V&C NCO NIG BTR AER NET BAN C	FPCO UP RCE
UPLAND SANDPIPER	<i>Bartramia longicauda</i>	Shorebird	BBS	S	ST - T	TRS V&C NCO NIG BTR AER NET BAN CRE	
COMMON SNIFE	<i>Gallinago gallinago</i>	Shorebird	PO CBC	S	GM - T	TRS V&C NCO NIG BTR AER NET BAN CRE	
AMERICAN WOODCOCK	<i>Scolopax minor</i>	Shorebird	PO WOC BBA	S	GM	TRS V&C NCO NIG BTR AER NET BAN CRE	
RING-BILLED GULL	<i>Larus delawarensis</i>	Shorebird	PTC PO WOC	R	PR	TRS V&C NCO NIG BTR AER NET BAN C	FPCO UP VTRS FTRS RCE

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
HERRING GULL	<i>Larus argentatus</i>	Shorebird	R	R	PR	TRS V&C NCO NIG BTR AER NET BAN CRE	
LESSER BLACK-BACKED GULL	<i>Larus fuscus</i>	Shorebird	R	W	PR	TRS V&C NCO NIG BTR AER NET BAN CRE	
COMMON TERN	<i>Sterna hirundo</i>	Shorebird	R	S	PR - X	TRS V&C NCO NIG BTR AER NET BAN CRE	
ROCK DOVE	<i>Columba livia</i>	Groundbird	PTC PO BBA BBS	R	GM	TRS VCP PCO SMA V&C COR TRA NCO FLC NIG RCE NET SNR BAN CRE LTT FSV	
MOURNING DOVE	<i>Zenaida macroura</i>	Groundbird	PTC PO WOC BBA	R	GM	TRS VCP PCO SMA V&C COR TRA NCO F NIG RCE NET SNR BAN CRE LTT FSV	IRE FPCO UPKO VTRS FTRS RCE
BLACK-BILLED CUCKOO	<i>Coccyzus erythrophthalmus</i>	Passerine	PTC BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NE T BAN CRE	UPCO
YELLOW-BILLED CUCKOO	<i>Coccyzus americana</i>	Passerine	PTC WOC BBA BB	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	UPCO VTRS FTRS
COMMON BARN OWL	<i>Tyto alba</i>	Owl	WOC BBA CBC	M	PR - C1	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	
EASTERN SCREECH OWL	<i>Otus asio</i>	Owl	BBA CBC	R	PR	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	
GREAT HORNED OWL	<i>Bubo virginiana</i>	Owl	PTC WOC BBA CB	R	PR	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	OPI
BARRED OWL	<i>Strix varia</i>	Owl	PTC PO WOC BBA	R	PR	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	UPCO VTRS FTRS
LONG-EARED OWL	<i>Asio otus</i>	Owl	R	S	PR - C3	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	
SHORT-EARED OWL	<i>Asio flammeus</i>	Owl	WOC CBC	S	PR	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	
NORTHERN SAW-WHET OWL	<i>Aegolius acadicus</i>	Owl	WOC	S	PR - C3	TRS PCO SMA V&C COR OPI ROC RCE BAN CRE	
COMMON NIGHTHAWK	<i>Chordeiles minor</i>	Passerine	WOC BBA	S	PR - C3	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WHIP-POOR-WILL	<i>Caprimulgus vociferus</i>	Passerine	BBA BBS	S	PR - C3	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
CHIMNEY SWIFT	<i>Chaetura pelagica</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
RUBY-THROATED HUMMINGBIRD	<i>Archilochus colubris</i>	Passerine	PO WOC BBA BBS	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BELTED KINGFISHER	<i>Ceryle alcyon</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS
RED-HEADED WOODPECKER	<i>Melanerpes erythrocephalus</i>	Woodpecker	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
RED-BELLIED WOODPECKER	<i>Melanerpes carolinus</i>	Woodpecker	PTC PO WOC BBA	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS RCE
YELLOW-BELLIED SAPSUCKER	<i>Sphyrapicus varius</i>	Woodpecker	PTC WOC CBC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
DOWNY WOODPECKER	<i>Picoides pubescens</i>	Woodpecker	PTC PO WOC BBA	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS RCE
HAIRY WOODPECKER	<i>Picoides villosus</i>	Woodpecker	PTC WOC BBA BB	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS
NORTHERN FLICKER	<i>Colaptes auratus</i>	Woodpecker	PTC PO BBA BBS	S	PR	NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS
PILEATED WOODPECKER	<i>Dryocopus pileatus</i>	Woodpecker	PTC PO WOC BBA	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE FSV	IRE FPCO UPKO VTRS FTRS
OLIVE-SIDED FLYCATCHER	<i>Contopus borealis</i>	Passerine	R	S	PR - X	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
EASTERN WOOD-PEEWEE	<i>Contopus virens</i>	Passerine	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS RCE
YELLOW-BELLIED FLYCATCHER	<i>Empidonax flaviventris</i>	Passerine	R	S	ST	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
ACADIAN FLYCATCHER	<i>Empidonax virens</i>	Passerine	PTC BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
ALDER FLYCATCHER	<i>Empidonax alnorum</i>	Passerine	BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WILLOW FLYCATCHER	<i>Empidonax traillii</i>	Passerine	PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
LEAST FLYCATCHER	<i>Empidonax minimus</i>	Passerine	BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
EASTERN PHOEBE	<i>Sayornis phoebe</i>	Passerine	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
GREAT CRESTED FLYCATCHER	<i>Myiarchus crinitus</i>	Passerine	PTC PO WOC BBA	S	PR	NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS RCE
EASTERN KINGBIRD	<i>Tyrannus tyrannus</i>	Passerine	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	RCE
HORNED LARK	<i>Eremophila alpestris</i>	Passerine	WOC BBS CBC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PURPLE MARTIN	<i>Progne subis</i>	Passerine	PTC WOC BBA BB	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	RCE
TREE SWALLOW	<i>Tachycineta bicolor</i>	Passerine	PTC BBA BBS	S	PR	NBT TRS VCP PCO SMA V&C COR NCO	FPCO UPKO

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESIDENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
NORTHERN ROUGH-WINGED SWALLOW	<i>Stelgidopteryx serripennis</i>	Passerine	PTC BBA BBS	S	PR	NET BAN CRE TRS VCP PCO SMA V&C COR NCO NET BAN CRE	RCE
BANK SWALLOW	<i>Riparia riparia</i>	Passerine	BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
CLIFF SWALLOW	<i>Hirundo pyrrhonota</i>	Passerine	BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BARN SWALLOW	<i>Hirundo rustica</i>	Passerine	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
BLUE JAY	<i>Cyanocitta cristata</i>	Passerine	PTC PO WOC BBA	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
AMERICAN CROW	<i>Corvus brachyrhynchos</i>	Passerine	PTC PO WOC BBA	R	GM	FSV ROC TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
FISH CROW	<i>Corvus ossifragus</i>	Passerine	PTC BBA BBS CB	R	GM	ROC TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS
COMMON RAVEN	<i>Corvus corax</i>	Passerine	PTC BBS CBC	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	UPKO
BLACK-CAPPED CHICKADEE	<i>Poecile atricapillus</i>	Passerine	PTC PO WOC BBA	R	PR	FSV NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
CAROLINA CHICKADEE	<i>Poecile carolinensis</i>	Passerine	PTC PO BBA BBS	R	PR	FSV NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
TUFTED TITMOUSE	<i>Baeolophus bicolor</i>	Passerine	PTC PO WOC BBA	R	PR	FSV NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
RED-BREASTED NUTHATCH	<i>Sitta canadensis</i>	Passerine	PTC WOC CBC	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
WHITE-BREASTED NUTHATCH	<i>Sitta carolinensis</i>	Passerine	PTC PO BBA BBS	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
BROWN CREEPER	<i>Certhia americana</i>	Passerine	PTC WOC BBA CB	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
CAROLINA WREN	<i>Thryothorus ludovicianus</i>	Passerine	PTC PO WOC BBA	R	PR	FSV NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
BEWICK'S WREN	<i>Thryomanes bewickii</i>	Passerine	R	S	PR - X	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
HOUSE WREN	<i>Troglodytes aedon</i>	Passerine	PTC PO WOC BBA	S	PR	NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
WINTER WREN	<i>Troglodytes troglodytes</i>	Passerine	PTC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
SEDGE WREN	<i>Cistothorus platensis</i>	Passerine	R	S	ST - T	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
MARSH WREN	<i>Cistothorus palustris</i>	Passerine	PTC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
GOLDEN-CROWNED KINGLET	<i>Regulus satrapa</i>	Passerine	PTC WOC CBC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO
RUBY-CROWNED KINGLET	<i>Regulus calendula</i>	Passerine	PTC PO WOC CBC M		PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS
BLUE-GRAY GNATCATCHER	<i>Poliptila caerulea</i>	Passerine	PTC PO WOC BBA S	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
EASTERN BLUEBIRD	<i>Sialia sialis</i>	Passerine	PTC PO WOC BBA S	S	PR	ROC RCE FSV NBT TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
VEERY	<i>Catharus fuscescens</i>	Passerine	PTC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
GRAY-CHEEKED THRUSH	<i>Catharus minimus</i>	Passerine	PTC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO PCO VTRS FTRS
SWAINSON'S THRUSH	<i>Catharus ustulatus</i>	Passerine	WOC	S	PR - C2	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
HERMIT THRUSH	<i>Catharus guttatus</i>	Passerine	PTC WOC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO
WOOD THRUSH	<i>Hylocichla mustelina</i>	Passerine	PTC PO BBA BBS S	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
AMERICAN ROBIN	<i>Turdus migratorius</i>	Passerine	PTC PO WOC BBA S	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
GRAY CATBIRD	<i>Dumetella carolinensis</i>	Passerine	PTC PO BBA BBS S	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
NORTHERN MOCKINGBIRD	<i>Mimus polyglottos</i>	Passerine	PTC PO WOC BBA R	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
BROWN THRASHER	<i>Toxostoma rufum</i>	Passerine	PTC BBA BBS	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
AMERICAN PIPIT	<i>Anthus rubescens</i>	Passerine	R	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
CEDAR WAXWING	<i>Bombycilla cedrorum</i>	Passerine	PTC WOC BBA BB R	R	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS RCE
NORTHERN SHRIKE	<i>Lanius excubitor</i>	Passerine	CBC	W	PR	BCT RCE TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
LOGGERHEAD SHRIKE	<i>Lanius ludovicianus</i>	Passerine	WOC CBC	M	PR - X	BCT RCE TRS VCP PCO SMA V&C COR	

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
EUROPEAN STARLING	<i>Stumus vulgaris</i>	Passerine	PTC PO WOC BBA R		NN	NCO NET BAN CRE ROC FSV TRS VCP PCO SMA V&C COR	IRE FPCO UPKO VTRS FTRS RCE
WHITE-EYED VIREO	<i>Vireo griseus</i>	Passerine	PTC PO BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO
BLUE-HEADED VIREO	<i>Vireo solitarius</i>	Passerine	PO	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
YELLOW-THROATED VIREO	<i>Vireo flavifrons</i>	Passerine	PO BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WARBLING VIREO	<i>Vireo gilvus</i>	Passerine	BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PHILADELPHIA VIREO	<i>Vireo philadelphicus</i>	Passerine	PTC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO
RED-EYED VIREO	<i>Vireo olivaceus</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
BLUE-WINGED WARBLER	<i>Vermivora pinus</i>	Passerine	PTC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS
GOLDEN-WINGED WARBLER	<i>Vermivora chrysoptera</i>	Passerine	R	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
TENNESSEE WARBLER	<i>Vermivora peregrina</i>	Passerine	PTC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
ORANGE-CROWNED WARBLER	<i>Vermivora celata</i>	Passerine	R	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
NASHVILLE WARBLER	<i>Vermivora ruficapilla</i>	Passerine	PO	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
NORTHERN PARULA	<i>Parula americana</i>	Passerine	PTC BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS
YELLOW WARBLER	<i>Dendroica petechia</i>	Passerine	PTC BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS RCE
CHESTNUT-SIDED WARBLER	<i>Dendroica pensylvanica</i>	Passerine	PTC PO BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
MAGNOLIA WARBLER	<i>Dendroica magnolia</i>	Passerine	PTC PO	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
CAPE MAY WARBLER	<i>Dendroica tigrina</i>	Passerine	PTC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
BLACK-THROATED BLUE WARBLER	<i>Dendroica caerulescens</i>	Passerine	PTC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
YELLOW-RUMPED WARBLER	<i>Dendroica coronata</i>	Passerine	PTC PO WOC CBC S		PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
BLACK-THROATED GREEN WARBLER	<i>Dendroica virens</i>	Passerine	PTC BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS
BLACKBURNIAN WARBLER	<i>Dendroica fusca</i>	Passerine	PTC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
YELLOW-THROATED WARBLER	<i>Dendroica dominica</i>	Passerine	R	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PINE WARBLER	<i>Dendroica pinus</i>	Passerine	PTC BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPCO VTRS FTRS
PRAIRIE WARBLER	<i>Dendroica discolor</i>	Passerine	PTC BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
PALM WARBLER	<i>Dendroica palmarum</i>	Passerine	R	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BAY-BREASTED WARBLER	<i>Dendroica castanea</i>	Passerine	R	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BLACKPOLL	<i>Dendroica striata</i>	Passerine	PTC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO RCE
CERULEAN WARBLER	<i>Dendroica cerulea</i>	Passerine	R	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BLACK-AND-WHITE WARBLER	<i>Mniotilta varia</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
AMERICAN REDSTART	<i>Setophaga ruticilla</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
PROTHONOTARY WARBLER	<i>Protonotaria citrea</i>	Passerine	R	S	PR - C1	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WORM-EATING WARBLER	<i>Helminthos vermivorus</i>	Passerine	PTC BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO
SWAINSON'S WARBLER	<i>Limnothlypis swainsonii</i>	Passerine	R	A	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
OVENBIRD	<i>Seiurus aurocapillus</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPCO VTRS FTRS
NORTHERN WATERTHRUSH	<i>Seiurus noveboracensis</i>	Passerine	R	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
LOUISIANA WATERTHRUSH	<i>Seiurus motacilla</i>	Passerine	PO	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
KENTUCKY WARBLER	<i>Oporomis formosus</i>	Passerine	BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET	

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
CONNECTICUT WARBLER	<i>Oporornis agilis</i>	Passerine	R	M	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
MOURNING WARBLER	<i>Oporornis philadelphia</i>	Passerine	R	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
COMMON YELLOWTHROAT	<i>Geothlypis trichas</i>	Passerine	PTC WOC BBA BB	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	IRE FPCO UPKO VTRS FTRS
HOODED WARBLER	<i>Wilsonia citrina</i>	Passerine	PTC BBA BBS	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	FPCO UPKO VTRS FTRS
WILSON'S WARBLER	<i>Wilsonia pusilla</i>	Passerine	PO	M	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
CANADA WARBLER	<i>Wilsonia canadensis</i>	Passerine	R	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
YELLOW-BREASTED CHAT	<i>Icteria virens</i>	Passerine	BBA BBS	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
SUMMER Tanager	<i>Piranga rubra</i>	Passerine	BBA	S	PR - C2	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
SCARLET Tanager	<i>Piranga olivacea</i>	Passerine	PTC PO WOC BBA	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	IRE FPCO UPKO VTRS FTRS RCE
NORTHERN CARDINAL	<i>Cardinalis cardinalis</i>	Passerine	PTC PO WOC BBA	R	PR	NET BAN CRE FSV TRS VCP PCO SMA V&C COR NCO	IRE FPCO UPKO VTRS FTRS RCE
ROSE-BREASTED GROSBEAK	<i>Pheucticus ludovicianus</i>	Passerine	PTC PO BBA	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	VTRS FTRS
BLUE GROSBEAK	<i>Guiraca caerulea</i>	Passerine	R	S	PR - C2	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
INDIGO BUNTING	<i>Passerina cyanea</i>	Passerine	PTC PO WOC BBA	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	FPCO UPKO VTRS FTRS RCE
DICKCISSEL	<i>Spiza americana</i>	Passerine	R	S	PR - C3	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	
EASTERN TOWHEE	<i>Pipilo erythrophthalmus</i>	Passerine	PTC WOC BBA BB	S	PR	NET BAN CRE FSV TRS VCP PCO SMA V&C COR NCO	IRE FPCO UPKO VTRS FTRS RCE
AMERICAN TREE SPARROW	<i>Spizella arborea</i>	Passerine	PTC WOC CBC	W	PR	NET BAN CRE FSV TRS VCP PCO SMA V&C COR NCO	VTRS FTRS
CHIPPING SPARROW	<i>Spizella passerina</i>	Passerine	PTC PO BBA BBS	S	PR	NET BAN CRE FSV TRS VCP PCO SMA V&C COR NCO	IRE FPCO UPKO VTRS FTRS RCE
FIELD SPARROW	<i>Spizella pusilla</i>	Passerine	PTC PO WOC BBA	S	PR	BAN CRE TRS VCP PCO SMA V&C COR NCO NET	IRE FPCO UPKO VTRS FTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
VESPER SPARROW	<i>Poocetes gramineus</i>	Passerine	BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
SAVANNAH SPARROW	<i>Passerculus sandwichensis</i>	Passerine	BBA BBS CBC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
GRASSHOPPER SPARROW	<i>Ammodramus savannarum</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
HENSLOW'S SPARROW	<i>Ammodramus henslowii</i>	Passerine	R	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
FOX SPARROW	<i>Passerella iliaca</i>	Passerine	WOC CBC	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
SONG SPARROW	<i>Melospiza melodia</i>	Passerine	PTC PO WOC BBA	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
LINCOLN'S SPARROW	<i>Melospiza lincolni</i>	Passerine	R	M	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
SWAMP SPARROW	<i>Melospiza georgiana</i>	Passerine	CBC	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WHITE-THROATED SPARROW	<i>Zonotrichia albicollis</i>	Passerine	PTC PO WOC CBC	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
WHITE-CROWNED SPARROW	<i>Zonotrichia leucophrys</i>	Passerine	PO WOC CBC	W	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
DARK-EYED JUNCO	<i>Junco hyemalis</i>	Passerine	PTC PO WOC BBS	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
LAPLAND LONGSPUR	<i>Calcarius lapponicus</i>	Passerine	R	W	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
SNOW BUNTING	<i>Plectrophenax nivalis</i>	Passerine	R	W	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
BOBOLINK	<i>Dolichonyx oryzivorus</i>	Passerine	PTC PO WOC BBA	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	VTRS FTRS
RED-WINGED BLACKBIRD	<i>Agelaius phoeniceus</i>	Passerine	PTC PO WOC BBA	R	PR	FSV ROC FLC TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS RCE
EASTERN MEADOWLARK	<i>Stumella magna</i>	Passerine	PTC PO BBA BBS	S	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	UPKO VTRS FTRS RCE
RUSTY BLACKBIRD	<i>Euphagus carolinus</i>	Passerine	CBC	W	PR	ROC FLC TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
COMMON GRACKLE	<i>Quiscalus quiscula</i>	Passerine	PTC PO WOC BBA	R	PR	ROC FLC TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
BROWN-HEADED COWBIRD	<i>Molothrus ater</i>	Passerine	PTC CBC	S	PR	ROC FLC TRS VCP PCO SMA V&C COR	FPCO UPKO VTRS FTRS

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
ORCHARD ORIOLE	<i>Icterus spurius</i>	Passerine	PO BBA BBS	S	PR	NCO NET BAN CRE TRS VCP PCO SMA V&C COR NCO NET BAN CRE	RCE
BALTIMORE ORIOLE	<i>Icterus galbula</i>	Passerine	PO WOC BBA BBS	S	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PINE GROSBEAK	<i>Pinicola enucleator</i>	Passerine	R	W	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PURPLE FINCH	<i>Carpodacus purpureus</i>	Passerine	PTC WOC BBS CB	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	FPCO UPKO VTRS FTRS
HOUSE FINCH	<i>Carpodacus mexicanus</i>	Passerine	PTC WOC BBA BB	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS RCE
RED CROSSBILL	<i>Loxia curvirostra</i>	Passerine	R	W	PR - C3	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
WHITE-WINGED CROSSBILL	<i>Loxia leucoptera</i>	Passerine	WOC	W	PR	TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
COMMON REDPOLL	<i>Carduelis flammea</i>	Passerine	CBC	W	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
PINE SISKIN	<i>Carduelis pinus</i>	Passerine	PTC WOC	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO
AMERICAN GOLDFINCH	<i>Carduelis tristis</i>	Passerine	PTC PO WOC BBA	R	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	IRE FPCO UPKO VTRS FTRS
EVENING GROSBEAK	<i>Coccothraustes vespertinus</i>	Passerine	CBC	W	PR	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	
HOUSE SPARROW	<i>Passer domesticus</i>	Passerine	PTC PO BBA BBS	R	NN	FSV TRS VCP PCO SMA V&C COR NCO NET BAN CRE	RCE
VIRGINIA OPOSSUM	<i>Didelphis virginiana</i>	Didelphimorphia	R	R	FB	TRS TRA SST NIG RKI LTT MAR CRE	
MASKED SHREW	<i>Sorex cinerius</i>	Insectivora	WOC	R	PR	TRS PFT STT LTT DFE MAR CRE	
MARYLAND SHREW	<i>Sorex fontinalis</i>	Insectivora	PTC	R	PR	TRS PFT STT LTT DFE MAR CRE	PFT LTT
SMOKY SHREW	<i>Sorex fumeus</i>	Insectivora	R	R	PR	TRS PFT STT LTT DFE MAR CRE	
LONG-TAILED SHREW	<i>Sorex dispar</i>	Insectivora	R	R	PR	TRS PFT STT LTT DFE MAR CRE	
NORTHERN WATER SHREW	<i>Sorex palustris</i>	Insectivora	R	R	PR - C2	TRS PFT STT LTT DFE MAR CRE	
NORTHERN SHORT-TAILED SHREW	<i>Blarina brevicauda</i>	Insectivora	PTC PO	R	PR	TRS PFT STT LTT DFE MAR CRE	PFT LTT
EASTERN MOLE	<i>Scalopus aquaticus</i>	Insectivora	R	R	PR	TRS PFT STT LTT DFE MAR CRE	
STARNOSE MOLE	<i>Condylura cristata</i>	Insectivora	R	R	PR	TRS PFT STT LTT DFE MAR CRE	
HAIRYTAIL MOLE	<i>Parascalops aquaticus</i>	Insectivora	R	R	PR	TRS PFT STT LTT DFE MAR CRE	
NORTHERN MYOTIS	<i>Myotis septentrionalis</i>	Chiroptera	R	P	PR - C2	V&C ROC NET LTT BAN CRE	
LITTLE BROWN MYOTIS	<i>Myotis lucifugus</i>	Chiroptera	PO	R	PR	V&C ROC NET LTT BAN CRE	

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
INDIANA MYOTIS	<i>Myotis sodalis</i>	Chiroptera	R	R	FE - E	V&C ROC NET LTT BAN CRE	
SMALL FOOTED MYOTIS	<i>Myotis leibii</i>	Chiroptera	R	R	ST - T	V&C ROC NET LTT BAN CRE	
SILVER-HAIRED BAT	<i>Lasionycteris noctivagans</i>	Chiroptera	R	S	PR - C2	V&C ROC NET LTT BAN CRE	
EASTERN PIPISTRELLE	<i>Pipistrellus subflavus</i>	Chiroptera	R	R	PR	V&C ROC NET LTT BAN CRE	
RED BAT	<i>Lasiurus borealis</i>	Chiroptera	R	S	PR	V&C ROC NET LTT BAN CRE	
BIG BROWN BAT	<i>Eptesicus fuscus</i>	Chiroptera	PO	R	PR	V&C ROC NET LTT BAN CRE	
HOARY BAT	<i>Lasiurus cinereus</i>	Chiroptera	R	S	PR	V&C ROC NET LTT BAN CRE	
SEMINOLE BAT	<i>Lasiurus seminolus</i>	Chiroptera	R	S	PR - C3	V&C ROC NET LTT BAN CRE	
EVENING BAT	<i>Nycticeius humeralis</i>	Chiroptera	R	S	PR - C2	V&C ROC NET LTT BAN CRE	
RACCOON	<i>Procyon lotor</i>	Carnivora	PTC WOC	R	GM	LTT TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	RKI
LEAST WEASEL	<i>Mustela nivalis</i>	Carnivora	R	R	FB - C3	LTT TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
ERMINE	<i>Mustela erminea</i>	Carnivora	R	R	FB	LTT TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
LONG-TAILED WEASEL	<i>Mustela frenata</i>	Carnivora	PO WOC	R	FB	LTT TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
MINK	<i>Mustela vison</i>	Carnivora	PTC WOC	R	FB	LTT TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	RKI
FISHER	<i>Martes pennanti</i>	Carnivora	R	R	FB - E/X	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
MARTEN	<i>Martes americanus</i>	Carnivora	R	R	FB - E/X	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
RIVER OTTER	<i>Lutra canadensis</i>	Carnivora	R	R	FB - C1	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
EASTERN SPOTTED SKUNK	<i>Spilogale putorius</i>	Carnivora	R	R	FB - C3	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
STRIPED SKUNK	<i>Mephitis mephitis</i>	Carnivora	PTC	R	FB	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	RKI
RED FOX	<i>Vulpes vulpes</i>	Carnivora	PO WOC	R	FB	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
GRAY FOX	<i>Urocyon cinereoargenteus</i>	Carnivora	WOC	R	FB	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
BOBCAT	<i>Felis rufus</i>	Carnivora	R	R	FB - C1	TRS V&C SCI DLI TRA SST NIG RKI RCE AER MAR CRE	
WOODCHUCK	<i>Marmota monax</i>	Rodentia	PTC PO WOC	R	GM	TRS V&C TRA RKI SNR LTT MAR CRE	RCE

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESI-DENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
EASTERN CHIPMUNK	<i>Tamias striatus</i>	Rodentia	PTC PO	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	LTT RCE RKI
EASTERN GRAY SQUIRREL	<i>Sciurus carolinensis</i>	Rodentia	PTC PO WOC	R	GM	TRS V&C TRA RKI SNR LTT MAR CRE	RCE RKI
EASTERN FOX SQUIRREL	<i>Sciurus niger</i>	Rodentia	R	R	GM	TRS V&C TRA RKI SNR LTT MAR CRE	
RED SQUIRREL	<i>Tamiasciurus hudsonicus</i>	Rodentia	R	R	GM	TRS V&C TRA RKI SNR LTT MAR CRE	
SOUTHERN FLYING SQUIRREL	<i>Glaucomys volans</i>	Rodentia	WOC	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	
NORTHERN FLYING SQUIRREL	<i>Glaucomys sabrinus</i>	Rodentia	R	R	PR - C2	TRS V&C TRA RKI SNR LTT MAR CRE	
BEAVER	<i>Castor canadensis</i>	Rodentia	R	R	FB	TRS V&C TRA RKI SNR LTT MAR CRE	
WHITE-FOOTED MOUSE	<i>Peromyscus leucopus</i>	Rodentia	PTC	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	LTT
DEER MOUSE	<i>Peromyscus maniculatus</i>	Rodentia	PTC	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	LTT
EASTERN WOODRAT	<i>Neotoma floridana</i>	Rodentia	R	R	ST - T	TRS V&C TRA RKI SNR LTT MAR CRE	
SOUTHERN BOG LEMMING	<i>Synaptomys cooperi</i>	Rodentia	R	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	
BOREAL RED-BACKED VOLE	<i>Clethrionomys gapperi</i>	Rodentia	R	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	
MEADOW VOLE	<i>Microtus pennsylvanicus</i>	Rodentia	PTC	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	LTT
ROCK VOLE	<i>Microtus chrotorrhinus</i>	Rodentia	R	R	PR - C1	TRS V&C TRA RKI SNR LTT MAR CRE	
WOODLAND VOLE	<i>Microtus pinetorum</i>	Rodentia	R	R	PR	TRS V&C TRA RKI SNR LTT MAR CRE	
MUSKRAT	<i>Ondatra zibethicus</i>	Rodentia	PO	R	FB	TRS TRA DLI NIG LTT DFE MAR CRE	
NORWAY RAT	<i>Rattus norvegicus</i>	Rodentia	R	R	NN	TRS TRA PFT STT LTT DFE MAR CRE	
HOUSE MOUSE	<i>Mus musculus</i>	Rodentia	R	R	NN	TRS TRA PFT STT LTT DFE MAR CRE	
MEADOW JUMPING MOUSE	<i>Zapus hudsonicus</i>	Rodentia	PTC	R	PR	TRS TRA PFT STT LTT DFE	PFT LTT

Appendix 1. (Continued)

NAME	SPECIES	PRO-CITE GROUP	OCCURRENCE STATUS	RESIDENCY STATUS	LEGAL STATUS	PROTOCOL	FIELD-TESTED PROTOCOL
WOODLAND JUMPING MOUSE	<i>Napaeozapus insignis</i>	Rodentia	R	R	PR	MAR CRE TRS TRA PFT STT LTT DFE MAR CRE	
PORCUPINE	<i>Erethizon dorsatum</i>	Rodentia	R	R	PR	TRS TRA NIG RKI RCE LTT MAR CRE	
SNOWSHOE HARE	<i>Lepus americana</i>	Lagomorpha	R	R	GM - C1	TRS SCI TRA SST NIG RCE LTT SNR MAR CRE	
EASTERN COTTONTAIL	<i>Sylvilagus floridanus</i>	Lagomorpha	PTC PO	R	GM	TRS SCI TRA SST NIG RCE LTT SNR MAR CRE	RCE
NEW ENGLAND COTTONTAIL	<i>Sylvilagus transitionalis</i>	Lagomorpha	R	R	GM - C1	TRS SCI TRA SST NIG RCE LTT SNR MAR CRE	

Appendix 2. *Pro-Cite* Group Names for all classes of vertebrate species in the Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site (Variable No. 5).

Class		Pro-Cite Group	Fauna
I.	Amphibia	Caudata	Salamanders
		Salientia	Toads, Frogs
II.	Reptilia	Serpentes	Snakes
		Lacertilia	Lizards
		Testudines	Turtles and Tortoises
III.	Aves	Waterfowl	Gaviiformes, Podicipediformes, Pelecaniformes, and Anseriformes
		Shorebird	Charadriiformes
		Wader	Ciconiiformes and Gruiformes
		Upland Groundbird	Galliformes and Columbiformes
		Raptor	Falconiformes
		Owl	Strigiformes
		Woodpecker	Piciformes
		Passerine	Passeriformes, Caprimulgiformes, Cuculiformes, Apodiformes, and Coraciiformes
IV.	Mammalia	Didelphimorphia	Virginia Opossum
		Insectivora	Shrews, Moles
		Chiroptera	Bats
		Carnivora	Raccoon, Weasels, Skunks, Canids, and Felids

Appendix 2. *Pro-Cite* Group Names for all classes of vertebrate species in the Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site (Variable No. 5). (continued).

Class	Pro-Cite Group	Fauna
	Rodentia	
	Sciuridae	Squirrels, Chipmunks, Prairie Dogs, and Ground Squirrels
	Castoridae	Beaver
	Muridae	Mice, Rats, Lemmings, and Voles
	Erethizontidae	Porcupine
	Lagomorpha	Rabbits and Hares

Appendix 3. Codes for sources of documentation used for the occurrence status in the Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site (Variable No. 8).

Code	Documentation
PTC	Observation while conducting a protocol
PO	Personal observation
WOC	National Park Service wildlife observation card
BBA	Pennsylvania Game Commission Breeding Bird Atlas
BBS	U.S. Fish and Wildlife Service Breeding Bird Survey
CBC	Audubon Society Christmas Bird Count
R	Predicted occurrence from published range maps

Appendix 4. Codes for the residency status of vertebrate species in the Faunal Database for Gettysburg National Historic Park and Eisenhower National Historic Site (Variable 9).

Code	Residency Status
W	Winter Resident
S	Summer Resident
R	Year-round Resident
M	Migrant
A	Accidental

Appendix 5. Codes for the federal and state legal population status of vertebrate species in the Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site (Variable No. 10).

Legal Status:

FE = Federally Endangered

FT = Federally Threatened

SE = State Endangered

ST = State Threatened

SV = State Vulnerable

EX = State Extirpated

NN = State Non-native

PR = State Protected

GM = State Game

FB = State Furbearer

PA Biological Survey Classification:

E = Endangered

T = Threatened

X = Extirpated

C1 = State At Risk Candidate Species

C2 = State Rare Candidate Species

C3 = State Status Undetermined Species

Appendix 6. Codes for the survey protocols for inventorying and monitoring vertebrate species in the Faunal Database for Gettysburg National Military Park and Eisenhower National Historic Site (Variables No. 11 and No. 12).

FTRS	=	Fixed-width Transect
VTRS	=	Variable-width Transect
FPCO	=	Fixed-radius Point Count
VPCO	=	Unlimited-radius Point Count
VCP	=	Variable-width Circular-plot
SMA	=	Spot-mapping
V&C	=	Communication (and Vocalization) Index
IRE	=	Interspecific Recording
COR	=	Conspecific Recording
SCI	=	Scat/Sign Index
OPI	=	Pellet Index
DLI	=	Dam/Lodge/Den Index
TRA	=	Tracking
SST	=	Scent Station
NCO	=	Nest Count
ROC	=	Roost Count
FLC	=	Flush Count
NIG	=	Nightlighting
SOU	=	Sounding
RKI	=	Road Kill
RCE	=	Road Survey
BTR	=	Boat Survey
AER	=	Aerial Survey
QUA	=	Quadrat
NET	=	Netting (Mist-net)
TNE	=	Tadpole Netting
SNR	=	Snaring
PFT	=	Pitfall Trapping
STT	=	Snap-trapping
LTT	=	Live-trapping
BCT	=	Bal-chatri Trapping
NBT	=	Nestbox Trapping
FTR	=	Funnel-trapping
DFE	=	Drift Fence
MAR	=	Marking
BAN	=	Banding/Tagging
CRE	=	Capture-recapture
LTR	=	Natural-Substrate Survey Protocol (Rock- and Log-turning Protocol)
CVB	=	Coverboard
AST	=	Artificial Shelter
TSE	=	Timed Search
FSV	=	Feeder Survey

Appendix 7. Instructions for ordering a copy of the Faunal Database from the National Park Service.

For a copy of the Faunal Database send a letter to: National Park Service, Chief Scientist, Chesapeake System Support Office, U.S. Custom House, 200 Chestnut Street, Philadelphia, PA 19106. The letter should include the following:

- 1) Your name and mailing address.
- 2) Requested form of the database: 3.5" diskette or hard copy.
- 3) National park(s) of interest: Gettysburg National Military Park/Eisenhower National Historic Site, Hopewell Furnace National Historic Site, or Valley Forge National Historical Park.

Appendix 8. Bird species, number of individuals, and, in parentheses, density (no./ha) and maximum distance (m) of observations for each species (used for density estimate, TRAN-UL only) during all seasons and at all study sites using TRAN-30, TRAN-50, TRAN-UL, PNTC-30, and PNTC-UL at Gettysburg National Military Park and Eisenhower National Historic Site. NA = density could not be calculated because maximum distance from transect was 0.

SITE: Pennsylvania Monument Grassland (PMG)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black Vulture	1 (0.21)	1 (0.13)	1 (NA, 0)	--	--
Turkey Vulture	3 (0.63)	3 (0.38)	3 (1.88, 10)	--	--
Mourning Dove	3 (0.63)	3 (0.38)	3 (NA, 0)	--	--
Northern Flicker	1 (0.21)	1 (0.13)	1 (NA, 0)	--	--
Barn Swallow	1 (0.21)	1 (0.13)	1 (NA, 0)	--	--
Northern Mockingbird	1 (0.21)	1 (0.13)	1 (0.25, 25)	--	--
European Starling	3 (0.63)	3 (0.38)	3 (0.94, 20)	--	--
Indigo Bunting	0 (0.00)	1 (0.13)	1 (0.13, 50)	--	--
Chipping Sparrow	1 (0.21)	1 (0.13)	1 (NA, 0)	--	--
Grasshopper Sparrow	12 (2.50)	12 (1.50)	12 (3.75, 20)	--	--
Eastern Meadowlark	5 (1.04)	5 (0.63)	5 (1.56, 20)	--	--
Total No. Individuals	31	32	32	--	--
Total No. Species	10	11	11	--	--

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Turkey Vulture	--	--	--	1 (0.88)	1
Red-tailed Hawk	--	--	--	1 (0.88)	1
Mourning Dove	--	--	--	7 (6.16)	7
Chimney Swift	--	--	--	1 (0.88)	1
Red-bellied Woodpecker	--	--	--	1 (0.88)	1
Northern Flicker	--	--	--	0 (0.00)	1
Black-capped Chickadee	--	--	--	4 (3.52)	4
Tufted Titmouse	--	--	--	1 (0.88)	1
White-breasted Nuthatch	--	--	--	0 (0.00)	1
House Wren	--	--	--	5 (4.40)	5
Wood Thrush	--	--	--	0 (0.00)	1
American Robin	--	--	--	2 (1.76)	2
Gray Catbird	--	--	--	9 (7.92)	9
Brown Thrasher	--	--	--	1 (0.88)	1

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1993 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Prairie Warbler	--	--	--	1 (0.88)	1
Common Yellowthroat	--	--	--	2 (1.76)	2
Northern Cardinal	--	--	--	7 (6.16)	7
Indigo Bunting	--	--	--	2 (1.76)	3
Rufous-sided Towhee	--	--	--	2 (1.76)	2
Field Sparrow	--	--	--	9 (7.92)	10
Song Sparrow	--	--	--	5 (4.40)	6
Common Grackle	--	--	--	1 (0.88)	1
Brown-headed Cowbird	--	--	--	1 (0.88)	1
House Finch	--	--	--	1 (0.88)	1
American Goldfinch	--	--	--	6 (5.28)	6
Total No. Individuals	--	--	--	70	76
Total No. Species	--	--	--	22	25

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Downy Woodpecker	0 (0.00)	1 (0.50)	1 (0.50, 50)	--	--
Wood Thrush	3 (2.50)	3 (1.50)	3 (3.75, 20)	--	--
Gray Catbird	3 (2.50)	3 (1.50)	3 (15.00, 5)	--	--
Brown Thrasher	0 (0.00)	1 (0.50)	1 (NA, 0)	--	--
Northern Cardinal	2 (1.67)	2 (1.00)	2 (2.50, 20)	--	--
Rufous-sided Towhee	1 (0.83)	1 (0.50)	1 (5.00, 5)	--	--
Total No. Individuals	10	11	11	--	--
Total No. Species	6	6	6	--	--

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Mourning Dove	4 (1.90)	4 (1.14)	4 (NA, 0)	--	--
Chimney Swift	1 (0.48)	1 (0.29)	1 (NA, 0)	--	--
Red-bellied Woodpecker	4 (1.90)	4 (1.14)	4 (1.43, 30)	--	--
Northern Flicker	1 (0.48)	1 (0.29)	1 (0.48, 30)	--	--
Eastern Wood- pewee	1 (0.48)	1 (0.29)	1 (1.43, 20)	--	--
Great Crested Flycatcher	1 (0.48)	1 (0.29)	1 (1.43, 20)	--	--
American Crow	4 (1.90)	4 (1.14)	4 (1.90, 30)	--	--
Fish Crow	4 (1.90)	4 (1.14)	4 (1.43, 20)	--	--
House Wren	2 (0.95)	2 (0.57)	2 (2.86, 20)	--	--
American Robin	2 (0.95)	2 (0.57)	2 (NA, 0)	--	--
Gray Catbird	5 (2.38)	5 (1.43)	5 (3.57, 20)	--	--
Northern Cardinal	6 (2.86)	6 (1.71)	6 (8.57, 10)	--	--
Rufous-sided Towhee	3 (1.43)	3 (0.86)	3 (2.86, 15)	--	--
Chipping Sparrow	3 (1.43)	3 (0.86)	3 (4.29, 20)	--	--

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)
 SEASON: 1993 Breeding Season (cont.)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Field Sparrow	4 (1.90)	4 (1.14)	4 (2.86, 20)	--	--
House Finch	10 (4.76)	10 (2.86)	10 (9.52, 15)	--	--
American Goldfinch	4 (1.90)	4 (1.14)	4 (11.43, 5)	--	--
Total No. Individuals	57	57	57	--	--
Total No. Species	17	17	17	--	--

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)
 SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Killdeer	--	--	--	0 (0.00)	1
Red-bellied Woodpecker	--	--	--	1 (1.77)	1
Northern Flicker	--	--	--	1 (1.77)	1
Eastern Wood- pewee	--	--	--	1 (1.77)	4
Great Crested Flycatcher	--	--	--	1 (1.77)	1
Blue Jay	--	--	--	3 (5.31)	3
Fish Crow	--	--	--	2 (3.54)	2
Black-capped Chickadee	--	--	--	1 (1.77)	1
Tufted Titmouse	--	--	--	4 (7.08)	4
White-breasted Nuthatch	--	--	--	1 (1.77)	1
Brown Creeper	--	--	--	1 (1.77)	1
House Wren	--	--	--	10 (17.70)	10
Blue-gray Gnatcatcher	--	--	--	2 (3.54)	2
Wood Thrush	--	--	--	0 (0.00)	3

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1993 Breeding Season (cont.)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Gray Catbird	--	--	--	7 (12.39)	7
Northern Mockingbird	--	--	--	0 (0.00)	5
Brown Thrasher	--	--	--	2 (3.54)	2
Northern Cardinal	--	--	--	5 (8.85)	5
Rufous-sided Towhee	--	--	--	2 (3.54)	2
Indigo Bunting	--	--	--	3 (5.31)	3
House Finch	--	--	--	1 (1.77)	1
Total No. Individuals	--	--	--	48	60
Total No. Species	--	--	--	18	21

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black Vulture	--	--	--	2 (3.54)	2
Mourning Dove	--	--	--	1 (1.77)	1
Red-headed Woodpecker	--	--	--	2 (3.54)	2
Red-bellied Woodpecker	--	--	--	4 (7.08)	4
Downy Woodpecker	--	--	--	2 (3.54)	2
Northern Flicker	--	--	--	4 (7.08)	7
Pileated Woodpecker	--	--	--	0 (0.00)	1
Eastern Wood-pewee	--	--	--	1 (1.77)	5
Great Crested Flycatcher	--	--	--	1 (1.77)	1
Blue Jay	--	--	--	7 (12.39)	7
American Crow	--	--	--	2 (3.54)	4
Fish Crow	--	--	--	0 (0.00)	1
Black-capped Chickadee	--	--	--	8 (14.16)	8

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Tufted Titmouse	--	--	--	14 (24.78)	14
White-breasted Nuthatch	--	--	--	2 (3.54)	3
House Wren	--	--	--	17 (30.09)	20
Eastern Bluebird	--	--	--	0 (0.00)	3
Wood Thrush	--	--	--	11 (19.47)	13
Gray Catbird	--	--	--	6 (10.62)	6
Red-eyed Vireo	--	--	--	4 (7.08)	5
Scarlet Tanager	--	--	--	2 (3.54)	2
Northern Cardinal	--	--	--	14 (24.78)	16
Rufous-sided Towhee	--	--	--	1 (1.77)	1
Field Sparrow	--	--	--	0 (0.00)	2
Common Grackle	--	--	--	3 (5.31)	3
Total No. Individuals	--	--	--	108	133
Total No. Species	--	--	--	21	25

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Great Blue Heron	1 (0.28)	1 (0.17)	1 (0.33, 25)	--	--
Chimney Swift	1 (0.28)	1 (0.17)	1 (1.67, 5)	--	--
Belted Kingfisher	0 (0.00)	1 (0.17)	1 (0.11, 75)	--	--
Red-bellied Woodpecker	1 (0.28)	1 (0.17)	1 (0.83, 10)	--	--
Downy Woodpecker	1 (0.28)	1 (0.17)	1 (0.28, 30)	--	--
Northern Flicker	3 (0.83)	3 (0.50)	3 (0.83, 10)	--	--
Eastern Wood-pewee	1 (0.28)	1 (0.17)	1 (0.56, 15)	--	--
Black-capped Chickadee	1 (0.28)	1 (0.17)	1 (0.33, 25)	--	--
Tufted Titmouse	1 (0.28)	1 (0.17)	1 (NA, 0)	--	--
House Wren	8 (2.22)	8 (1.33)	8 (2.22, 30)	--	--
Wood Thrush	3 (0.83)	3 (0.50)	3 (0.83, 30)	--	--
Gray Catbird	6 (1.67)	6 (1.00)	6 (2.50, 20)	--	--
Scarlet Tanager	2 (0.56)	3 (0.50)	3 (0.50, 50)	--	--
Northern Cardinal	3 (0.83)	3 (0.50)	3 (2.50, 10)	--	--
Rufous-sided Towhee	2 (0.56)	2 (0.33)	2 (0.56, 30)	--	--
Common Grackle	8 (2.22)	8 (1.33)	8 (5.33, 25)	--	--
Total No. Individuals	42	44	44	--	--
Total No. Species	15	16	16	--	--

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Red-headed Woodpecker	1 (0.33)	1 (0.20)	1 (0.50, 20)	--	--
Red-bellied Woodpecker	3 (1.00)	3 (0.60)	3 (1.50, 20)	--	--
Downy Woodpecker	1 (0.33)	1 (0.20)	1 (0.50, 20)	--	--
Northern Flicker	1 (0.33)	2 (0.40)	2 (0.50, 40)	--	--
Eastern Wood-pewee	4 (1.33)	4 (0.80)	4 (1.33, 30)	--	--
Great Crested Flycatcher	1 (0.33)	1 (0.20)	1 (0.50, 20)	--	--
Blue Jay	11 (3.67)	13 (2.60)	13 (3.25, 40)	--	--
Fish Crow	1 (0.33)	1 (0.20)	1 (0.33, 30)	--	--
Black-capped Chickadee	8 (2.67)	8 (1.60)	8 (4.00, 20)	--	--
Tufted Titmouse	4 (1.33)	4 (0.80)	4 (2.00, 20)	--	--
White-breasted Nuthatch	1 (0.33)	1 (0.20)	1 (0.67, 15)	--	--
House Wren	3 (1.00)	3 (0.60)	3 (1.50, 20)	--	--
Wood Thrush	14 (4.67)	16 (3.20)	16 (4.00, 40)	--	--
American Robin	3 (1.00)	3 (0.60)	3 (1.00, 30)	--	--
Gray Catbird	1 (0.33)	1 (0.20)	1 (0.67, 15)	--	--

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1993 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Red-eyed Vireo	4 (1.33)	4 (0.80)	4 (1.60, 25)	--	--
Ovenbird	5 (1.67)	8 (1.60)	8 (1.60, 50)	--	--
Scarlet Tanager	1 (0.33)	1 (0.20)	1 (0.50, 20)	--	--
Northern Cardinal	10 (3.33)	10 (2.00)	10 (3.33, 30)	--	--
Rufous-sided Towhee	5 (1.67)	5 (1.00)	5 (1.67, 30)	--	--
Common Grackle	11 (3.67)	11 (2.20)	11 (NA, 0)	--	--
Total No. Individuals	93	102	102	--	--
Total No. Species	21	21	21	--	--

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Red-bellied Woodpecker	--	--	--	2 (1.18)	2
Downy Woodpecker	--	--	--	3 (1.77)	4
Northern Flicker	--	--	--	1 (0.59)	2
Pileated Woodpecker	--	--	--	2 (1.18)	5
Eastern Wood-pewee	--	--	--	2 (1.18)	5
Blue Jay	--	--	--	9 (5.31)	11
American Crow	--	--	--	5 (2.95)	7
Black-capped Chickadee				5 (2.95)	5
Tufted Titmouse	--	--	--	9 (5.31)	11
White-breasted Nuthatch	--	--	--	0 (0.00)	1
House Wren	--	--	--	3 (1.77)	4
Wood Thrush	--	--	--	18 (10.62)	25
American Robin	--	--	--	1 (0.59)	1
Red-eyed Vireo	--	--	--	3 (1.77)	5
Ovenbird	--	--	--	2 (1.18)	5

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Scarlet Tanager	--	--	--	2 (1.18)	2
Northern Cardinal	--	--	--	2 (1.18)	6
Total No. Individuals	--	--	--	101	69
Total No. Species	--	--	--	17	18

Appendix 8 (Continued).

SITE: Pennsylvania Monument Grassland (PMG)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Mockingbird	2 (0.42)	2 (0.25)	2 (0.50, 25)	--	--
Grasshopper Sparrow	1 (0.21)	1 (0.13)	1 (NA, 0)	--	--
Eastern Meadowlark	2 (0.42)	2 (0.25)	2 (NA, 0)	--	--
American Goldfinch	2 (0.42)	2 (0.25)	2 (NA, 0)	--	--
Total No. Individuals	7	7	7	--	--
Total No. Species	4	4	4	--	--

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)
 SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Turkey Vulture	--	--	--	1 (0.88)	1
Red-tailed Hawk	--	--	--	1 (0.88)	1
Mourning Dove	--	--	--	1 (0.88)	1
Red-headed Woodpecker	--	--	--	1 (0.88)	1
Red-bellied Woodpecker	--	--	--	5 (4.40)	5
Downy Woodpecker	--	--	--	1 (0.88)	1
Northern Flicker	--	--	--	4 (3.54)	4
Eastern Phoebe	--	--	--	2 (1.77)	2
Blue Jay	--	--	--	25 (22.10)	25
Black-capped Chickadee	--	--	--	4 (3.54)	4
Tufted Titmouse	--	--	--	17 (15.03)	17
House Wren	--	--	--	4 (3.54)	4
American Robin	--	--	--	23 (20.34)	23
Gray Catbird	--	--	--	27 (23.87)	28
Northern Mockingbird	--	--	--	4 (3.54)	4

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1993 Fall Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Cedar Waxwing	--	--	--	40 (35.37)	40
Red-eyed Vireo	--	--	--	1 (0.88)	1
Magnolia Warbler	--	--	--	6 (5.31)	6
Common Yellowthroat	--	--	--	3 (2.65)	3
Northern Cardinal	--	--	--	9 (7.96)	9
Rufous-sided Towhee	--	--	--	4 (3.54)	4
Chipping Sparrow	--	--	--	2 (1.77)	2
Song Sparrow	--	--	--	1 (0.88)	1
Common Grackle	--	--	--	50 (44.00)	50
House Finch	--	--	--	4 (3.54)	4
American Goldfinch	--	--	--	4 (3.54)	4
Total No. Individuals	--	--	--	237	238
Total No. Species	--	--	--	26	26

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Blue Jay	2 (1.67)	2 (1.00)	2 (1.67, 30)	--	--
American Crow	2 (1.67)	2 (1.00)	2 (NA, 0)	--	--
Black-capped Chickadee	2 (1.67)	2 (1.00)	2 (1.67, 30)	--	--
Tufted Titmouse	1 (0.83)	1 (0.50)	1 (1.00, 25)	--	--
Red-breasted Nuthatch	2 (1.67)	2 (1.00)	2 (2.00, 25)	--	--
Ruby-crowned Kinglet	1 (0.83)	1 (0.50)	1 (5.00, 5)	--	--
Gray-cheeked Thrush	1 (0.83)	1 (0.50)	1 (1.00, 25)	--	--
American Robin	7 (5.83)	7 (3.50)	7 (7.00, 25)	--	--
Chipping Sparrow	1 (0.83)	1 (0.50)	1 (1.25, 20)	--	--
American Goldfinch	3 (2.50)	3 (1.50)	3 (2.50, 30)	--	--
Total No. Individuals	22	22	22	--	--
Total No. Species	10	10	10	--	--

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Red-tailed Hawk	1 (0.48)	1 (0.29)	1 (0.71, 20)	--	--
Red-bellied Woodpecker	2 (0.95)	2 (0.57)	2 (0.95, 30)	--	--
Northern Flicker	1 (0.48)	1 (0.29)	1 (NA, 0)	--	--
Black-capped Chickadee	1 (0.48)	1 (0.29)	1 (0.71, 20)	--	--
Tufted Titmouse	2 (0.95)	2 (0.57)	2 (1.90, 15)	--	--
House Wren	2 (0.95)	2 (0.57)	2 (1.90, 15)	--	--
Cedar Waxwing	4 (1.90)	4 (1.14)	4 (NA, 0)	--	--
European Starling	1 (0.48)	1 (0.29)	1 (1.43, 10)	--	--
Northern Cardinal	4 (1.90)	4 (1.14)	4 (2.29, 25)	--	--
Chipping Sparrow	1 (0.48)	1 (0.29)	1 (NA, 0)	--	--
Field Sparrow	22 (10.48)	22 (6.29)	22 (20.95, 15)	--	--
Dark-eyed Junco	1 (0.48)	1 (0.29)	1 (0.95, 15)	--	--
Common Grackle	108 (51.43)	108 (61.71)	108 (NA, 0)	--	--
House Finch	4 (1.90)	4 (1.14)	4 (2.86, 20)	--	--
Total No. Individuals	159	159	159	--	--
Total No. Species	16	16	16	--	--

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Turkey Vulture	--	--	--	5 (8.84)	5
Red-headed Woodpecker	--	--	--	2 (3.54)	4
Red-bellied Woodpecker	--	--	--	4 (7.07)	4
Yellow-bellied Sapsucker	--	--	--	2 (3.54)	2
Northern Flicker	--	--	--	1 (1.77)	1
Blue Jay	--	--	--	30 (53.05)	30
Black-capped Chickadee	--	--	--	9 (15.92)	9
Tufted Titmouse	--	--	--	11 (19.45)	11
Carolina Wren	--	--	--	1 (1.77)	1
House Wren	--	--	--	2 (3.54)	2
Ruby-crowned Kinglet	--	--	--	1 (1.77)	1
American Robin	--	--	--	1 (1.77)	1
Gray Catbird	--	--	--	7 (12.38)	7
Brown Thrasher	--	--	--	1 (1.77)	1
Magnolia Warbler	--	--	--	2 (3.54)	2

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1993 Fall Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black-throated Green Warbler	--	--	--	1 (1.77)	1
Pine Warbler	--	--	--	1 (1.77)	1
Common Yellowthroat	--	--	--	1 (1.77)	1
Scarlet Tanager	--	--	--	1 (1.77)	1
Northern Cardinal	--	--	--	6 (10.61)	6
Chipping Sparrow	--	--	--	6 (10.61)	6
Field Sparrow	--	--	--	11 (19.45)	11
Dark-eyed Junco	--	--	--	1 (1.77)	1
Total No. Individuals	--	--	--	106	108
Total No. Species	--	--	--	22	22

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black Vulture	--	--	--	1 (0.71)	1
Turkey Vulture	--	--	--	2 (1.41)	2
Red-headed Woodpecker	--	--	--	8 (5.66)	8
Red-bellied Woodpecker	--	--	--	14 (9.90)	14
Yellow-bellied Sapsucker	--	--	--	1 (0.71)	1
Downy Woodpecker	--	--	--	4 (2.83)	4
Northern Flicker	--	--	--	3 (2.12)	3
Eastern Wood-pewee	--	--	--	1 (0.71)	1
Blue Jay	--	--	--	27 (19.10)	28
American Crow	--	--	--	1 (0.71)	1
Black-capped Chickadee	--	--	--	18 (12.73)	18
Tufted Titmouse	--	--	--	20 (14.15)	20
Red-breasted Nuthatch	--	--	--	2 (1.41)	2
White-breasted Nuthatch	--	--	--	7 (4.95)	7

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993 Fall Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Brown Creeper	--	--	--	1 (0.71)	1
Winter Wren	--	--	--	1 (0.71)	1
Hermit Thrush	--	--	--	1 (0.71)	1
Wood Thrush	--	--	--	3 (2.12)	3
American Robin	--	--	--	10 (7.07)	10
Gray Catbird	--	--	--	2 (1.41)	2
Chestnut-sided Warbler	--	--	--	1 (0.71)	1
Magnolia Warbler	--	--	--	5 (3.54)	6
Black-throated Blue Warbler	--	--	--	1 (0.71)	1
Scarlet Tanager	--	--	--	1 (0.71)	1
Northern Cardinal	--	--	--	8 (5.66)	8
Common Grackle	--	--	--	1 (0.71)	100
American Goldfinch	--	--	--	1 (0.71)	1
Total No. Individuals	--	--	--	144	246

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993 Fall Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Total No. Species	--	--	--	27	27

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	1 (0.17)	1 (0.17, 50)	--	--
Wood Duck	4 (1.11)	4 (0.67)	4 (1.67, 20)	--	--
Sharp-shinned Hawk	1 (0.28)	1 (0.17)	1 (0.42, 20)	--	--
Belted Kingfisher	1 (0.28)	2 (0.33)	2 (0.42, 40)	--	--
Red-bellied Woodpecker	2 (0.56)	2 (0.33)	2 (0.83, 20)	--	--
Yellow-bellied Sapsucker	1 (0.28)	1 (0.17)	1 (NA, 0)	--	--
Downy Woodpecker	2 (0.56)	2 (0.33)	2 (0.83, 20)	--	--
Hairy Woodpecker	1 (0.28)	1 (0.17)	1 (0.33, 25)	--	--
Northern Flicker	1 (0.28)	1 (0.17)	1 (0.33, 25)	--	--
Pileated Woodpecker	2 (0.56)	2 (0.33)	2 (0.67, 25)	--	--
Eastern Wood- pewee	1 (0.28)	2 (0.33)	2 (0.33, 50)	--	--
Blue Jay	10 (2.78)	10 (1.67)	10 (2.78, 30)	--	--
American Crow	0 (0.00)	1 (0.17)	1 (0.14, 60)	--	--
Black-capped Chickadee	5 (1.39)	5 (0.83)	5 (2.08, 20)	--	--
Tufted Titmouse	3 (0.83)	3 (0.50)	3 (1.25, 20)	--	--

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1993 Fall Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
White-breasted Nuthatch	1 (0.28)	1 (0.17)	1 (0.56, 15)	--	--
Carolina Wren	1 (0.28)	1 (0.17)	1 (0.56, 15)	--	--
American Robin	1 (0.28)	1 (0.17)	1 (0.42, 20)	--	--
Gray Catbird	3 (0.83)	3 (0.50)	3 (1.25, 20)	--	--
Tennessee Warbler	2 (0.56)	2 (0.33)	2 (NA, 0)	--	--
Magnolia Warbler	2 (0.56)	2 (0.33)	2 (NA, 0)	--	--
Black-throated Blue Warbler	1 (0.28)	1 (0.17)	1 (0.83, 10)	--	--
Pine Warbler	1 (0.28)	1 (0.17)	1 (0.42, 20)	--	--
Common Yellowthroat	2 (0.56)	2 (0.33)	2 (NA, 0)	--	--
Scarlet Tanager	1 (0.28)	1 (0.17)	1 (0.42, 20)	--	--
Northern Cardinal	4 (1.94)	4 (1.17)	4 (1.94, 30)	--	--
Total No. Individuals	53	57	57	--	--
Total No. Species	25	27	27	--	--

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)
 SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Red-bellied Woodpecker	4 (1.33)	5 (1.00)	5 (1.25, 40)	--	--
Blue Jay	0 (0.00)	2 (0.40)	2 (0.40, 50)	--	--
American Crow	0 (0.00)	3 (0.60)	3 (0.60, 50)	--	--
Tufted Titmouse	1 (0.33)	1 (0.20)	1 (0.50, 20)	--	--
Wood Thrush	2 (0.67)	3 (0.60)	3 (0.75, 40)	--	--
Northern Cardinal	1 (0.33)	1 (0.20)	1 (0.33, 30)	--	--
Total No. Individuals	8	15	15	--	--
Total No. Species	4	6	6	--	--

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993 Fall Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	--	--	--	30 (17.7)	30
Black Vulture	--	--	--	2 (1.18)	2
Red-bellied Woodpecker	--	--	--	13 (7.66)	13
Downy Woodpecker	--	--	--	3 (1.77)	3
Common Flicker	--	--	--	1 (0.59)	1
Pileated Woodpecker	--	--	--	1 (0.59)	1
Blue Jay	--	--	--	15 (8.84)	17
American Crow	--	--	--	0 (0.00)	1
Black-capped Chickadee	--	--	--	14 (8.25)	14
Carolina Chickadee	--	--	--	4 (2.36)	4
Tufted Titmouse	--	--	--	12 (7.07)	12
Red-breasted Nuthatch	--	--	--	2 (1.18)	2
White-breasted Nuthatch	--	--	--	3 (1.77)	4
Carolina Wren	--	--	--	3 (1.77)	4
Ruby-crowned Kinglet	--	--	--	1 (0.59)	1

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993 Fall Migration Season (cont.)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Gray-checked Thrush	--	--	--	1 (0.59)	1
Wood Thrush	--	--	--	10 (5.89)	10
American Robin	--	--	--	2 (1.18)	2
Magnolia Warbler	--	--	--	1 (0.59)	1
Northern Cardinal	--	--	--	1 (0.59)	1
House Finch	--	--	--	2 (1.18)	2
Total No. Individuals	--	--	--	121	126
Total No. Species	--	--	--	20	21

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.77)	2
Red-tailed Hawk	0 (0.00)	1 (0.25)	1 (0.16, 80)	1 (0.88)	1
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.77)	2
Red-bellied Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	5 (4.40)	5
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Northern Flicker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Blue Jay	2 (0.83)	3 (0.75)	3 (0.75, 50)	5 (4.40)	5
American Crow	0 (0.00)	4 (1.00)	2 (0.45, 40)	2 (1.77)	2
Black-capped Chickadee	1 (0.42)	2 (0.50)	2 (0.63, 40)	2 (1.77)	2
Tufted Titmouse	0 (0.00)	1 (0.25)	1 (0.21, 60)	3 (2.65)	3
White-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.77)	2
Golden-crowned Kinglet	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Eastern Bluebird	0 (0.00)	0 (0.00)	0 (0.00)	6 (5.31)	6
American Robin	5 (2.08)	5 (1.25)	5 (NA, 0)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Mockingbird	2 (0.83)	2 (0.50)	2 (0.83, 30)	1 (0.88)	1
European Starling	5 (2.08)	5 (1.25)	5 (2.08, 30)	1 (0.88)	1
Northern Cardinal	3 (1.25)	6 (1.50)	6 (1.67, 60)	4 (3.54)	4
Rufous-sided Towhee	0 (0.00)	2 (0.50)	2 (0.50, 50)	0 (0.00)	0
Dark-eyed Junco	2 (0.83)	2 (0.50)	2 (1.67, 15)	0 (0.00)	0
Common Grackle	0 (0.00)	1 (0.25)	1 (0.21, 60)	1 (0.88)	1
House Finch	0 (0.00)	3 (0.75)	3 (0.75, 50)	9 (7.96)	9
Total No. Individuals	19	37	37	49	49
Total No. Species	7	13	13	18	18

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Killdeer	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Red-bellied Woodpecker	1 (0.83)	1 (0.50)	1 (0.83, 30)	0 (0.00)	0
Blue Jay	5 (4.17)	5 (2.50)	5 (8.33, 15)	0 (0.00)	1
Black-capped Chickadee	5 (4.17)	5 (2.50)	5 (4.17, 30)	0 (0.00)	0
Tufted Titmouse	0 (0.00)	0 (0.00)	0 (0.00)	4 (7.07)	4
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Northern Mockingbird	2 (1.67)	2 (1.00)	2 (5.00, 10)	0 (0.00)	0
Cedar Waxwing	2 (1.67)	2 (1.00)	2 (1.67, 30)	0 (0.00)	0
Northern Cardinal	2 (1.67)	3 (1.50)	3 (1.88, 40)	1 (1.77)	1
Dark-eyed Junco	1 (0.83)	1 (0.50)	1 (2.50, 10)	0 (0.00)	0
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
House Finch	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	3
Total No. Individuals	18	19	19	8	13
Total No. Species	7	7	7	5	8

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	2 (0.95)	2 (0.57)	2 (NA, 0)	1 (1.18)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	3 (3.54)	3
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Northern Flicker	2 (0.95)	2 (0.57)	2 (NA, 0)	0 (0.00)	0
Blue Jay	1 (0.48)	1 (0.29)	1 (0.57, 25)	4 (4.72)	4
American Crow	0 (0.00)	2 (0.57)	2 (0.38, 75)	0 (0.00)	0
Fish Crow	2 (0.95)	2 (0.57)	2 (0.29, 20)	3 (3.54)	3
Black-capped Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	1
Tufted Titmouse	0 (0.00)	1 (0.29)	1 (0.36, 40)	0 (0.00)	0
White-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	7 (8.25)	7
European Starling	0 (0.00)	0 (0.00)	0 (0.00)	3 (3.54)	3
Northern Cardinal	7 (3.33)	7 (2.00)	7 (3.33, 30)	1 (1.18)	2
White-throated Sparrow	1 (0.48)	1 (0.29)	1 (0.48, 30)	0 (0.00)	0

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Dark-eyed Junco	8 (3.81)	8 (2.29)	8 (3.81, 30)	1 (1.18)	2
Common Grackle	1 (0.48)	1 (0.29)	1 (NA, 0)	10 (11.79)	10
Brown-headed Cowbird	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	1
Purple Finch	2 (0.95)	2 (0.57)	2 (0.29, 20)	0 (0.00)	0
House Finch	0 (0.00)	2 (0.57)	2 (0.48, 120)	10 (11.79)	10
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	3 (3.54)	3
Total No. Individuals	26	31	31	48	52
Total No. Species	9	12	12	13	15

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	15 (8.33)	15 (5.00)	15 (NA, 0)	0 (0.00)	0
Red-tailed Hawk	1 (0.56)	1 (0.67)	1 (NA, 0)	0 (0.00)	0
Barred Owl	0 (0.00)	3 (1.00)	3 (0.67, 75)	0 (0.00)	0
Red-headed Woodpecker	3 (1.67)	4 (1.33)	4 (1.67, 30)	0 (0.00)	1
Red-bellied Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	3 (5.31)	3
Downy Woodpecker	1 (0.56)	1 (0.33)	1 (0.83, 75)	1 (1.77)	1
Blue Jay	0 (0.00)	0 (0.00)	0 (0.00)	3 (5.31)	4
American Crow	0 (0.00)	1 (0.33)	1 (0.22, 75)	0 (0.00)	1
Black-capped Chickadee	1 (0.56)	1 (0.33)	1 (1.11, 15)	13 (22.99)	13
Carolina Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Tufted Titmouse	3 (1.67)	4 (1.33)	4 (3.33, 40)	3 (5.31)	3
White-breasted Nuthatch	5 (2.78)	7 (2.33)	7 (2.92, 40)	3 (5.31)	3
Brown Creeper	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0
Carolina Wren	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	2
Northern Mockingbird	1 (0.56)	1 (0.33)	1 (1.11, 15)	7 (12.28)	7

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Cardinal	5 (2.78)	5 (1.67)	50 (8.33, 10)	1 (1.77)	1
American Tree Sparrow	2 (1.11)	2 (0.67)	2 (2.22, 15)	0 (0.00)	0
Field Sparrow	2 (1.11)	2 (0.67)	2 (1.67, 20)	9 (15.92)	9
Song Sparrow	6 (3.33)	6 (2.00)	6 (5.00, 20)	2 (3.54)	2
White-throated Sparrow	0 (0.00)	0 (0.00)	0 (0.00)	7 (12.38)	8
Dark-eyed Junco	22 (12.22)	22 (7.33)	22 (18.33, 20)	50 (88.42)	50
Total No. Individuals	68	76	76	104	109
Total No. Species	14	16	16	14	16

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	13 (9.20)	13
Wood Duck	9 (2.50)	9 (1.50)	9 (7.50, 10)	0 (0.00)	0
Black Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Red-headed Woodpecker	2 (0.56)	2 (0.33)	2 (0.56, 30)	8 (5.66)	8
Red-bellied Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	5 (3.54)	5
Downy Woodpecker	1 (0.28)	1 (0.17)	1 (0.33, 25)	5 (3.54)	3
Northern Flicker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Blue Jay	0 (0.00)	1 (0.17)	1 (0.21, 40)	5 (3.54)	7
American Crow	4 (1.11)	6 (1.00)	6 (0.71, 70)	4 (2.83)	6
Black-capped Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	9 (6.37)	9
Tufted Titmouse	0 (0.00)	0 (0.00)	0 (0.00)	5 (3.54)	5
Red-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
White-breasted Nuthatch	1 (0.28)	1 (0.17)	1 (0.42, 20)	8 (5.66)	8

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Brown Creeper	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Golden-crowned Kinglet	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.41)	2
American Robin	1 (0.28)	1 (0.17)	1 (0.33, 25)	1 (0.71)	1
Song Sparrow	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
Dark-eyed Junco	0 (0.00)	0 (0.00)	0 (0.00)	10 (7.07)	10
Total No. Individuals	19	22	22	76	84
Total No. Species	7	8	8	17	18

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	19 (5.28)	19 (3.17)	19 (10.56, 15)	2 (1.41)	3
Wood Duck	1 (0.28)	1 (0.17)	1 (0.33, 25)	3 (0.71)	3
Mallard	3 (0.83)	3 (0.50)	3 (1.25, 20)	4 (2.83)	4
Turkey Vulture	1 (0.28)	1 (0.17)	1 (NA, 0)	1 (0.71)	1
Red-tailed Hawk	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Killdeer	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.41)	2
Belted Kingfisher	1 (0.56)	1 (0.33)	1 (0.67, 25)	0 (0.00)	0
Red-bellied Woodpecker	2 (0.56)	3 (0.50)	3 (0.63, 40)	3 (2.12)	1
Downy Woodpecker	1 (0.28)	1 (0.17)	1 (NA, 0)	1 (0.71)	1
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Crow	2 (0.56)	2 (0.33)	2 (NA, 0)	5 (3.54)	7
Black-capped Chickadee	15 (4.17)	15 (2.50)	15 (5.00, 25)	3 (2.12)	3
Carolina Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Tufted Titmouse	1 (0.28)	1 (0.17)	1 (0.56, 15)	3 (2.12)	3
White-breasted Nuthatch	3 (0.83)	3 (0.50)	3 (1.00, 25)	5 (3.54)	5

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Carolina Wren	1 (0.28)	1 (0.17)	1 (0.33, 25)	0 (0.00)	0
Winter Wren	1 (0.28)	1 (0.17)	1 (NA, 0)	0 (0.00)	0
Eastern Bluebird	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Cedar Waxwing	3 (0.83)	3 (0.50)	3 (1.00, 25)	0 (0.00)	0
Northern Cardinal	1 (0.28)	1 (0.17)	1 (0.33, 25)	1 (0.71)	1
Song Sparrow	5 (1.39)	5 (0.83)	5 (NA, 0)	9 (6.37)	9
White-throated Sparrow	47 (13.06)	47 (7.83)	47 (39.17, 10)	0 (0.00)	0
Dark-eyed Junco	41 (11.39)	41 (6.83)	41 (27.33, 25)	9 (6.37)	9
House Finch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Total No. Individuals	148	149	149	51	57
Total No. Species	18	18	18	17	19

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.77)	2
Sharp-shinned Hawk	1 (0.33)	1 (0.20)	1 (NA, 0)	0 (0.00)	0
Red-bellied Woodpecker	1 (0.33)	3 (0.61)	3 (0.61, 50)	1 (0.88)	2
Downy Woodpecker	0 (0.00)	2 (0.40)	2 (0.50, 40)	2 (1.77)	3
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Blue Jay	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Crow	1 (0.33)	3 (0.60)	30 (0.43, 70)	4 (3.54)	5
Common Raven	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Tufted Titmouse	0 (0.00)	1 (0.20)	1 (0.17, 60)	1 (0.88)	2
White-breasted Nuthatch	0 (0.00)	2 (0.40)	2 (0.33, 60)	3 (2.65)	3
Brown Creeper	4 (1.33)	4 (0.80)	4 (1.33, 30)	1 (0.88)	1
Carolina Wren	0 (0.00)	1 (0.20)	1 (0.25, 40)	0 (0.00)	0
Eastern Bluebird	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Dark-eyed Junco	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.77)	2
Total No. Individuals	7	17	17	17	24

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Total No. Species	4	8	8	9	12

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993-94 Winter Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	40 (8.89)	40 (5.33)	40 (NA, 0)	0 (0.00)	0
Black Vulture	2 (0.44)	2 (0.27)	2 (0.44, 30)	2 (1.18)	2
Turkey Vulture	3 (0.67)	7 (0.93)	7 (0.78, 40)	20 (11.79)	20
Red-tailed Hawk	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	2
Red-headed Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
Red-bellied Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.18)	2
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	3 (1.77)	4
Pileated Woodpecker	0 (0.00)	1 (0.13)	1 (0.08, 80)	0 (0.00)	0
Blue Jay	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	2
American Crow	1 (0.22)	2 (0.27)	2 (0.33, 40)	3 (1.77)	3
Black-capped Chickadee	3 (0.67)	3 (0.40)	3 (1.00, 20)	8 (4.72)	8
Tufted Titmouse	1 (0.22)	2 (0.27)	2 (0.27, 50)	0 (0.00)	0
Red-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
White-breasted Nuthatch	0 (0.00)	1 (0.13)	1 (0.17, 40)	9 (5.31)	10
Brown Creeper	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1993-94 Winter Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Common Grackle	50 (11.11)	51 (6.80)	51 (5.67, 60)	0 (0.00)	0
House Finch	1 (0.22)	1 (0.13)	1 (0.22, 30)	0 (0.00)	0
Pine Siskin	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
Total No. Individuals	101	110	110	54	58
Total No. Species	8	10	10	14	14

Appendix 8 (Continued).

SITE: Pennsylvania Monument Grassland (PMG)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Mourning Dove	1 (0.21)	1 (0.13)	1 (0.63, 10)	--	--
Blue Jay	1 (0.21)	1 (0.13)	1 (0.21, 30)	--	--
Northern Mockingbird	2 (0.42)	2 (0.25)	2 (0.63, 20)	--	--
European Starling	2 (0.42)	4 (0.50)	4 (0.71, 35)	--	--
Grasshopper Sparrow	4 (0.83)	4 (0.50)	4 (0.83, 30)	--	--
Eastern Meadowlark	5 (1.04)	5 (0.63)	5 (1.25, 25)	--	--
Total No. Individuals	15	17	17	--	--
Total No. Species	6	6	6	--	--

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Double-crested Cormorant	0 (0.00)	0 (0.00)	0 (0.00)	10 (8.80)	10
Turkey Vulture	1 (0.42)	1 (0.25)	1 (NA, 0)	0 (0.00)	0
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	4 (3.52)	4
Yellow-billed Cuckoo	1 (0.42)	1 (0.25)	1 (0.83, 15)	0 (0.00)	0
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Red-bellied Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Northern Flicker	1 (0.42)	1 (0.25)	1 (NA, 0)	0 (0.00)	0
Blue Jay	0 (0.00)	2 (0.50)	2 (0.50, 50)	4 (3.52)	4
American Crow	0 (0.00)	2 (0.50)	2 (0.42, 60)	0 (0.00)	0
Tufted Titmouse	2 (0.83)	2 (0.50)	2 (1.00, 25)	0 (0.00)	0
House Wren	4 (1.67)	4 (1.00)	4 (1.67, 30)	3 (2.64)	4
Blue-gray Gnatcatcher	1 (0.42)	1 (0.25)	1 (2.50, 5)	0 (0.00)	0
Wood Thrush	2 (0.83)	2 (0.50)	2 (1.25, 20)	1 (0.88)	1
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	3 (2.64)	3
Gray Catbird	2 (0.83)	3 (0.75)	3 (0.94, 40)	4 (3.52)	4

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Mockingbird	6 (2.50)	6 (1.50)	6 (2.50, 30)	3 (2.64)	3
Brown Thrasher	1 (0.42)	1 (0.25)	1 (0.63, 20)	2 (1.76)	2
European Starling	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
White-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.76)	2
Chestnut-sided Warbler	1 (0.42)	1 (0.25)	1 (2.50, 5)	1 (0.88)	1
Black-throated Blue Warbler	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Common Yellowthroat	3 (1.25)	3 (0.75)	3 (1.25, 30)	3 (2.64)	5
Northern Cardinal	4 (1.67)	4 (1.00)	4 (3.33, 15)	2 (1.76)	2
Rufous-sided Towhee	4 (1.67)	4 (1.00)	4 (2.00, 25)	6 (5.28)	7
Field Sparrow	5 (2.08)	5 (1.25)	5 (4.17, 15)	7 (6.16)	7
Song Sparrow	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	2
White-throated Sparrow	6 (2.50)	6 (1.50)	6 (3.75, 20)	4 (3.52)	4
Red-winged Blackbird	0 (0.00)	2 (0.50)	2 (0.50, 50)	0 (0.00)	0
Eastern Meadowlark	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Common Grackle	1 (0.42)	1 (0.25)	1 (NA, 0)	2 (1.76)	2
Brown-headed Cowbird	1 (0.42)	1 (0.25)	1 (0.50, 25)	0 (0.00)	0
House Finch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	2
Total No. Individuals	46	53	53	66	74
Total No. Species	18	21	21	22	23

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Killdeer	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Mourning Dove	4 (3.33)	4 (2.00)	4 (3.33, 30)	3 (5.31)	4
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Red-bellied Woodpecker	0 (0.00)	1 (0.50)	1 (0.63, 40)	0 (0.00)	0
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Blue Jay	2 (1.67)	3 (1.50)	3 (1.50, 50)	3 (5.31)	4
Tufted Titmouse	1 (0.83)	1 (0.50)	1 (2.50, 10)	2 (3.54)	2
House Wren	2 (1.67)	2 (1.00)	2 (2.00, 25)	1 (1.77)	1
Wood Thrush	3 (2.50)	3 (1.50)	3 (3.00, 25)	3 (5.31)	3
American Robin	3 (2.50)	3 (1.50)	3 (3.00, 25)	5 (8.85)	5
Gray Catbird	1 (0.83)	1 (0.50)	1 (NA, 0)	0 (0.00)	0
Brown Thrasher	1 (0.83)	1 (0.50)	1 (NA, 0)	0 (0.00)	0
Yellow-rumped Warbler	1 (0.83)	1 (0.50)	1 (2.50, 10)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Common Yellowthroat	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Northern Cardinal	2 (1.67)	2 (1.00)	2 (1.67, 30)	0 (0.00)	1
Rufous-sided Towhee	0 (0.00)	1 (0.50)	1 (0.63, 40)	3 (5.31)	4
Field Sparrow	2 (1.67)	2 (1.00)	2 (1.67, 30)	0 (0.00)	2
White-throated Sparrow	1 (0.83)	1 (0.50)	1 (1.25, 20)	0 (0.00)	0
Common Grackle	3 (2.50)	3 (1.50)	3 (2.50, 30)	7 (12.39)	7
House Finch	1 (0.83)	1 (0.50)	1 (1.67, 15)	1 (1.77)	1
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Total No. Individuals	27	30	30	34	41
Total No. Species	14	16	16	14	18

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Mourning Dove	2 (0.95)	2 (0.57)	2 (1.43, 20)	3 (3.54)	3
Barred Owl	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	7 (8.26)	7
Downy Woodpecker	1 (0.48)	2 (0.57)	2 (0.71, 40)	0 (0.00)	0
Northern Flicker	1 (0.48)	1 (0.29)	1 (0.48, 30)	1 (1.18)	1
Great Crested Flycatcher	1 (0.48)	1 (0.29)	1 (0.48, 30)	0 (0.00)	0
Tree Swallow	0 (0.00)	0 (0.00)	0 (0.00)	2 (2.36)	2
Blue Jay	2 (0.95)	5 (1.43)	5 (1.79, 40)	1 (1.18)	1
American Crow	3 (1.43)	3 (0.86)	3 (1.43, 30)	2 (2.36)	3
Fish Crow	2 (0.95)	4 (1.14)	4 (0.95, 60)	0 (0.00)	2
Black-capped Chickadee	4 (1.90)	4 (1.14)	4 (1.90, 30)	1 (1.18)	1
Tufted Titmouse	2 (0.95)	2 (0.57)	2 (0.95, 30)	2 (2.36)	2
House Wren	1 (0.48)	1 (0.29)	1 (2.86, 5)	1 (1.18)	1
Ruby-crowned Kinglet	1 (0.48)	2 (0.57)	2 (0.82, 35)	0 (0.00)	0
Blue-gray Gnatcatcher	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	1

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
American Robin	3 (1.43)	3 (0.86)	3 (8.57, 5)	0 (0.00)	0
European Starling	0 (0.00)	1 (0.29)	1 (NA, 0)	2 (2.36)	2
Gray Catbird	2 (0.95)	2 (0.57)	2 (0.95, 30)	3 (3.54)	3
Northern Mockingbird	1 (0.48)	1 (0.29)	1 (0.95, 15)	0 (0.00)	2
Northern Cardinal	4 (1.90)	5 (1.43)	5 (1.79, 40)	3 (3.54)	3
Rufous-sided Towhee	3 (1.43)	3 (0.86)	3 (2.14, 20)	1 (1.18)	2
Chipping Sparrow	2 (0.95)	2 (0.57)	2 (0.95, 30)	2 (2.36)	2
Field Sparrow	5 (2.38)	5 (1.43)	5 (4.76, 15)	1 (1.18)	3
Dark-eyed Junco	1 (0.48)	1 (0.29)	1 (0.48, 30)	0 (0.00)	0
White-throated Sparrow	1 (0.48)	1 (0.29)	1 (NA, 0)	0 (0.00)	0
Red-winged Blackbird	1 (0.48)	2 (0.57)	2 (0.71, 40)	0 (0.00)	0
Common Grackle	5 (2.38)	5 (1.43)	5 (3.57, 20)	1 (1.18)	1
Brown-headed Cowbird	1 (0.48)	2 (0.57)	2 (0.71, 40)	1 (1.18)	1
House Finch	4 (2.38)	4 (1.43)	4 (2.38, 30)	3 (3.54)	3
American Goldfinch	4 (1.90)	5 (1.43)	5 (1.43, 50)	0 (0.00)	1

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Total No. Individuals	58	70	70	38	48
Total No. Species	26	27	27	18	23

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	1 (0.33)	1 (0.33, 50)	0 (0.00)	0
Black Vulture	1 (0.56)	1 (0.33)	1 (NA, 0)	2 (3.54)	2
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	4 (7.08)	4
Red-tailed Hawk	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Barred Owl	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Red-headed Woodpecker	2 (1.11)	2 (0.67)	2 (NA, 0)	0 (0.00)	0
Red-bellied Woodpecker	0 (0.00)	1 (0.33)	1 (0.42, 40)	0 (0.00)	1
Downy Woodpecker	1 (0.56)	1 (0.33)	1 (0.56, 30)	0 (0.00)	0
Northern Flicker	2 (1.11)	2 (0.67)	2 (1.67, 20)	2 (3.54)	2
Eastern Phoebe	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	1
Blue Jay	2 (1.11)	3 (1.00)	3 (1.25, 40)	0 (0.00)	0
Black-capped Chickadee	3 (1.67)	3 (1.00)	3 (2.50, 20)	0 (0.00)	1
Tufted Titmouse	4 (2.22)	4 (1.33)	4 (2.67, 25)	2 (3.54)	2
House Wren	2 (1.11)	2 (0.67)	2 (1.11, 30)	3 (5.31)	3

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Blue-gray Gnatcatcher	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Wood Thrush	3 (1.67)	3 (1.00)	3 (1.67, 30)	0 (0.00)	0
Gray Catbird	3 (1.67)	3 (1.00)	3 (3.33, 15)	2 (3.54)	2
Northern Mockingbird	0 (0.00)	0 (0.00)	0 (0.00)	3 (5.31)	3
Brown Thrasher	1 (0.56)	1 (0.33)	1 (1.67, 10)	0 (0.00)	0
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	9 (15.93)	9
Blue-winged Warbler	2 (1.11)	2 (0.67)	2 (1.33, 25)	1 (1.77)	1
Chestnut-sided Warbler	1 (0.56)	1 (0.33)	1 (0.56, 30)	1 (1.77)	1
Yellow-rumped Warbler	1 (0.56)	1 (0.33)	1 (1.11, 15)	0 (0.00)	0
Prairie Warbler	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0
Black-and-White Warbler	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Common Yellowthroat	1 (0.56)	1 (0.33)	1 (3.33, 5)	0 (0.00)	0
Northern Cardinal	3 (1.67)	4 (1.33)	4 (1.90, 35)	2 (3.54)	2
Rufous-sided Towhee	3 (1.67)	3 (1.00)	3 (2.50, 20)	6 (10.62)	7

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Field Sparrow	2 (1.11)	4 (1.33)	4 (1.33, 50)	1 (1.77)	1
Song Sparrow	1 (0.56)	1 (0.33)	1 (1.67, 10)	2 (3.54)	2
White-throated Sparrow	5 (2.78)	5 (1.67)	5 (2.78, 30)	2 (3.54)	3
Dark-eyed Junco	2 (1.11)	2 (0.67)	2 (2.22, 15)	0 (0.00)	0
Common Grackle	2 (1.11)	2 (0.67)	2 (1.11, 30)	0 (0.00)	0
House Finch	2 (1.11)	2 (0.67)	2 (1.11, 30)	0 (0.00)	0
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Total No. Individuals	51	57	57	48	58
Total No. Species	25	27	27	19	25

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Wood Duck	2 (0.56)	2 (0.33)	2 (NA, 0)	0 (0.00)	0
Turkey Vulture	1 (0.28)	1 (0.17)	1 (NA, 0)	5 (8.85)	5
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Yellow-billed Cuckoo	0 (0.00)	1 (0.17)	1 (0.14, 60)	0 (0.00)	0
Red-headed Woodpecker	3 (0.83)	3 (0.50)	3 (2.50, 10)	0 (0.00)	0
Red-bellied Woodpecker	3 (0.83)	3 (0.50)	3 (0.83, 30)	2 (3.54)	3
Downy Woodpecker	3 (0.83)	3 (0.50)	3 (0.83, 30)	3 (5.31)	3
Northern Flicker	3 (0.83)	3 (0.50)	3 (1.25, 20)	1 (1.77)	1
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	2
Eastern Phoebe	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	3 (5.31)	3
Blue Jay	1 (0.28)	1 (0.17)	1 (0.42, 20)	0 (0.00)	0
American Crow	0 (0.00)	1 (0.17)	1 (0.14, 60)	0 (0.00)	0
Black-capped Chickadee	1 (0.28)	1 (0.17)	1 (0.42, 20)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Carolina Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Tufted Titmouse	3 (0.83)	4 (0.67)	4 (0.83, 40)	6 (10.62)	6
White-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	8 (14.16)	8
House Wren	6 (1.67)	6 (1.00)	6 (2.50, 20)	10 (17.70)	11
Winter Wren	2 (0.56)	2 (0.33)	2 (0.83, 20)	0 (0.00)	0
Ruby-crowned Kinglet	1 (0.28)	1 (0.17)	1 (0.33, 25)	1 (1.77)	1
Blue-gray Gnatcatcher	3 (0.83)	3 (0.50)	3 (1.26, 20)	4 (7.08)	5
Eastern Bluebird	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
Wood Thrush	2 (0.56)	2 (0.33)	2 (0.56, 30)	4 (7.08)	5
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Gray Catbird	1 (0.28)	1 (0.17)	1 (0.33, 25)	1 (1.77)	1
Philadelphia Vireo	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Northern Parula	1 (0.28)	1 (0.17)	1 (0.28, 30)	0 (0.00)	0
Chestnut-sided Warbler	2 (0.56)	2 (0.33)	2 (0.56, 30)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Yellow-rumped Warbler	0 (0.00)	0 (0.00)	0 (0.00)	3 (5.31)	3
Black-throated Green Warbler	0 (0.00)	1 (0.17)	1 (0.17, 50)	0 (0.00)	0
Prairie Warbler	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Redstart	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Hooded Warbler	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Scarlet Tanager	1 (0.28)	1 (0.17)	1 (0.28, 30)	1 (1.77)	2
Northern Cardinal	1 (0.28)	1 (0.17)	1 (0.42, 20)	6 (10.62)	7
Rose-breasted Grosbeak	2 (0.56)	2 (0.33)	2 (0.56, 30)	0 (0.00)	0
Indigo Bunting	1 (0.28)	1 (0.17)	1 (0.28, 30)	0 (0.00)	0
Rufous-sided Towhee	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Field Sparrow	0 (0.00)	1 (0.17)	1 (0.14, 60)	0 (0.00)	0
White-throated Sparrow	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Brown-headed Cowbird	2 (0.56)	2 (0.33)	2 (0.83, 20)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Purple Finch	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Total No. Individuals	48	53	53	72	86
Total No. Species	24	28	28	26	31

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	8 (2.22)	8 (1.33)	8 (2.22, 30)	3 (2.13)	4
Wood Duck	11 (3.06)	11 (1.83)	11 (4.58, 20)	20 (1.42)	4
Mallard	3 (0.83)	3 (0.50)	3 (1.25, 20)	0 (0.00)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Red-shouldered Hawk	0 (0.00)	1 (0.17)	1 (0.12, 70)	0 (0.00)	0
Spotted Sandpiper	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.42)	2
Red-bellied Woodpecker	3 (0.83)	3 (0.50)	3 (0.83, 30)	3 (2.13)	4
Downy Woodpecker	3 (0.83)	3 (0.50)	3 (1.25, 20)	6 (4.26)	7
Northern Flicker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Pileated Woodpecker	1 (0.28)	1 (0.17)	1 (0.28, 30)	0 (0.00)	0
Great-crested Flycatcher	0 (0.00)	1 (0.17)	1 (0.21, 40)	0 (0.00)	1
Blue Jay	4 (1.11)	4 (0.67)	4 (NA, 0)	1 (0.71)	1
American Crow	4 (1.11)	8 (1.33)	8 (1.11, 60)	0 (0.00)	1
Black-capped Chickadee	1 (0.28)	1 (0.17)	1 (0.33, 25)	0 (0.00)	0
Carolina Chickadee	3 (0.83)	3 (0.50)	3 (1.25, 20)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Tufted Titmouse	3 (0.83)	4 (0.67)	4 (0.83, 40)	4 (2.84)	5
White-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	5 (3.55)	5
House Wren	8 (2.22)	8 (1.33)	8 (2.22, 30)	11 (7.81)	11
Ruby-crowned Kinglet	1 (0.28)	1 (0.17)	1 (0.42, 20)	1 (0.71)	1
Blue-gray Gnatcatcher	5 (1.39)	5 (0.83)	5 (2.08, 20)	5 (3.55)	5
Gray-cheeked Thrush	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Wood Thrush	6 (1.67)	6 (1.00)	6 (1.67, 30)	4 (2.84)	5
American Robin	1 (0.28)	1 (0.17)	1 (NA, 0)	1 (0.71)	1
Gray Catbird	5 (1.39)	5 (0.83)	5 (1.67, 25)	0 (0.00)	0
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	12 (8.52)	12
European Starling	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
White-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Northern Parula	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Yellow-rumped Warbler	5 (1.39)	5 (0.83)	5 (4.17, 10)	1 (0.71)	1
Prairie Warbler	0 (0.00)	1 (0.17)	1 (0.21, 40)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black-and-White Warbler	1 (0.28)	1 (0.17)	1 (NA, 0)	0 (0.00)	0
American Redstart	1 (0.28)	1 (0.17)	1 (0.28, 30)	1 (0.71)	1
Common Yellowthroat	2 (0.56)	2 (0.33)	2 (3.33, 5)	1 (0.71)	1
Northern Cardinal	4 (1.11)	4 (0.67)	4 (1.11, 30)	5 (3.55)	5
Rufous-sided Towhee	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Song Sparrow	1 (0.28)	1 (0.17)	1 (0.42, 20)	1 (0.71)	1
White-throated Sparrow	2 (0.56)	3 (0.50)	3 (0.63, 40)	3 (2.13)	3
Eastern Meadowlark	0 (0.00)	1 (0.17)	1 (0.21, 40)	0 (0.00)	0
Common Grackle	1 (0.28)	1 (0.17)	1 (0.84, 10)	1 (0.71)	1
Brown-headed Cowbird	4 (1.11)	4 (0.67)	4 (NA, 0)	0 (0.00)	0
House Finch	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
American Goldfinch	2 (0.56)	2 (0.33)	2 (0.56, 30)	2 (1.42)	2
Total No. Individuals	96	106	106	82	93
Total No. Species	29	33	33	30	34

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Black Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	3 (2.64)	3
Cooper's Hawk	0 (0.00)	1 (0.20)	1 (0.13, 75)	0 (0.00)	0
Downy Woodpecker	1 (0.33)	1 (0.20)	1 (0.50, 20)	0 (0.00)	1
Northern Flicker	1 (0.33)	1 (0.20)	1 (0.33, 30)	1 (0.88)	1
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Blue Jay	0 (0.00)	1 (0.20)	1 (0.25, 40)	5 (4.40)	5
Tufted Titmouse	0 (0.00)	3 (0.60)	3 (0.75, 40)	2 (1.76)	2
White-breasted Nuthatch	1 (0.33)	1 (0.20)	1 (0.33, 30)	1 (0.88)	1
House Wren	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Ruby-crowned Kinglet	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Blue-gray Gnatcatcher	1 (0.33)	1 (0.20)	10 (0.50, 20)	0 (0.00)	0
Hermit Thrush	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Wood Thrush	7 (2.33)	8 (1.60)	8 (1.60, 50)	5 (4.40)	5
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Red-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.76)	2
Black-throated Blue Warbler	1 (0.33)	1 (0.20)	1 (0.33, 30)	1 (0.88)	1
Yellow-rumped Warbler	3 (1.00)	3 (0.60)	3 (NA, 0)	0 (0.00)	0
Black-throated Green Warbler	1 (0.33)	2 (0.40)	2 (0.50, 40)	0 (0.00)	1
Ovenbird	4 (1.33)	5 (1.00)	5 (1.25, 40)	3 (2.64)	4
Scarlet Tanager	2 (0.67)	2 (0.40)	2 (1.00, 20)	1 (0.88)	1
Northern Cardinal	7 (2.33)	10 (2.00)	10 (2.86, 35)	6 (5.28)	7
Red-winged Blackbird	2 (0.67)	4 (0.80)	4 (1.00, 40)	5 (4.40)	5
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Total No. Individuals	31	44	44	44	49
Total No. Species	12	15	15	21	24

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1994 Spring Migration Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	2 (0.27)	2 (0.33, 40)	0 (0.00)	0
Black Vulture	1 (0.22)	1 (0.13)	1 (NA, 0)	2 (1.18)	2
Turkey Vulture	5 (1.11)	5 (0.67)	5 (1.67, 20)	20 (11.80)	20
Broad-winged Hawk	1 (0.22)	1 (0.13)	1 (NA, 0)	0 (0.00)	0
Mourning Dove	2 (0.44)	2 (0.27)	2 (NA, 0)	0 (0.00)	0
Red-bellied Woodpecker	0 (0.00)	2 (0.27)	2 (0.33, 40)	2 (1.18)	2
Downy Woodpecker	4 (0.89)	4 (0.53)	4 (0.89, 30)	1 (0.59)	1
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3
Eastern Wood- pewee	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Great Crested Flycatcher	1 (0.22)	1 (0.13)	1 (0.27, 25)	0 (0.00)	0
Blue Jay	4 (0.89)	6 (0.80)	6 (0.67, 60)	3 (1.77)	4
Fish Crow	0 (0.00)	3 (0.40)	3 (0.50, 40)	0 (0.00)	0
Black-capped Chickadee	1 (0.22)	1 (0.13)	1 (0.17, 40)	0 (0.00)	2
Carolina Chickadee	1 (0.22)	1 (0.13)	1 (0.67, 10)	0 (0.00)	0
Tufted Titmouse	1 (0.22)	1 (0.13)	1 (0.22, 30)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
White-breasted Nuthatch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
House Wren	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Winter Wren	3 (0.67)	3 (0.40)	3 (0.80, 25)	1 (0.59)	3
Hermit Thrush	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Wood Thrush	5 (1.11)	5 (0.67)	5 (1.11, 30)	4 (2.36)	7
Red-eyed Vireo	3 (0.67)	3 (0.40)	3 (0.67, 30)	1 (0.59)	2
Black-throated Blue Warbler	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.18)	2
Black-throated Green Warbler	1 (0.22)	2 (0.27)	2 (0.33, 40)	0 (0.00)	1
Blackburnian Warbler	2 (0.44)	2 (0.27)	2 (0.44, 30)	0 (0.00)	0
American Redstart	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
Worm-eating Warbler	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.59)	1
Ovenbird	0 (0.00)	3 (0.40)	3 (0.40, 50)	0 (0.00)	8
Hooded Warbler	0 (0.00)	1 (0.13)	1 (0.17, 40)	0 (0.00)	0
Scarlet Tanager	2 (0.44)	2 (0.27)	2 (0.44, 30)	0 (0.00)	2
Northern Cardinal	1 (0.22)	1 (0.13)	1 (0.22, 30)	0 (0.00)	2

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1994 Spring Migration Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.18)	2
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Total No. Individuals	38	52	52	41	70
Total No. Species	17	22	22	13	23

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.76)	3
Red-headed Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Red-bellied Woodpecker	0 (0.00)	1 (0.25)	1 (0.25, 50)	0 (0.00)	0
Eastern Wood-pewee	0 (0.00)	1 (0.25)	1 (0.21, 60)	0 (0.00)	1
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Tree Swallow	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10
Blue Jay	0 (0.00)	1 (0.25)	1 (0.21, 60)	1 (0.88)	4
American Crow	3 (1.25)	3 (0.75)	3 (3.75, 10)	0 (0.00)	0
Black-capped Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.88)	1
Tufted Titmouse	1 (0.42)	1 (0.25)	1 (0.63, 20)	0 (0.00)	0
White-breasted Nuthatch	2 (0.83)	2 (0.50)	2 (0.83, 30)	0 (0.00)	0
House Wren	2 (0.83)	2 (0.50)	2 (0.83, 30)	1 (0.88)	2
Wood Thrush	0 (0.00)	1 (0.25)	1 (0.31, 40)	0 (0.00)	1
American Robin	0 (0.00)	1 (0.25)	1 (0.31, 40)	1 (0.88)	1
Gray Catbird	3 (1.25)	3 (0.75)	3 (1.25, 30)	8 (7.04)	9

Appendix 8 (Continued).

SITE: Warfield Ridge Old-Field (WOF)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Mockingbird	2 (0.83)	2 (0.50)	2 (0.83, 30)	0 (0.00)	2
Brown Thrasher	2 (0.83)	2 (0.50)	2 (1.00, 25)	0 (0.00)	0
Cedar Waxwing	1 (0.42)	1 (0.25)	1 (0.63, 20)	0 (0.00)	0
Blue-winged Warbler	1 (0.42)	1 (0.25)	1 (1.25, 10)	0 (0.00)	1
Common Yellowthroat	2 (0.83)	4 (1.00)	4 (1.25, 40)	3 (2.64)	5
Scarlet Tanager	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Northern Cardinal	1 (0.42)	1 (0.25)	1 (0.63, 20)	3 (2.64)	5
Indigo Bunting	2 (0.83)	2 (0.50)	2 (0.83, 30)	3 (2.64)	4
Rufous-sided Towhee	2 (0.83)	2 (0.50)	2 (0.83, 30)	2 (1.76)	4
Field Sparrow	1 (0.42)	2 (0.50)	2 (0.42, 60)	4 (3.52)	4
Song Sparrow	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.76)	2
Brown-headed Cowbird	1 (0.42)	2 (0.50)	2 (0.36, 70)	0 (0.00)	0
American Goldfinch	1 (0.42)	1 (0.25)	1 (2.50, 5)	0 (0.00)	0
Total No. Individuals	27	36	36	32	65
Total No. Species	16	21	21	13	21

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2
Red-tailed Hawk	1 (0.83)	1 (0.50)	1 (NA, 0)	0 (0.00)	0
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Eastern Wood-pewee	0 (0.00)	1 (0.50)	1 (0.42, 60)	0 (0.00)	1
Blue Jay	0 (0.00)	1 (0.50)	1 (0.63, 40)	0 (0.00)	0
Black-capped Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Tufted Titmouse	1 (0.83)	1 (0.50)	1 (0.83, 30)	0 (0.00)	0
House Wren	1 (0.83)	1 (0.50)	1 (1.00, 25)	0 (0.00)	1
Wood Thrush	0 (0.00)	2 (1.00)	2 (0.83, 60)	1 (1.77)	3
American Robin	1 (0.83)	2 (1.00)	2 (1.25, 40)	1 (1.77)	2
Gray Catbird	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	3
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	10 (17.70)	10
Red-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Magnolia Warbler	2 (1.67)	2 (1.00)	2 (NA, 0)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Picnic Old-Field (POF)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Blackpoll	1 (0.83)	1 (0.50)	1 (NA, 0)	0 (0.00)	0
Common Yellowthroat	1 (0.83)	1 (0.50)	1 (1.25, 20)	0 (0.00)	0
Northern Cardinal	1 (0.83)	1 (0.50)	1 (1.25, 20)	0 (0.00)	1
Rufous-sided Towhee	3 (2.50)	3 (1.50)	3 (3.75, 20)	0 (0.00)	2
Field Sparrow	1 (0.83)	1 (0.50)	1 (2.50, 10)	1 (1.77)	1
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	3
Brown-headed Cowbird	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Total No. Individuals	13	18	18	18	34
Total No. Species	10	13	13	7	16

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Yellow-billed Cuckoo	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Chimney Swift	4 (1.90)	4 (1.14)	4 (NA, 0)	1 (1.18)	1
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	2
Great Crested Flycatcher	1 (0.48)	2 (0.57)	2 (0.71, 40)	3 (3.54)	5
Blue Jay	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	5
American Crow	0 (0.00)	2 (0.57)	2 (0.19, 50)	0 (0.00)	3
Fish Crow	1 (0.48)	1 (0.29)	1 (0.57, 25)	1 (1.18)	2
Black-capped Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	2
Tufted Titmouse	1 (0.48)	2 (0.57)	2 (0.71, 40)	0 (0.00)	3
Brown Creeper	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	1
House Wren	2 (0.95)	2 (0.57)	2 (1.43, 20)	2 (2.36)	5
Wood Thrush	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Robin	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	1
Northern Mockingbird	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1

Appendix 8 (Continued).

SITE: McMillan Old-Field (MOF)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Brown Thrasher	1 (0.48)	1 (0.29)	1 (2.86, 5)	0 (0.00)	0
European Starling	1 (0.48)	1 (0.29)	1 (NA, 0)	0 (0.00)	0
Northern Cardinal	3 (1.43)	3 (0.86)	3 (1.43, 30)	3 (3.54)	5
Indigo Bunting	0 (0.00)	1 (0.29)	1 (0.29, 50)	0 (0.00)	2
Rufous-sided Towhee	2 (0.95)	2 (0.57)	2 (0.95, 30)	0 (0.00)	1
Chipping Sparrow	1 (0.48)	1 (0.29)	1 (1.43, 10)	0 (0.00)	0
Field Sparrow	5 (2.38)	5 (1.43)	5 (7.14, 10)	2 (2.36)	3
Brown-headed Cowbird	3 (1.43)	3 (0.86)	3 (1.71, 25)	0 (0.00)	1
House Finch	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.18)	2
American Goldfinch	4 (1.90)	4 (1.14)	4 (3.81, 15)	5 (5.90)	9
Total No. Individuals	28	34	34	22	57
Total No. Species	13	15	15	13	23

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Black-billed Cuckoo	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Red-headed Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Red-bellied Woodpecker	1 (0.56)	1 (0.33)	1 (0.67, 25)	1 (1.77)	2
Great Crested Flycatcher	0 (0.00)	1 (0.33)	1 (0.42, 40)	0 (0.00)	1
Eastern Wood-pewee	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Blue Jay	0 (0.00)	2 (0.66)	2 (0.48, 70)	1 (1.77)	2
American Crow	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Black-capped Chickadee	1 (0.56)	1 (0.33)	1 (0.56, 30)	1 (1.77)	2
Tufted Titmouse	1 (0.56)	1 (0.33)	1 (0.90, 15)	1 (1.77)	3
House Wren	5 (2.78)	6 (2.00)	6 (2.50, 40)	2 (3.54)	4
Wood Thrush	0 (0.00)	2 (0.66)	2 (0.44, 75)	0 (0.00)	1
Gray Catbird	1 (0.56)	1 (0.33)	1 (NA, 0)	3 (5.31)	3
Red-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Black-throated Blue Warbler	1 (0.56)	1 (0.33)	1 (1.67, 10)	0 (0.00)	0
Chestnut-sided Warbler	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0

Appendix 8 (Continued).

SITE: Devil's Den Old-Field (DOF)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
American Redstart	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0
Scarlet Tanager	0 (0.00)	1 (0.33)	1 (0.33, 50)	0 (0.00)	0
Northern Cardinal	1 (0.56)	2 (0.66)	2 (0.56, 60)	2 (3.54)	3
Rufous-sided Towhee	1 (0.56)	1 (0.33)	1 (3.33, 5)	2 (3.54)	3
Song Sparrow	1 (0.56)	1 (0.33)	1 (3.33, 5)	1 (1.77)	2
Brown-headed Cowbird	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0
House Finch	1 (0.56)	1 (0.33)	1 (0.83, 20)	0 (0.00)	0
Total No. Individuals	17	25	25	18	31
Total No. Species	13	17	17	13	16

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Barred Owl	0 (0.00)	1 (0.17)	1 (0.11, 75)	0 (0.00)	0
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Red-headed Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	2 (3.54)	2
Red-bellied Woodpecker	0 (0.00)	3 (0.50)	3 (0.33, 75)	2 (3.54)	6
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	2
Northern Flicker	2 (0.55)	4 (0.67)	4 (0.83, 40)	2 (3.54)	3
Eastern Wood-pewee	1 (0.28)	1 (0.17)	1 (0.28, 30)	1 (1.77)	3
Acadian Flycatcher	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
Great Crested Flycatcher	2 (0.55)	2 (0.33)	2 (NA, 0)	3 (5.31)	3
Blue Jay	2 (0.55)	7 (1.17)	7 (0.49, 120)	0 (0.00)	3
Black-capped Chickadee	1 (0.28)	1 (0.17)	1 (0.33, 25)	1 (1.77)	1
Carolina Chickadee	1 (0.28)	1 (0.17)	1 (0.28, 30)	3 (5.31)	3
Tufted Titmouse	3 (0.83)	5 (0.50)	5 (1.38, 30)	2 (3.54)	5

Appendix 8 (Continued).

SITE: Devil's Den Lowland (DDL)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
White-breasted Nuthatch	1 (0.28)	1 (0.17)	1 (1.67, 5)	4 (7.08)	4
House Wren	5 (1.39)	5 (0.83)	5 (2.08, 20)	4 (7.08)	6
Blue-gray Gnatcatcher	3 (0.83)	3 (0.50)	3 (1.25, 20)	0 (0.00)	0
Wood Thrush	1 (0.28)	1 (0.17)	1 (0.42, 20)	3 (5.31)	9
Gray Catbird	1 (0.28)	1 (0.17)	1 (0.28, 30)	2 (3.54)	3
Red-eyed Vireo	1 (0.28)	1 (0.17)	1 (0.28, 30)	2 (3.54)	2
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	9 (15.93)	9
American Redstart	2 (0.55)	2 (0.33)	2 (1.11, 15)	0 (0.00)	0
Scarlet Tanager	0 (0.00)	1 (0.17)	1 (0.21, 40)	0 (0.00)	2
Northern Cardinal	2 (0.55)	2 (0.33)	2 (NA, 0)	4 (7.08)	5
Rufous-sided Towhee	2 (0.55)	2 (0.33)	2 (NA, 0)	1 (1.77)	1
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.77)	1
Brown-headed Cowbird	1 (0.28)	1 (0.17)	1 (0.28, 30)	0 (0.00)	0
American Goldfinch	1 (0.28)	1 (0.17)	1 (0.42, 20)	1 (1.77)	1
Total No. Individuals	33	47	47	50	77
Total No. Species	19	22	22	21	24

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Canada Goose	7 (1.94)	7 (1.67)	7 (NA, 0)	0 (0.00)	0
Wood Duck	22 (6.11)	22 (3.67)	22 (12.2, 15)	0 (0.00)	0
Mallard	9 (2.50)	9 (1.50)	9 (5.00, 15)	5 (3.55)	5
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Cooper's Hawk	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Chimney Swift	3 (0.83)	3 (0.50)	3 (NA, 0)	10 (7.10)	10
Belted Kingfisher	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	2
Red-bellied Woodpecker	1 (0.28)	2 (0.33)	2 (0.42, 40)	2 (1.42)	2
Downy Woodpecker	1 (0.28)	1 (0.17)	1 (0.83, 10)	1 (0.71)	1
Northern Flicker	1 (0.28)	1 (0.17)	1 (0.42, 20)	0 (0.00)	0
Eastern Woodpeewee	0 (0.00)	1 (0.17)	1 (0.24, 35)	1 (0.71)	4
Acadian Flycatcher	1 (0.28)	1 (0.17)	1 (0.28, 30)	0 (0.00)	0
Great Crested Flycatcher	7 (1.94)	7 (1.67)	7 (2.33, 25)	2 (1.42)	3
Blue Jay	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
American Crow	0 (0.00)	2 (0.33)	2 (0.17, 100)	0 (0.00)	3
Carolina Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Tufted Titmouse	4 (1.11)	4 (0.67)	4 (2.22, 15)	3 (2.13)	3
White-breasted Nuthatch	1 (0.28)	1 (0.17)	1 0.83, 10)	3 (2.13)	3
House Wren	6 (1.67)	7 (1.67)	7 (1.46, 40)	3 (2.13)	6
Blue-gray Gnatcatcher	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Eastern Bluebird	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
Veery	1 (0.28)	1 (0.17)	1 (0.83, 10)	0 (0.00)	0
Wood Thrush	0 (0.00)	1 (0.17)	1 (0.14, 60)	1 (0.71)	1
American Robin	1 (0.28)	1 (0.17)	1 (0.56, 15)	0 (0.00)	0
Gray Catbird	7 (1.94)	7 (1.67)	7 (2.33, 25)	2 (1.42)	3
Red-eyed Vireo	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	2
Yellow Warbler	1 (0.28)	1 (0.17)	1 (1.67, 5)	0 (0.00)	0
Cape May Warbler	1 (0.28)	1 (0.17)	1 (0.42, 20)	0 (0.00)	0
Blackpoll	0 (0.00)	0 (0.00)	0 (0.00)	3 (2.13)	3
American Redstart	1 (0.28)	1 (0.17)	1 (0.42, 20)	0 (0.00)	0
Scarlet Tanager	1 (0.28)	1 (0.17)	1 (0.28, 30)	1 (0.71)	1

Appendix 8 (Continued).

SITE: Landfill Lowland (LFL)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Northern Cardinal	0 (0.00)	1 (0.17)	1 (0.21, 40)	1 (0.71)	2
Indigo Bunting	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	2
Rufous-sided Towhee	1 (0.28)	1 (0.17)	1 (0.83, 10)	1 (0.71)	1
Song Sparrow	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Common Grackle	0 (0.00)	0 (0.00)	0 (0.00)	5 (3.55)	5
Brown-headed Cowbird	1 (0.28)	1 (0.17)	1 (0.56, 15)	1 (0.71)	1
American Goldfinch	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.71)	1
Total No. Individuals	79	86	86	53	70
Total No. Species	22	26	26	25	28

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Cooper's Hawk	1 (0.33)	1 (0.20)	1 (NA, 0)	0 (0.00)	0
Downy Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.76)	3
Red-bellied Woodpecker	0 (0.00)	2 (0.41)	2 (0.33, 60)	2 (1.76)	5
Northern Flicker	0 (0.00)	1 (0.20)	1 (0.25, 40)	0 (0.00)	0
Pileated Woodpecker	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Eastern Wood-pewee	1 (0.33)	2 (0.40)	2 (0.40, 50)	1 (0.88)	4
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2
Blue Jay	1 (0.33)	4 (0.80)	4 (0.57, 70)	0 (0.00)	0
American Crow	0 (0.00)	1 (0.20)	1 (0.13, 80)	0 (0.00)	0
Tufted Titmouse	1 (0.33)	3 (0.60)	3 (0.60, 50)	0 (0.00)	2
White-breasted Nuthatch	1 (0.33)	1 (0.20)	1 (0.33, 30)	1 (0.88)	1
Wood Thrush	5 (1.67)	7 (1.40)	7 (1.75, 40)	6 (5.28)	8
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	3 (2.64)	3
Red-eyed Vireo	2 (1.00)	2 (0.40)	2 (1.00, 30)	3 (2.64)	4
Magnolia Warbler	0 (0.00)	1 (0.20)	1 (0.29, 35)	0 (0.00)	0
Blackpoll	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1

Appendix 8 (Continued).

SITE: Little Round Top Upland (LRU)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Ovenbird	1 (0.33)	2 (0.40)	2 (0.40, 50)	1 (0.88)	1
Scarlet Tanager	0 (0.00)	1 (0.20)	1 (0.20, 50)	1 (0.88)	3
Northern Cardinal	3 (1.00)	5 (1.00)	5 (0.83, 60)	2 (1.76)	8
Brown-headed Cowbird	1 (0.33)	1 (0.20)	1 (0.50, 20)	0 (0.00)	0
Total No. Individuals	17	34	34	22	46
Total No. Species	10	15	15	10	14

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1994 Breeding Season

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
Turkey Vulture	0 (0.00)	0 (0.00)	0 (0.00)	4 (2.36)	5
Broad-winged Hawk	1 (0.22)	1 (0.13)	1 (0.26, 25)	0 (0.00)	0
Mourning Dove	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Chimney Swift	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Red-bellied Woodpecker	1 (0.22)	3 (0.40)	3 (0.33, 60)	2 (1.18)	4
Downy Woodpecker	2 (0.44)	4 (0.53)	4 (0.38, 70)	0 (0.00)	1
Northern Flicker	2 (0.44)	2 (0.27)	2 (NA, 0)	0 (0.00)	0
Pileated Woodpecker	0 (0.00)	1 (0.13)	1 (0.13, 50)	0 (0.00)	1
Eastern Woodpeewee	0 (0.00)	2 (0.27)	2 (0.27, 50)	1 (0.59)	8
Acadian Flycatcher	1 (0.22)	1 (0.13)	1 (NA, 0)	0 (0.00)	0
Great Crested Flycatcher	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Blue Jay	3 (0.67)	4 (0.53)	4 (0.53, 50)	2 (1.18)	5
American Crow	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3
Black-capped Chickadee	0 (0.00)	1 (0.13)	1 (0.17, 40)	0 (0.00)	0
Carolina Chickadee	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.18)	2
Tufted Titmouse	2 (0.44)	3 (0.40)	3 (0.51, 40)	2 (1.18)	5

Appendix 8 (Continued).

SITE: Big Round Top Upland (BRU)

SEASON: 1994 Breeding Season (continued)

Species	TRAN-30	TRAN-50	TRAN-UL	PNTC-30	PNTC-UL
House Wren	1 (0.22)	1 (0.13)	1 (1.33, 5)	0 (0.00)	1
Wood Thrush	3 (0.67)	12 (1.60)	12 (1.33, 60)	2 (1.18)	4
American Robin	1 (0.22)	1 (0.13)	1 (NA, 0)	1 (0.59)	1
Cedar Waxwing	0 (0.00)	0 (0.00)	0 (0.00)	5 (2.95)	9
Red-eyed Vireo	4 (0.89)	4 (0.53)	4 (0.33, 80)	2 (1.18)	5
Black-throated Green Warbler	0 (0.00)	1 (0.13)	1 (0.17, 40)	0 (0.00)	0
Blackpoll	3 (0.67)	3 (0.40)	3 (1.33, 15)	0 (0.00)	0
Ovenbird	1 (0.22)	3 (0.40)	3 (0.51, 40)	1 (0.59)	3
Scarlet Tanager	2 (0.44)	4 (0.53)	4 (0.38, 70)	2 (1.18)	4
Northern Cardinal	2 (0.44)	2 (0.27)	2 (0.44, 30)	1 (0.59)	1
Total No. Individuals	29	54	54	27	65
Total No. Species	15	19	19	13	20

Appendix 9. Bird species and number of individuals observed while conducting the 20.8 km vehicular-road survey protocol during the 1993-94 winter season (March, two surveys) and the 1994 spring migration season (May, one survey) at Gettysburg National Military Park and Eisenhower National Historic Site.

Species	Winter	Spring
Canada Goose	69	16
Mallard	4	0
Black Vulture	3	0
Red-tailed Hawk	1	0
Turkey Vulture	5	0
American Kestrel	2	0
Ring-billed Gull	7	0
Killdeer	2	3
Rock Dove	2	0
Mourning Dove	0	3
Chimney Swift	0	1
Red-bellied Woodpecker	0	1
Downy Woodpecker	2	1
Eastern Wood-pewee	0	8
Great Crested Flycatcher	0	6
Eastern Kingbird	0	2
Purple Martin	0	4
Northern Rough-winged Swallow	0	2
Blue Jay	2	1
American Crow	14	0
Black-capped Chickadee	4	1
Tufted Titmouse	4	1
White-breasted Nuthatch	1	0
House Wren	0	5
Brown Creeper	1	0
Eastern Bluebird	5	2
Wood Thrush	0	3
American Robin	12	9
Gray Catbird	0	3

Appendix 9. (Continued)

Species	Winter	Spring
Northern Mockingbird	2	3
Brown Thrasher	0	1
Cedar Waxwing	0	10
European Starling	28	10
Red-eyed Vireo	0	4
Yellow Warbler	0	1
Blackpoll	0	1
Scarlet Tanager	0	2
Northern Cardinal	1	5
Indigo Bunting	0	1
Rufous-sided Towhee	0	1
Chipping Sparrow	0	1
Song Sparrow	5	1
Dark-eyed Junco	4	0
Red-winged Blackbird	0	7
Eastern Meadowlark	1	1
Brown-headed Cowbird	0	3
House Finch	0	4
House Sparrow	0	3
Total No. Individuals	181	132
Total No. Species	24	37

Appendix 10. Small mammal live-trapping (LT) and pitfall-trapping (PF) data for adults (A), sub-adults (S), juveniles (J), unknown (U-K), males (M), and females (F) at all study sites and rock wall sites during summer 1993 and at additional trapping sites during summer 1994 for Gettysburg National Military Park and Eisenhower National Historic Site.

SITE: Pennsylvania Monument Grassland (PMG)

SPECIES: Deer Mouse (*Peromyscus maniculatus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/28	1	0	0	1	0	0	0	2	0
8/05	0	0	0	0	0	0	1	1	0
8/10	1	0	0	0	0	0	0	1	1
8/11	1	0	0	0	1	0	0	2	1
8/12	1	0	0	0	0	1	0	2	2
8/13	1	0	0	0	1	0	0	2	2
8/24	1	0	0	0	1	0	0	2	1
Total	6	0	0	1	3	1	1	12	7

92% of all individuals captured at PMG

Percent recaptures (7/12) = 58%

No./100 trapnights = 5.13; Total trapnights = 234

No./100 LT-trapnights = 7.7; Total LT-trapnights = 156

No./100 PF-trapnights = 0; Total PF-trapnights = 78

Sex Ratio = 9M:2F = 1:0.22

Age Ratio = 6A:1S:4J = 1:0.17:0.67

OTHER SPECIES:

Meadow Jumping Mouse (*Zapus hudsonius*)

1 U-K captured 8/24 (pitfall)

Appendix 10. (continued)

SITE: Valley of Death Grassland (VDG)

SPECIES: Meadow Vole (*Microtus pennsylvanicus*)

1 A-F captured 7/13

1 A-M captured 7/23

1 U-K captured 7/28

Total trapnights = 195

Total LT-trapnights = 130

Total PF-trapnights = 65

All live-trap captures; no recaptures

Appendix 10. (continued)

SITE: Warfield Ridge Old-Field (WOF)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/13	0	0	0	1	0	0	0	1	0
7/14	0	0	0	1	0	0	0	1	1
7/22	0	1	0	1	0	0	0	2	0
7/23	0	0	0	0	0	0	1	1	1
7/28	0	0	0	0	0	0	1	1	1
Total	0	1	0	3	0	0	2	6	3

43% of all individuals captured at WOF

Percent recaptures (316) = 50

No./100 trapnights = 3.8; Total trapnights = 156

No./100 LT-trapnights = 5.8; Total LT-trapnights = 104

No./100 PF-trapnights = 0; Total PF-trapnights = 52

Sex Ratio = 0M:4F

Age Ratio = 1A:3S:0J = 1:3:0

OTHER SPECIES:

Meadow Vole (*Microtus pennsylvanicus*)

1 U-K captured 7/23

1 U-K captured 7/28

1 re-captured 8/05

All live-trap captures

Maryland Shrew (*Sorex fontinalis*)

1 U-K captured 7/30 (pitfall)

1 U-K captured 8/04 (pitfall)

1 U-K captured 8/05 (live-trap)

2 U-K captured 8/06 (live-trap)

No recaptures

Appendix 10. (continued)

SITE: Picnic Old-Field (POF)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/13	2	1	0	0	0	0	0	3	0
7/14	1	1	0	0	0	0	0	2	1
7/20	1	0	0	0	0	0	0	1	0
7/21	1	0	0	0	0	0	0	1	1
7/22	1	0	0	0	0	0	0	1	1
7/23	1	0	0	0	0	0	0	1	1
7/29	1	0	0	0	0	0	0	1	1
7/30	2	0	0	0	0	0	0	2	1
8/06	0	0	1	0	0	0	0	1	0
Total	10	2	1	0	0	0	0	13	6

87% of all individuals captured at POF

Percent recaptures (6/13) = 46%

No./100 trapnights = 16.67; Total trapnights = 78

No./100 LT-trapnights = 25.0; Total LT-trapnights = 52

No./100 PF-trapnights = 0; Total PF-trapnights = 26

Sex Ratio = 11M:1F = 1:0.1

Age Ratio = 12A:1S:0J = 1:0.08:0

Mean Adult Weight (g) (\pm SD) = 20.17 (\pm 2.71), n = 6

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/21 (pitfall)

Eastern Chipmunk (*Tamias striatus*)

1 A-F captured 8/05 (live-trap)

Weight (g) = 78

Appendix 10. (continued)

SITE: McMillan Old-Field (MOF)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/21	1	0	0	0	0	0	0	1	0
7/27	1	0	0	1	0	0	0	2	0
7/28	0	1	0	0	0	0	0	1	0
7/30	1	1	0	0	0	0	0	2	2
8/04	0	1	0	0	0	0	0	1	1
8/05	0	1	0	0	0	0	0	1	1
8/06	0	1	0	0	0	0	0	1	1
Total	3	5	0	1	0	0	0	9	5

90% of all individuals captured at MOF

Percent recaptures (5/9) = 56%

No./100 trapnights = 7.69; Total trapnights = 117

No./100 LT-trapnights = 11.5; Total LT-trapnights = 78

No./100 PF-trapnights = 0; Total PF-trapnights = 39

Sex Ratio = 3M:6F = 1:2

Age Ratio = 8A:1S:0J = 1:0.13:0.00

Mean Adult Weight (g) (\pm SD) = 22.0 (\pm 3.6), n = 3

OTHER SPECIES:

Eastern Chipmunk (*Tamias striatus*)

1 U-K captured 7/23 (live-trap)

Appendix 10. (continued)

SITE: Devil's Den Old-Field (DOF)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/13	0	0	0	0	0	0	0	0	0
7/14	0	0	0	0	0	0	0	0	0
7/20	0	0	0	0	0	0	0	0	0
7/21	0	1	0	0	0	0	0	0	1
7/22	0	0	0	0	0	0	0	0	0
7/23	0	1	0	0	0	0	0	1	1
7/27	0	0	0	0	0	0	0	0	0
7/28	0	0	0	0	0	0	0	0	0
7/29	0	1	0	0	0	0	0	1	1
7/30	1	1	0	0	0	0	0	1	2
8/04	1	0	0	1	0	0	0	1	2
8/05	1	1	0	0	0	0	0	2	2
8/06	0	1	0	1	0	0	0	2	2
Total	3	6	0	2	0	0	0	8	11

92% of all individuals captured at DOF

Percent recaptures (8/11) = 73%

No./100 trapnights = 14.1; Total trapnights = 78

No./100 LTT trapnights = 21.2; Total LTT trapnights = 52

No./100 PFT trapnights = 0.0; Total PFT trapnights = 26

Sex Ratio = 3M:8F = 1:2.7

Age Ratio = 9A:2S:0J = 1:0.22:0.0

Mean Adult Weight (g) (\pm SD) = 20.0 (\pm 0.0), n= 2

OTHER SPECIES:

Eastern Chipmunk (*Tamias striatus*)

1 A-M (85 g) captured 7/23 (live-trap)

Appendix 10. (continued)

SITE: Devil's Den Lowland (DDL)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/13	1	0	0	0	0	0	1	2	0
7/14	0	2	0	0	0	0	0	2	0
7/20	3	1	1	0	0	0	0	5	2
7/21	3	3	0	0	0	2	0	7	4
7/22	3	0	0	0	0	1	1	5	1
7/23	1	2	0	0	0	2	0	4	2
7/27	2	2	0	0	0	1	3	8	4
7/28	1	1	0	0	0	1	0	3	2
7/29	2	4	0	0	0	0	0	5	2
7/30	4	1	0	0	0	1	0	4	4
8/04	4	6	0	1	0	1	1	11	9
8/05	5	3	0	0	0	0	0	7	6
8/06	3	4	0	3	0	0	0	10	6
Total	32	29	1	4	0	9	6	73	42

91% of all individuals captured at DDL

Percent recaptures (42/73) = 58

No./100 trapnights = 31.2; Total trapnights = 234

No./100 LT-trapnights = 46.8; Total LT-trapnights = 156

No./100 PF-trapnights = 0; Total PF-trapnights = 78

Sex Ratio = 30M:37F = 1:1.2

Age Ratio = 52A:6S:9J = 1:0.12:0.17

Mean Adult Weight (g) (\pm SD) = 19.47 (\pm 4.03), n = 15

Appendix 10. (continued)

SITE: Devil's Den Lowland (DDL) (continued)

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/14 (live-trap)

Eastern Chipmunk (*Tamias striatus*)

1 A-M captured 7/22

1 A-F captured 7/30

1 A-M and 1 A-F captured 8/05

All live-trap captures

Mean Adult Weight (g) (\pm SD) = 70.9 (\pm 10.17), n = 4

Maryland Shrew (*Sorex fontinalis*)

1 U-K captured 7/20 (pitfall)

No recaptures

Meadow Jumping Mouse (*Zapus hudsonius*)

1 U-K captured 7/27 (live-trap)

Appendix 10. (continued)

SITE: Landfill Lowland (LFL)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/21	0	1	0	0	0	1	0	2	0
7/22	0	3	0	0	0	0	0	3	1
7/23	3	1	0	2	0	0	1	7	0
7/27	1	1	0	0	0	0	1	4	2
7/28	1	1	0	1	0	0	1	4	2
7/29	0	2	0	2	0	0	1	5	4
7/30	3	2	0	2	0	0	0	7	5
8/04	3	3	0	0	0	0	0	6	4
8/05	3	1	0	1	0	0	0	5	4
8/06	2	2	0	0	0	0	0	4	4
8/11	3	3	0	0	0	0	1	7	7
8/12	2	2	0	1	0	0	2	6	5
8/13	1	1	0	0	0	1	2	5	5
8/24	2	5	0	0	0	0	1	8	4
Total	24	27	0	9	0	2	10	72	47

97% of all individuals captured at LFL

Percent recaptures (47/72) = 65%

No./100 trapnights = 36.9; Total trapnights = 195

No./100 LT-trapnights = 55.4; Total LT-trapnights = 130

No./100 PF-trapnights = 0; Total PF-trapnights = 65

Sex Ratio = 24M:38F = 1:1.58

Age Ratio = 51A:9S:2J = 1:0.18:0.04

Mean Adult Weight (g) (\pm SD) = 15.1 (\pm 6.15), n = 10

Appendix 10. (continued)

SITE: Landfill Lowland (LFL) (continued)

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/20 (pitfall)

Meadow Vole (*Microtus pennsylvanicus*)

1 A-F captured 7/21 (live-trap)

Appendix 10. (continued)

SITE: Little Round Top Upland (LRU)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/13	0	1	0	0	0	0	0	1	0
7/14	2	0	0	0	0	0	0	2	0
7/20	2	0	1	0	0	0	0	3	1
7/21	1	1	1	0	0	0	0	3	2
7/22	2	1	0	1	0	0	0	4	3
7/23	1	1	0	1	0	0	0	3	2
7/28	1	1	0	0	0	0	1	3	1
7/29	1	1	0	1	0	0	0	3	3
7/30	2	0	0	0	0	0	0	2	1
8/04	1	0	0	0	0	0	1	2	1
8/05	2	0	0	1	0	0	0	3	3
Total	15	6	2	4	0	0	2	29	17

85% of all individuals captured at LRU

Percent recaptures (17/29) = 59%

No./100 trapnights = 29.5; Total trapnights = 156

No./100 LT-trapnights = 27.9; Total LT-trapnights = 104

No./100 PF-trapnights = 0; Total PF-trapnights = 52

Sex Ratio = 17M:10F = 1:0.59

Age Ratio = 21A:6S:0J = 1:0.29:0

Mean Adult Weight (g) (\pm SD) = 20.0 (\pm 1.0), n = 3

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/20

2 U-K captured 7/27

1 U-K captured 7/29

1 U-K captured 8/04

All live-trap captures; no recaptures

Appendix 10. (continued)

SITE: Big Round Top Upland (BRU)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/20	0	0	1	0	0	0	0	1	0
7/21	2	0	0	0	0	0	0	2	0
7/22	3	0	0	0	1	0	1	5	2
7/23	3	0	1	1	0	0	0	5	3
7/27	2	0	2	0	0	0	0	4	3
7/28	1	0	2	0	0	0	1	4	2
7/29	2	0	0	1	0	0	0	3	2
7/30	1	1	1	0	0	0	0	3	1
8/04	3	0	0	1	0	0	1	5	1
8/05	0	1	1	0	0	0	1	3	2
8/10	1	0	0	1	0	0	0	2	2
8/11	3	0	1	2	0	0	0	6	4
8/12	0	0	0	1	0	0	0	1	1
8/13	3	0	0	1	0	0	0	4	3
Total	24	2	9	9	0	0	4	48	26

89% of all individuals captured at BRU

Percent recaptures (26/48) = 54%

No./100 Trapnights = 20.5; Total Trapnights = 234

No./100 LT-trapnights = 30.8; Total LT-trapnights = 156

No./100 PF-trapnights = 0; Total PF-trapnights = 78

Sex Ratio = 33M:11F = 1:0.33

Age Ratio = 26A:18S:0J = 1:0.69:0.00

Mean Adult Weight (g) (\pm SD) = 20.0 (\pm 2.5), n = 9

Appendix 10. (continued)

SITE: Big Round Top Upland (BRU) (continued)

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/20 (pitfall)

1 U-K captured 7/29 (pitfall)

1 U-K captured 8/12 (live-trap)

No recaptures

Eastern Chipmunk (*Tamias striatus*)

1 A-F captured 8/11 (live-trap)

Maryland Shrew (*Sorex fontinalis*)

2 U-K captured 8/12 (pitfall)

No recaptures

Appendix 10. (continued)

SITE: Horse Path Rocks (HPR)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/20	1	1	1	0	0	0	0	3	0
7/21	2	1	0	5	0	0	1	9	1
7/22	2	3	0	4	0	0	0	9	6
7/23	2	3	0	2	0	0	0	7	6
7/27	3	3	1	5	0	0	0	12	9
7/28	3	2	1	4	0	0	0	10	10
7/29	5	2	1	3	0	0	1	12	10
7/30	1	2	0	1	0	0	0	4	3
8/05	1	0	1	1	0	0	0	3	1
Total	20	17	5	25	0	0	2	69	46

96% of all individuals captured at HPR

Percent recaptures (46/69) = 67%

No./100 trapnights = 31.3; Total trapnights = 220

Sex Ratio = 25M:42F = 1:1.68

Age Ratio = 37A:30S:0J = 1:0.81:0

Mean Adult Weight (g) (\pm SD) = 20.64 (\pm 3.38), n = 11

Live-traps only (no pitfall traps used)

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/27

1 U-K captured 8/06

No recaptures

Appendix 10. (continued)

SITE: Devil's Den Rocks (DDR)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/20	1	0	1	0	0	0	0	2	0
7/21	1	1	1	0	0	0	0	3	2
7/22	1	1	0	0	0	0	1	3	2
7/23	1	2	0	0	0	0	0	3	2
7/27	0	1	0	1	0	2	1	5	1
7/28	0	1	0	1	1	0	1	4	3
7/29	1	1	0	1	0	1	1	5	5
7/30	1	2	0	1	0	1	2	7	7
Total	6	9	2	4	1	4	6	32	22

100% of all individuals captured at DDR

Percent recaptures (22/32) = 69%

No./100 trapnights = 32; Total trapnights = 100

Sex Ratio = 9M:17F = 1:1.89

Age Ratio = 15A:6S:5J = 1:0.40:0.33

Mean Adult Weight (g) (\pm SD) = 21 (\pm 1.0), n = 3

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: Pennsylvania's Monument Rocks (PMR)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/20	1	0	0	0	0	0	0	1	0
7/21	3	0	0	0	0	0	0	3	1
7/22	4	2	0	0	0	0	0	6	3
7/23	3	1	0	0	0	0	0	4	4
7/27	2	2	0	1	0	0	0	5	3
7/28	2	2	0	1	0	0	1	6	5
7/29	2	2	0	1	0	0	0	5	5
7/30	3	2	0	1	0	0	0	6	3
8/05	0	1	0	0	0	0	0	1	1
Total	20	12	0	4	0	0	1	37	25

95% of all individuals captured at PMR

Percent recaptures (25/37) = 68

No./100 trapnights = 28.5; Total trapnights = 130

Sex Ratio = 20M:16F = 1:0.8

Age Ratio = 32A:4S:0J = 1:0.13:0.00

Mean Adult Weight (g) (\pm SD) = 18.8 (\pm 5.54), n = 5

Live-traps only (no pitfall traps used)

OTHER SPECIES:

Deer Mouse (*Peromyscus maniculatus*)

1 U-K captured 7/29

1 U-K captured 8/05

No recaptures

Appendix 10. (continued)

SITE: Sedgwick Rocks (SWR)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/21	1	1	0	0	0	0	0	2	0
7/22	0	1	0	0	0	0	0	1	1
7/23	1	1	0	0	0	0	0	2	1
7/27	1	0	0	0	0	0	0	1	1
7/29	0	1	0	0	0	1	0	2	0
7/30	0	0	0	0	0	1	0	1	0
Total	3	4	0	0	0	2	0	9	3

100% of all individuals captured at SWR

Percent recaptures (3/9) = 33%

No./100 trapnights = 10.0; Total trapnights = 90

Sex Ratio = 3M:6F = 1:2

Age Ratio = 7A:0S:2J = 1:0.00:0.29

Mean Adult Weight (g) (\pm SD) = 21.5 (\pm 3.11), n = 4

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: Valley of Death Rocks (VDR)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

1 A-M captured 7/20

1 U-K captured 7/20

No recaptures

Total trapnights = 70

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: Pennsylvania Monument Grassland (PMG)

SPECIES: Meadow Vole (*Microtus pennsylvanicus*)

1 A-F captured 7/12

1 A-F and 1 J-M captured 7/14

1 J-M recaptured 7/15

1 J-M captured 7/16

1 recapture

Total trapnights = 50

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: Red Rock Road Grassland (RRG)

SPECIES: Meadow Vole (*Microtus pennsylvanicus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/12	3	0	0	0	0	0	0	3	0
7/13	2	1	0	0	0	0	0	3	0
7/14	3	0	0	0	1	0	0	4	0
7/15	1	2	0	0	0	0	0	3	0
7/16	0	3	0	0	0	0	0	3	1
Total	9	6	0	0	1	0	0	16	1

94% of all individuals captured at RRG

Percent recaptures (1/16) = 6%

No./100 trapnights = 32; Total trapnights = 50

Sex Ratio = 10M:6F = 1:0.6

Age Ratio = 15A:0S:1J = 1:0.00:0.06

Mean Adult Weight (g) (\pm SD) = 39.7 (\pm 6.70), n = 13

Live-traps only (no pitfall traps used)

OTHER SPECIES:

White-footed Mouse (*Peromyscus leucopus*)

1 A-M captured 7/13

Appendix 10. (continued)

SITE: Sedgwick Avenue Grassland (SAG)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

1 A-M captured 7/12

1 A-M captured 7/13

1 A-F captured 7/14

1 A-M captured 7/15

2 A-F captured 7/16

1 recapture

Mean Adult Weight (g) (\pm SD) = 17.4 (\pm 1.36), n = 5

OTHER SPECIES: Meadow Vole (*Microtus pennsylvanicus*)

1 A-M captured 7/14

Total trapnights = 50

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: Eisenhower Old-Field (EOF)

SPECIES: Meadow Vole (*Microtus pennsylvanicus*)

1 A-M captured 7/12

1 A-M captured 7/16

No recaptures

Total trapnights = 50

Live-traps only (no pitfall traps used)

Appendix 10. (continued)

SITE: South Confederate Lowland (SCL)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

DATE	A-M	A-F	S-M	S-F	J-M	J-F	U-K	TOTAL	RECAPS
7/12	0	0	0	0	0	0	0	0	0
7/13	0	0	0	0	0	0	0	0	0
7/14	1	1	0	0	0	0	0	2	0
7/15	1	1	0	0	0	0	0	2	0
7/16	4	3	0	0	0	0	0	7	3
Total	6	5	0	0	0	0	0	11	3

92% of all individuals captured at RRG

Percent recaptures (3/11) = 27%

No./100 trapnights = 22; Total trapnights = 50

Sex Ratio = 6M:5F = 1:0.83

Age Ratio = 11A:0S:0J = 1:0.00:0.00

Mean Adult Weight (g) (\pm SD) = 17.4 (\pm 3.18)

Live-traps only (no pitfall traps used)

OTHER SPECIES:

Northern Short-tailed Shrew (*Blarina brevicauda*)

1 U-K captured 7/15

Appendix 10. (continued)

SITE: Culp's Hill Upland (CHU)

SPECIES: White-footed Mouse (*Peromyscus leucopus*)

1 A-M captured 7/15

4 A-M captured 7/16

1 recapture

Mean Adult Weight (g) (\pm SD) = 16.5 (\pm 1.5), n = 4

Total trapnights = 50

Live-traps only (no pitfall traps used)



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