

**Inventory of Distribution, Composition, and Relative Abundance of Birds at Hopewell
Culture National Historical Park**

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Summary

A year long inventory of the presence/absence of birds at Hopewell Culture National Historical Park documented 66 of 283 (23%) expected species. When combining the results of this inventory with other surveys on park land, 172 of the expected species (60% of 285) are known to be present at the park (two species new to list). Additionally, if excluding birds that are accidental or rare, 75% of the expected species (162 of 215) are confirmed.

The highest level of richness and abundance was found at Hopewell Mound Group, which had 44 species and 203 individuals (Table 4). The next highest numbers was from Hopeton Earthworks, which had 39 species and 146 individuals, High Bank Works had 35 species and 96 individuals, Mound City Group had 32 species and 89 individuals, and Seip Earthworks had the lowest numbers with 29 species and 100 individuals.

When comparing seasons, the early spring (April/May) sampling period resulted in the highest richness and abundance (44 species and 213 individuals), followed closely by the late spring (May/June) with 40 species and 196 individuals, the fall (Sept./Oct.) with 31 species and 129 individuals, and the winter (Jan.) with 29 species and 96 individuals (Table 6).

Habitat at the park was broken into four categories listed in order of highest richness and abundance to lowest: agriculture/old field- 54 species and 385 individuals, woods/upland- 39 species and 103 individuals, riparian- 36 species and 99 individuals, and mowed-24 species and 47 individuals (Table 7).

During the course of the 2003/2004 field work, three species of concern were documented and during other surveys on park land, the Federally listed Threatened bald eagle was documented as well as five other Ohio State Endangered species, four Ohio State Threatened Species, three other Ohio State Species of Concern, and thirteen other Ohio State Species of Interest

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Introduction

A comprehensive survey of birds that may utilize Hopewell Culture National Historical Park was initiated to determine species diversity and create a baseline inventory of bird species utilizing the park. Prior inventories have been conducted on various park units and will be incorporated with the results of this inventory. The collection of this information will then be incorporated into park monitoring and management plans in order to successfully manage for healthy and diverse populations of birds.

Hopewell Culture National Historical Park, a unit of the National Park Service (NPS), was established to preserve, protect, and interpret the remnants of the Hopewell, thereby increasing understanding of their culture. Since the establishment of the park in 1923, focus has been on the archeological remnants of the Hopewell culture. Work and study of the natural resources in the park however, has been limited and incomplete. In 1998, the U.S. Congress passed the National Parks Omnibus Management Act, which requires parks to collect baseline data on natural resources in order to create effective monitoring protocols to help manage and protect park resources. As a result, the Natural Resource Challenge program was created by NPS. This led to the formation of the Heartland Network one of many networks in the NPS Inventory and Monitoring program. One of the first priorities for the Heartland Network was to help parks conduct comprehensive inventories in order to build their baseline knowledge.

The state of Ohio is located along an important migratory pathway and also serves as vital breeding grounds for many migratory birds. Riparian areas are located throughout Ross County, with the Scioto River as the main water system that drains the whole county. The Scioto River Valley flows into the Ohio River Valley, which eventually connects with the Mississippi River Valley. In addition, Lake Erie is located along the northern border of Ohio, an extensively used resource by birds. In addition, wintering birds rely on the abundant resources found within this state during the colder months. As a result, throughout the seasons, a variety of birds can be observed, with migratory species especially abundant during the spring and fall. Approximately 283 bird species, ranging from local inhabitants, migratory, and accidental birds, may and have been observed in southern Ohio.

The goal of the inventory is to document 90% of the species that are reasonably expected to occur at the park. This inventory is a census of the five park units and will provide data on bird species composition, distribution, and relative abundance.

Study Area

Hopewell Culture National Historical Park is composed of five non-contiguous park units totaling more than 445 ha (1,100 ac) in size (Table 1). The park units are Mound City Group, Hopeton Earthworks, Hopewell Mound Group, High Bank Works, and Seip Earthworks. The five units are located around the town of Chillicothe, Ross County, Ohio (Figure 1). Two phytogeographic regions of Ohio meet along a NE/SW line. The northwest portion of the park and Ross County is composed of calcareous, glaciated till plain, while the southeast is made up of non-glaciated area (Braun 1989). The meeting of two regions may result in higher diversity of flora and fauna.

Each site was inventoried for vegetation in a 50 m radius prior to any sampling (see methods below).

Mound City Group (Mound City) is located at 16062 State Route 104, Chillicothe. This park unit contains five buildings, 1.6 km. (1 mi) of trails, and 1.2 km (0.74 mi) of road. The entire unit contains 48.6 ha (120 ac), with 12.1 ha (30 ac) actively mowed, 18.2 ha (45 ac) mowed periodically for hay, and 18.2 ha (45 ac) of early successional mixed mesophytic forest. The Scioto River borders the eastern edge of the unit.

Four sites were selected at the Mound City unit. Three sites, Site 1, 2, and 4, are located in relatively wooded areas, while a fourth site, Site 3 is located in a hay field (Figure 2).

The wooded sites (1, 2, and 4) are located nearby regularly mowed areas, thereby tall fescue (*Festuca elatior*) was predominant. Sites 1 and 2 are located in an upland area and the woods at these sites are mostly early successional mixed mesophytic forest (Bennett and Course 1996). The canopy and sub-canopy is dominated by hackberry (*Celtis occidentalis*) and black walnut (*Juglans nigra*) trees. Wild black cherry (*Prunus serotina*) trees also make up the canopy, while box elder (*Acer negundo*) can be found in the sub-canopy. The shrub layer is almost entirely composed of tatarian honeysuckle (*Lonicera tatarica*), with some trumpet creeper (*Campsis radicans*) and black raspberry (*Rubus occidentalis*) present. The aggressive Japanese honeysuckle (*Lonicera japonica*) climbs on every layer, and dominates the herbaceous vegetation. Other plants found at the ground level include poison ivy (*Toxicodendron radicans*) and garlic mustard (*Alliaria petiolata*).

Site 3 is located in the hay field consisting mainly of orchard grass (*Dactylis glomerata*) and alfalfa (*Medicago sativa*), with some curly dock (*Rumex crispus*) and bladder campion (*Silene latifolia*).

Both Site 3 and 4 are located near the riparian area of the Scioto River. Riparian areas serve as important routes and breeding grounds for many migratory birds. Due to the significant resources available in this water body for birds, the Scioto River Complex in Ross County and Pike County was designated an Important Bird Area (IBA) by the Ohio Audubon Society (Audubon Ohio 2001). Sites designated as IBA are considered significant due to the presence of essential habitat and large numbers of bird species that utilize the area. The Scioto River flows along the eastern edge of Mound City and is known to contain a wide diversity of aquatic and

riparian habitats. Severe erosion occurs in many areas of this river, in part due to the six dams in its upper reaches. Based on the extensive surveys conducted by the Ohio Environmental Protection Agency (OEPA) for more than 20 years, the designated aquatic use of the river improved from “Modified” to “Exceptional” warmwater (ODSW 2002). The attainment of “Exceptional” warmwater is based on the increase in species diversity, composition, and functional organization of fish and invertebrates.

The river flows approximately nine-tenths of a kilometer (0.6 mi) along the park boundary, with a portion causing extensive erosion. Some areas along the river are flooded periodically, while others are located at upper terraces. Site 4 is located on the upper terrace right by the river. The study site area is mostly wooded, with the canopy dominated by cottonwoods (*Populus deltoides*) and hackberry, with some black walnut (*Juglans nigra*) and sycamores (*Platanus occidentalis*). The sub-canopy is dominated by hackberry, black walnut, and box elder trees. Tatarian honeysuckle dominates the shrub layer. A large portion of Site 4 includes some mowed grass, but is otherwise dominated by periwinkle (*Vinca minor*), a non-native. Other plants peeking through the herbaceous layer are smooth sweet cicely (*Osmorhiza longistylis*), small-flowered leaf cup (*Polymnia canadensis*), poison ivy and garlic mustard.

Hopeton Earthworks (Hopeton) is located at the 1100 block of Hopeton Road, Chillicothe. This is one of the largest units encompassing approximately 151.9 ha (375.4 ac). The majority of the area, 96.0 ha (237.3 ac), is mainly composed of orchard grass and alfalfa and has been harvested for hay in the recent past. A relatively young fence row bisects the property and is composed mainly of hackberry, with some wild black cherry. Currently there is an active gravel mining operation located on the western half of the property. The Scioto River flows along a portion of the western side of the gravel mining operation. In addition, a no-till corn/soybean field owned by the park is located on the western side of the mining operation. Another 1.6 ha (4 ac) contains mowed grass and black walnut trees, while the remaining area is composed of early successional mixed deciduous open forest, with an intermittent stream, Dry Run, flowing through the 5.5 ha (13.6 ac) parcel.

The Hopeton unit contains a total of seven study sites, with Sites 1, 2, 3, and 6, located in hay fields, Site 5 on a regularly mowed area, Site 7 on a fallow field, and Site 8 along a riparian corridor (Figure 4).

The fields within this unit comprise the largest acreage – 96.0 ha (237.3 ac), however the unit is not entirely contiguous as an active gravel mining operation is located on the western portion of this park unit. Most of this unit has and continues to be actively mowed for hay (lease expires 2005). Sites 1, 2, 3, and 6, are dominated by orchard grass and alfalfa, with some Canada thistle (*Cirsium arvense*) and poison hemlock (*Conium maculatum*).

The field where Site 5 is located contains a dirt road used by the gravel mining company, and has one sugar maple tree in the area. The rest of the vegetation is composed of some multiflora rose (*Rosa multiflora*) but mainly red clover (*Trifolium pratense*) and tall fescue, with some Canada thistle, yellow sweet clover (*Melilotus officinalis*), and poison hemlock.

Site 7 is located in the northeast section of the park unit. This area has not been mowed for hay since 2001. Due to its history, the canopy, sub-canopy and shrub layer is mainly restricted to tree lines. Within the tree line are hackberry and wild black cherry, which are present in both the canopy and sub-canopy. White mulberry (*Morus alba*) can also be found in the sub-canopy layer. The shrubs within the tree line are mainly tartarian honeysuckle and multiflora rose. The main ground cover is the herbaceous layer which is dominated by common and giant goldenrod (*Solidago canadensis*, *S. gigantea*), Philadelphia fleabane (*Erigeron philadelphicus*), and poison hemlock.

The only riparian corridor enclosed within any of the park units is at Dry Run, an intermittent creek and extends 5.5 ha (13.6 ac). Site 8 was added to the randomly selected VCP sites in the hopes of surveying additional species not found at other sites. The canopy at this site is dominated by black walnut and honey locust (*Gleditsia triacanthos*), followed by some aspen (*Populus grandidentata*), sycamore, and box elder. The sub-canopy is mainly composed of hawthorn (*Crataegus* sp.), Ohio buckeye (*Aesculus pavia*), younger black walnut, and box elder. Multiflora rose comprises the main vegetation in the shrub layer, with some poison ivy and raspberry. The herbaceous layer was taken over by annual bedstraw (*Galium aparine*), with some wingstem (*Verbesina alternifolia*) and tall fescue, and garlic mustard beginning its progression into the forest floor.

Hopewell Mound Group (Hopewell) is located at 4731 Sulphur Lick Road, Chillicothe. An intermittent stream, Sulphur Lick, runs near the northern and eastern boundary of this 125.6 ha (310 ac) site, with the North Fork of Paint Creek bordering the southern edge. Currently the property is mainly composed of 73.0 ha (180.4 ac) of orchard grass pasture. The northern portion of the property includes 33.6 ha (83.0 ac) of semi-mature mixed mesophytic forest with a 1/3-acre impoundment located on the eastern edge within these woods. Currently there is an active erosion site along the southern border of Hopewell, where the North Fork of Paint Creek flows. Efforts to stabilize the bank are being considered, with native grasses and forbs planted in the area in the spring of 2004.

This park unit contains seven sites, with Sites 1, 3, 4, and 6, located in hay/fallow fields, Site 2 and 5 located in the upland area, and Site 7 in a regularly mowed area (Figure 5).

Sites 1, 3, and 6 are located in the 58.0-hectare (143.4 ac) field, which has a history of active agriculture, and was last cut for hay in 2002. Site 1 was located near the wooded upland area, therefore approximately 25% of the site contained wooded vegetation. The canopy from the wooded area was comprised of wild black cherry, sugar maple (*Acer saccharum*), hackberry, and shagbark hickory (*Carya ovata*). The sub-canopy was comprised of slippery elm (*Ulmus rubra*), shagbark hickory, and Ohio buckeye. Multiflora rose and raspberry dominated the shrub layer. The majority of the area was dominated by herbaceous vegetation such as orchard grass and red clover, followed by Canada thistle, poison hemlock, and eastern daisy fleabane (*Erigeron annuus*).

Both Sites 3 and 6 were located in the middle of one of the hayfields. No canopy, sub-canopy, or shrub layer was evident within the site. In the distance, tree lines were located on the eastern and western borders of this site, Sulphur Lick Road along the southern edge and the upland woods

bordering the north. The dominant plant in the field is orchard grass, with some eastern daisy fleabane.

Sites 2 and 5 are located in the 33.6 ha (83.0 ac) upland portion of this park unit. Site 2 is located near semi-mature mesophytic forest (Bennett and Course 1996). However, within the area, the vegetation was predominantly a shrubby/grassy upland area, with a mix of tall fescue and common goldenrod. A few trees were present, mainly white ash (*Fraxinus americana*) and honey locust. Multiflora rose was present at varying stages, dominating the sub-canopy and shrub layers. Other plants in the sub-canopy were dotted hawthorn (*Crataegus punctata*) and Russian olive (*Elaeagnus angustifolia*). Younger forms of Russian olive and white ash also contribute to the shrub layer. The herbaceous layer, which makes up more than 60% of the cover, was composed of tall fescue, common goldenrod and common blackberry (*Rubus allegheniensis*). The shrub and herbaceous layer for Site 5 contained similar vegetation, however the sub-canopy was mainly composed of only Russian olive, with no canopy evident.

The location of Site 4 is unique as it is situated near the riparian treeline of the North Fork of Paint Creek in a 6.3 ha (32.0 ac) field. Most of the site had been planted in winter wheat (*Triticum aestivum*) in 2002, however has been left fallow, therefore a mix of shepherds purse (*Capsella bursa-pastoris*), common goldenrod, eastern daisy fleabane, and Canadian horseweed are evident. Along the edge of the 50-meter circle, there is some white oak (*Quercus alba*) that make up the canopy, with hackberry in the sub-canopy.

The North Fork of Paint Creek, a tributary of Paint Creek, is considered by the Ohio EPA to contain Exceptional Warmwater Habitat (Cavendar and Kibbey 1999). In a study of the five major tributaries of Paint Creek by Cavender and Kibbey (1999), they found the North Fork contained the highest levels of species richness, with intolerant fish fauna found at most monitoring sites. Potentially detrimental problems may result from agricultural runoff, loss of riparian cover, and an increase in impervious surfaces due to development.

The final site at the Hopewell unit is Site 7, located in a regularly mowed area, and surrounded by Sulphur Lick Road to the South and Maple Grove Road to the East. In addition, along the Southwest side, there is a parking lot nearby. Historically, there had been an old farmhouse near this site that was torn down in 2002. The ground is relatively flat, however a strong drop occurs towards the eastern side of the site. Black walnut, black locust (*Robinia pseudoacacia*), and hackberry comprise the canopy, however they are few and far apart. The sub-canopy is also spaced far apart and represented by wild black cherry and honey locust, while multiflora rose makes up the sparse shrub layer. The dominant herbaceous layer is composed of a mix of tall fescue and orchard grass. In addition, there was some poison hemlock, annual bedstraw, and shepherds purse.

High Bank Works (High Bank) is a 67.5 ha (166.8 ac) parcel located at the end of County Road 900, off US 35 south of Chillicothe. Approximately 20.2 ha (50 ac) of this site is composed of alfalfa/orchard grass, with a slightly larger parcel left fallow. These fields have been mowed at least once a year. Another 5.3 ha (13.0 ac) is composed of winter wheat, and yet another 2.8 ha (7.0 ac) was chemically treated early in 2003. The Scioto River borders the western edge of this

property, where a 11.8 ha (29.0 ac) riparian woodland exists. The remaining land is still under negotiation.

High Bank is mainly composed of agriculture fields, of which four of the five sites are located. A fifth site is located in the riparian area of this park unit (Figure 3).

Sites 1, 3, 5, and 6 are located in agriculture fields. Site 1 is located in a field that was chemically treated in 2003, and had previously supported winter wheat. Sites 3 and 5 were located in the same field that is commonly used for hay, therefore is dominated by orchard grass and alfalfa, with some eastern daisy fleabane and Philadelphia fleabane. A fallow field is the location for Site 6. The predominant plant is eastern daisy fleabane, with some Carolina geranium (*Geranium carolinianum*) and common yellow oxalis (*Oxalis stricta*), followed by Canada thistle and bull thistle (*C. vulgare*).

The Scioto River flows by this park unit along a 450 m stretch of the western border of the property. Similar to Mound City, High Bank has also been designated as an IBA due to its ideal location along the Scioto River Complex. Site 4 is located in this riparian parcel, which extends 11.7 ha (29 ac), and also contains an ox-bow that is periodically flooded. The width of the riparian area ranges from 130 m to 290 m, and is located on the lower terrace. The canopy in this area is extensive and composed of sycamore, cottonwood, and silver maple (*Acer saccharinum*). Hackberry and box elder dominate the sub-canopy, with some Ohio buckeye and younger silver maple interspersed. Young Ohio buckeye also make up the only component in the shrub layer. The herbaceous layer is mostly tall fescue, Canadian woodnettle (*Laportea canadensis*), jewelweed (*Impatiens capensis*), and garlic mustard.

Seip Earthworks (Seip) is located on US 50 bordering Seip State Memorial, near Paint Valley High School, Bainbridge. The property is divided into two parcels, with Ohio Historical Society land located between the units. The southern border of this 67.0 ha (165.6 ac) site lies alongside Paint Creek. The creek is bordered by a 5.9 ha (14.6 ac) wooded riparian corridor.

A total of four sites are located at Seip. Sites 1, 2, and 4 are located in fallow fields, while Site 3 is at the border of the fallow field and riparian corridor.

This park unit contains fields separated into two parcels, all of which have no canopy, sub-canopy, or shrub layer. Sites 1 and 2 are located in the same parcel, while Site 4 is located in the smaller parcel. Site 1 was dominated by purpletop tridens (*Tridens flavus*) and orchard grass, with some common goldenrod mixed in. Evidence of winter wheat was also observed in this field. Although Site 2 is contiguous with Site 1, Site 2 had not been mowed for the last two years, therefore the dominant vegetation at this site was shepherds purse, followed by curly dock, field thistle, and daisy and Philadelphia fleabane. Site 4 contained higher levels of field and Canada thistle, along with daisy and Philadelphia fleabane.

Site 3 contains a mix of old field and riparian corridor, with approximately 40% of the site falling within the riparian area. The canopy layer is mainly composed of silver maple and sycamores. The sub-canopy is mostly box elder, and no shrub layer was evident. The herbaceous layer in the old field was dominated by tall fescue, with some daisy and Philadelphia

fleabane and winter wheat. Within the riparian area, the herbaceous layer was mainly composed of Canadian woodnettle. Other plants contributing to the riparian floor was garlic mustard, common blue violet (*Viola* sp.), smooth sweet cicely, and tall fescue.

The riparian area borders Paint Creek, a tributary to the Scioto River, which flows along the southern edge of Seip. According to the Ohio EPA's 2002 Integrated Report for Large River Assessment Units, the lower portion of Paint Creek is among the highest quality large rivers in the state. The incredible fish diversity in this portion of the stream, 91 species, reveals the excellent habitat and water quality evident in the stream (Cavender and Kibbey 1999). The designated aquatic life use is considered Exceptional Warm Water habitat and the Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), a state endangered species and Federal Species of Concern, has been found in this watershed (Pfungsten and Downs 1989).

Materials and Methods

Bird surveys were conducted from May 2003 to May 2004 following variable circular plot (VCP) methods of Peitz et al. (2002). Sampling points were selected from a random starting point using ArcView GIS 3.3, and located 400 m apart from each other, with a minimum distance of 50 m to any property boundary.

The coordinates for each site were downloaded and located using the Trimble Pro XR. The coordinates listed in Table 2 are projected in NAD 1983 CONUS. The randomly selected sites are shown in Figures 2 to 6. In addition to the sites selected randomly, a non-random site was selected at Hopeton Earthworks. The site was located along the only stream, Dry Run, that is within park boundaries, therefore may contain species not seen at any of the other sites.

Prior to conducting the actual survey for birds, the habitat was evaluated. A circle with a 50 m radius was studied to determine the immediate terrestrial habitat at each study site. Location data was determined using the Trimble Pro XR GPS. Photos were taken at each site and elevation recorded from topographic maps. The slope, aspect, topographic position, hydrologic regime, and ground cover were recorded. The vegetation was described based on plant type and growth, along with physiognomic class. Species were identified and stratified based on various cover classes and height classes. In addition, the percent of each cover class was estimated. Habitat was designated into four strata, agriculture/old field, woods/upland, riparian, and mowed. An example of the “terrestrial habitat data form” used to record habitat description is shown in Appendix 1.

When conducting a survey, researchers arrived at the first spot prior to sunrise. Once the sun rose, the first count began. The count lasted for five minutes, with data collected on a field data form (Appendix 2). Birds observed during the first three minutes are separated from the ones observed in the last two minutes. Once the count was complete, additional data concerning temperature, wind, precipitation, cloud cover, and noise level were recorded. Researchers travel to the next VCP site and continue until all sites at the park unit have been surveyed. Each VCP site was also recorded by audio tape. Identification of birds during the survey was differentiated by calls and/or sight. Whenever birds were visible, the distance was documented using a Bushnell Yardage Pro Tour XL rangefinder. Binoculars used were a Swift 736H Armored Aerolite, with 10x50 magnification.

Due to the presence of five noncontiguous units, bird surveying was conducted on different days for each park unit. Four rounds of surveys were conducted, broken up into the four seasons. Generally all five units were done within a 2-week period, as shown in Table 3.

Audio recordings of bird calls were collected at each survey site. When the opportunity arose, picture vouchers of birds were taken. If salvage specimens were found, collections were made. Scientific collection permits were obtained from the National Park Service, Ohio Department of Natural Resources Division of Wildlife, and the US Fish and Wildlife Service (Appendices 3, 4, and 5 respectively).

Specimens were identified using the following references: Harrison (1975), Peterson (1980), Kaufman (2000), and Sibley (2003).

Results

Expected Species

As a result of this inventory 66 of 283 (23%) of the expected species (which included species ranging from common (easily found) to accidentals (extremely rare) (Thomson 1994) were documented (Table 4). Other bird surveys increased the total number of species documented to 172 of 285 (60%). Two species were added to the list: the blue grosbeak (*Guiraca caerulea*) and black-throated blue warbler (*Dendroica caerulescens*).

If excluding birds that are accidental or rare, 162 of 215 (75%) of the expected species are documented (total number of expected species is lowered to 215). However, ten bird species listed as accidental or rare were documented resulting with 172 of 225 (76%) (Table 5).

During the course of the 2003/2004 fieldwork three species of management interest were documented: the Ohio state endangered northern harrier (*Circus cyaneus*), Ohio species of interest redhead (*Aythya americana*), and Ohio species of concern prothonotary warbler (*Protonotaria citrea*). Several other species of management interest were documented in other inventories and include the Federally listed Threatened bald eagle (*Haliaeetus leucocephalus*) (MacArthur 2000) and six Ohio State Endangered species. These include the lark sparrow (*Chondestes grammacus*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), golden-winged warbler (*Vermivora chrysoptera*), American bittern (*Botaurus lentiginosus*), and yellow-bellied sapsucker (*Sphyrapicus varius*). Four Ohio State Threatened Species documented include the dark-eyed junco (*Junco hyemalis*), hermit thrush (*Catharus guttatus*), upland sandpiper (*Bartramia longicauda*), and least flycatcher (*Empidonax minimus*). Eight Ohio State Species of Concern were documented and include: the great egret (*Casmerodius albus*), northern bobwhite (*Colinus virginianus*), bobolink (*Dolichonyx oryzivorus*), sedge wren (*Cistothorus platensis*), sharp-shinned hawk (*Accipiter striatus*), prothonotary warbler (*Protonotaria citrea*), cerulean warbler (*Dendroica cerulea*) and black vulture (*Coragyps atratus*). Fourteen Ohio State Species of Interest were documented: purple finch (*Carpodacus purpureus*), blue grosbeak, redhead (*Aythya americana*), magnolia warbler (*Dendroica magnolia*), golden-crowned kinglet (*Regulus satrapa*), Blackburnian warbler (*Dendroica fusca*), northern waterthrush (*Seiurus noveboracensis*), Canada warbler (*Wilsonia canadensis*), black-throated blue warbler, red-breasted nuthatch (*Sitta canadensis*), winter wren (*Troglodytes troglodytes*), northern pintail (*Anas acuta*), Bell's vireo (*Vireo bellii*), and brown creeper (*Certhia americana*).

Species Richness and Abundance

Hopewell Mound Group (Hopewell) was the most diverse unit and had the highest number of individuals (44 and 203 respectively, Table 4). The next highest numbers was from Hopeton Earthworks (Hopeton), which had 39 species and 146 individuals, High Bank Works (High Bank) had 35 species and 96 individuals, Mound City Group (Mound City) had 32 species and 89 individuals, and Seip Earthworks (Seip) had the lowest numbers with 29 species and 100 individuals. The results reflect the higher number of VCP sites, as Hopewell and Hopeton had 7 each, High Bank had 5, and Seip and Mound City had 4 each. Factoring the number of VCP

sites evens out the average number of species per site ranging from 5 to 8 bird species for all park units.

When comparing seasons, the early spring (April/May) sampling period resulted in the greatest number of species, 44, and individuals, 213, the late spring (May/June) with 40 species and 196 individuals, the fall (Sept./Oct.) with 31 species and 129 individuals, and the lowest numbers were observed in the winter (Jan.) with 29 species and 96 individuals (Table 6).

Habitat at the park was broken into four categories: agriculture/old field- 54 species and 385 individuals, woods/upland- 39 species and 103 individuals, riparian- 36 species and 99 individuals, and mowed-24 species and 47 individuals (Table 7). These results reflect the higher abundance of agriculture/old field strata throughout the park totaling 17 of 27 sites. There were 4 sites each in woods/upland strata and riparian strata, and only 2 in mowed strata.

Discussion

Expected Species

One reason for the low percentage (23%) of birds documented (66 species of 285 species) is due to timing, as many of the birds expected may only be in the area for a limited time (as for some species, this area is along their migratory route). Another problem is due to the sampling technique, which was limited to the morning. All nocturnal birds and other birds that wait for the thermals to build up may not be active, and therefore were not documented within the time of the early morning survey. Behavioral characteristics such as ground skulking birds or silent nesting birds increases the difficulty of observing these birds. In addition, most waterfowl would not likely use the park as water resources are limited to a 1/3-acre pond at Hopewell Mound Group, and an intermittent stream, Dry Run, at Hopeton Earthworks. Because park land is located adjacent to streams and Hopeton Earthworks neighbors a large gravel quarry pond, there may be some sightings of waterfowl, however it would be limited and accidental.

When including other surveys conducted on park land, a variety of techniques were used ranging from bird walks and driving around different areas and times of day, to active netting and banding of birds. Combining the results of these surveys with the current survey, the number of species documented increases to 172 species (60%). By altering the number of expected species to exclude rare and accidental species, the number of expected species is reduced to 215 species. In addition, ten of those listed as rare were documented, therefore the total number expected is 225, which results in 76% (172 species of 225 species) documented. Based on these calculations, 53 species were not documented through the efforts of this survey and other existing studies (Table 8). These species may not have been documented through the efforts of this survey and others due to various reasons ranging from timing, lack of habitat, to migratory range.

At least six species should have been observed during the survey, as habitat is present on park land, and they have been observed by this researcher in other parts of Ross County. They include the Henslow's sparrow (*Ammodramus henslowii*), Louisiana waterthrush (*Seiurus motacilla*), red-shouldered hawk (*Buteo lineatus*), wild turkey (*Meleagris gallopavo*), vesper sparrow (*Pooecetes gramineus*), and short-eared owl (*Asio flammeus*). As with any survey, timing is paramount, therefore, the species may not have been present during the time the survey was conducted. Further surveys should result with documentation of these species.

Nocturnal birds may be in this area, however no night-time surveying has been done on park land. Efforts to conduct some night surveys may result with success in documenting the northern saw-whet owl (*Aegolius acadicus*), long-eared owl (*Asio otus*), and Chuck-will's widow (*Caprimulgus carolinensis*). Currently there is an owl banding program for northern saw-whet owl's at Buzzard's Roost.

Many bird species that rely on water resources will find limited use on the park. Diving birds, waterfowl, shorebirds, rails, gulls and terns make up the majority (33 species) of birds not documented at this park (Table 8). Due to the lack of habitat, park land functions at best as a potential and quick stop along their migratory flight, therefore their time spent on park land is

reduced. The short visit increases the difficulty of observing these birds. The green-winged teal (*Anas crecca*) may be observed, as records indicate it has wintered along the mainstem of the Scioto River, which flows by three of the park units (McCormac and Kennedy 2004).

Birds that migrate through this area may or may not be observed in a given year based on weather conditions, habitat conditions, and time of year. Three species that may be observed are the olive-sided flycatcher (*Contopus borealis*), orange-crowned warbler (*Vermivora celata*), and rusty blackbird (*Euphagus carolinus*), as potential habitat does exist on park land. Four other species that may be observed on a limited basis (proper habitat is not present on park land) are the black-crowned night heron (*Nycticorax nycticorax*), evening grosbeak (*Coccothraustes vespertinus*), marsh wren (*Cistothorus palustris*), and red crossbill (*Loxia curvirostra*).

The lapland longspur's (*Calcarius lapponicus*) known range lies west of park land, therefore, the opportunity to observe them is limited, as their typical wintering area is the Great Plains (McCormac and Kennedy 2004). Habitat for these birds is large, barren fields, especially recently plowed areas. Current land management at this park does not allow plowing, and most fields are generally not barren. Habitat is also lacking for pine siskins (*Carduelis pinus*), birds that may winter in Ohio. Most of the surveys conducted have been done in the spring and summer, therefore surveys conducted in the winter may help to document the presence of pine siskins, along with other winter migrants.

Two other birds whose range barely overlaps park land are ruffed grouse (*Bonasa umbellus*) and snow bunting (*Plectrophenax nivalis*). Ruffed grouse are confined to the eastern half of Ohio, with higher concentrations in the southeast portion (McCormac and Kennedy 2004). Snow buntings prefer the other half of the state and may be found in the northwestern portion. Both species may be observed on park land, however, it would be infrequent.

Species Richness and Abundance

Based on the results of this survey, the American crow (*Corvus brachyrhynchos*) was the most numerous bird species observed at all park units, followed by the red-winged blackbird (*Agelaius phoeniceus*), eastern meadowlark (*Sturnella magna*), European starling (*Sturnus vulgaris*), and northern cardinal (*Cardinalis cardinalis*) (Table 4). These top six species are considered widespread throughout Ohio, especially during the summer breeding season (Peterjohn and Rice 2002). American crows, European starlings, and northern cardinals have some flexibility in selecting nesting habitat and some are residential, therefore, their presence on park land is to be expected. Red-winged blackbirds were once restricted to marshes, however as these types of habitat declined, they have been successful in breeding in upland habitats, which are plentiful on park land. Also, these birds migrate extensively, therefore are not present in high numbers during the winter season. The presence of eastern meadowlarks at all five units is indicative of the grassland habitat present on park land, and demonstrates the quality habitat provided. In addition, due to the unique location of park land, eastern meadowlarks have been found to breed in high numbers in the Illinoian Till Plain region (Peterjohn and Rice 2002).

Another indicator of grassland habitat providing quality habitat and supporting more species is based on the higher number of species and individuals documented in the agriculture/old field

sites. There were 54 species and 385 individuals documented at agriculture/old field sites, whereas the woods/upland sites resulted with 39 species and 103 individuals, the riparian sites had 36 species and 99 individuals, and the mowed areas had 24 species and 47 individuals (Table 7).

Along with eastern meadowlarks, two other bird species documented in the survey that are considered grassland obligate species are the dickcissel (*Spiza americana*) and grasshopper sparrow (*Ammodramus savannarum*). Eastern meadowlarks were observed at all five park units, dickcissels were observed at Hopewell Mound Group, Hopeton Earthworks, High Bank Works, and Seip Earthworks, and grasshopper sparrows were seen at Hopewell Mound Group, High Bank Works, and Seip Earthworks. The larger hay/fallow fields in these park units appear to offer sufficient habitat for all these species, while the 16.2 ha (40 ac) hay field at Mound City Group was inadequate for dickcissels and grasshopper sparrows. A possible explanation for the lower number of obligate grassland species at Mound City Group may be due to the active haying program conducted in the area, which results in the cutting of vegetation two to three times a year. All the other park units contain fields that are cut once a year or left fallow.

Based on findings by Swanson (1996), eastern meadowlarks and grasshopper sparrows are found to exhibit moderate sensitivity to habitat fragmentation, and are frequently found in tracts of grassland greater than 10 hectares (24.7 ac). Dickcissels have been found in grassland tracts of various sizes, therefore are considered to have low sensitivity to habitat fragmentation (Swanson 1996). Species normally found only in grassland tracts larger than 50 ha (123.6 ac), were not observed at the park units during this bird survey.

When comparing seasons, the April/May 2004 sampling period resulted in highest numbers of species (44) and individuals (213) observed, followed closely by the late spring sampling date of May/June 2003 with 40 species and 196 individuals observed (Figures 7 and 8). Combining the number of species observed from these two sampling periods results in 54 species documented during or near typical breeding seasons. Approximately 50 of the 54 species have been known to nest in Ross County, therefore their presence and activity would be more abundant during their nesting season (Table 6) (Peterjohn and Rice 2002).

Many bird species nest in central Ohio. The park currently has 40 nest boxes distributed at Mound City Group (4), Hopeton Earthworks (15), Hopewell Mound Group (13), and Seip Earthworks (5). Eastern bluebirds (*Sialia sialis*), tree swallows (*Tachycineta bicolor*), and house wrens (*Troglodytes aedon*) have successfully reared their young in these nest boxes.

During weekly surveys in the summer of 2004, park staff and volunteers (especially David Hess) documented the presence of blue grosbeak (*Passerina caerulea*), a species not included on the expected list. This species was observed throughout the summer, with fledglings also documented. This seems to indicate that aside from utilizing the area, these species may have successfully nested as well.

Through random luck, a few of these nests were discovered while out in the field. An eastern towhee (*Pipilo erythrophthalmus*) nest was found at the Mound City Group unit in the woodlot east of the main visitor's parking lot in April 2004. There were 4 eggs with the mother

incubating them until she was disturbed by observant park staff. In May, 2004, a house wren (*Troglodytes aedon*) nest was also discovered at this unit, with 4 eggs. The nest was located in the maintenance garage, in the center of a mounted hose reel with the mother carefully incubating the eggs. Out at the Seip Earthworks unit, an eastern meadowlark nest was found in May 2004. There were five eggs when the mother was disturbed. In late June 2004, another eastern meadowlark nest was found and a field sparrow (*Spizella pusilla*) nest. The meadowlark nest was empty, but the field sparrow nest had four eggs, with two of the eggs hatching right when we found it!

Another noteworthy event is the banding of young bald eagles (*Haliaeetus leucocephalus*) in Ross County in June 2004. A nest was found in the county and the Ohio Department of Natural Resources conducted a banding ceremony. The site was approximately 5 miles northeast of Seip Earthworks, therefore the recovery of these species may eventually result in a nest closer or on park land.

Conclusion

Habitat for birds encompass a wide range of needs. Migratory birds need readily accessible resources such as shelter, food and water available to assist them in their journey. Nesting birds also require the aforementioned, but in greater numbers, as their stay in this area spans for a longer period of time and also include larger numbers as their young will also need to be fed. The needs of each species varies, therefore, habitat diversity and quality is essential in order to support the many species that utilize park land. Riparian corridors and grassland areas are two important habitat types that the park can offer. In addition, development of habitat in areas neighboring park land should be monitored to determine the area and quality of habitat available for birds.

Riparian corridors play a significant role in the success of birds. Because all five park units are located nearby streams, the importance of maintaining existing corridors is paramount. The location along streams naturally attracts birds, and these areas should be protected to ensure their difficult journey is assisted as much as possible. With a total number of 172 species documented on parkland, the units no doubt play an important role along the migratory path of many species. Parkland is located along major migratory flyways, with the Scioto River offering a route between the Ohio River and Lake Erie.

During the colder months, some birds take refuge in wooded areas, therefore, these stands should be protected and improved (i.e. active control/removal of invasive species). In addition, brown-headed cowbird parasitism is further enhanced by increased woodland edges, therefore wooded areas should not be fragmented.

Less than 1 percent of native prairie found in Ohio remains, and this habitat type is considered the most endangered natural landscape in the state (ODNR 2002). Currently, the vegetation management plan includes the establishment of native grassland and protection of riparian corridors. The conversion of agricultural practices to native grassland will be beneficial to birds and other animals in the creation of habitat that may no longer be as plentiful due to the advancement of development.

The human population trend within the last ten years for Ross County is an increase of 5.8%. (US Census Bureau 2003). This increase is a percentage point higher than the state average, indicating development may also increase. Areas targeted for housing are generally agriculture fields, which results in less area for wildlife to utilize. Due to the noncontiguous nature of this park, the potential for park land to become sinks for wildlife is a possibility, as lands surrounding park land is converted to buildings. Based on the results of this survey, all types of habitat was used by wildlife, therefore larger ecosystem-wide vision should be used when considering management on and off park land.

Some management recommendations to consider are:

-  Further monitoring of all park units is recommended to determine the usage by migratory and nesting birds.

- ☒ Land management should involve leaving grassland areas undisturbed in order to ensure cover is available throughout the year.
- ☒ Conversion of agricultural land to native grassland should be closely monitored to determine the level of impact to grassland nesting bird success.
- ☒ Partnerships should be developed as this area has an active bird-banding group that has already conducted some bird-banding on park land, with very promising results.
- ☒ The pursuit of designation as Important Bird Area (IBA) should be considered as the high number of species already documented on park land reveals the quality habitat already in place. Two of the park units have already been designated IBA due to their proximity to the Scioto River, however the other three park units may have the unique qualities to qualify for such a designation.
- ☒ Maintenance of healthy woodlands and riparian areas should be a high priority as each park unit's proximity to streams result in their importance along migratory pathways.
- ☒ Invasive animal and plant control should be conducted, especially with the potential movement of the emerald ash borer (*Agrilus planipennis*) in the northern part of the state.

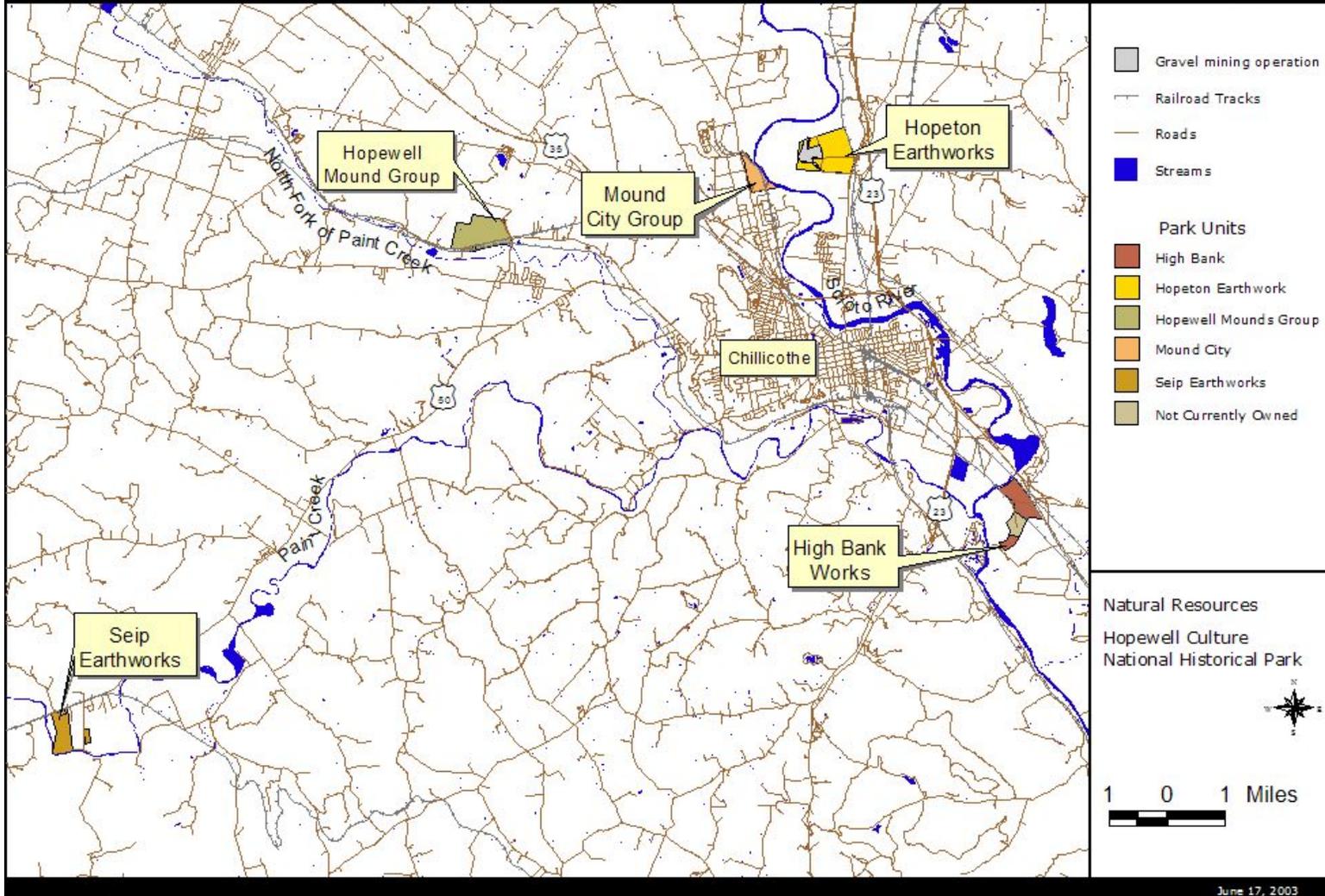
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Property Boundaries
Hopewell Culture National Historical Park

National Park Service
U.S. Department of the Interior



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Figure 1: Map of Hopewell Culture National Historical Park, Chillicothe, Ross County, Ohio.

Mound City Group

Hopewell Culture National Historical Park

National Park Service
U.S. Department of the Interior

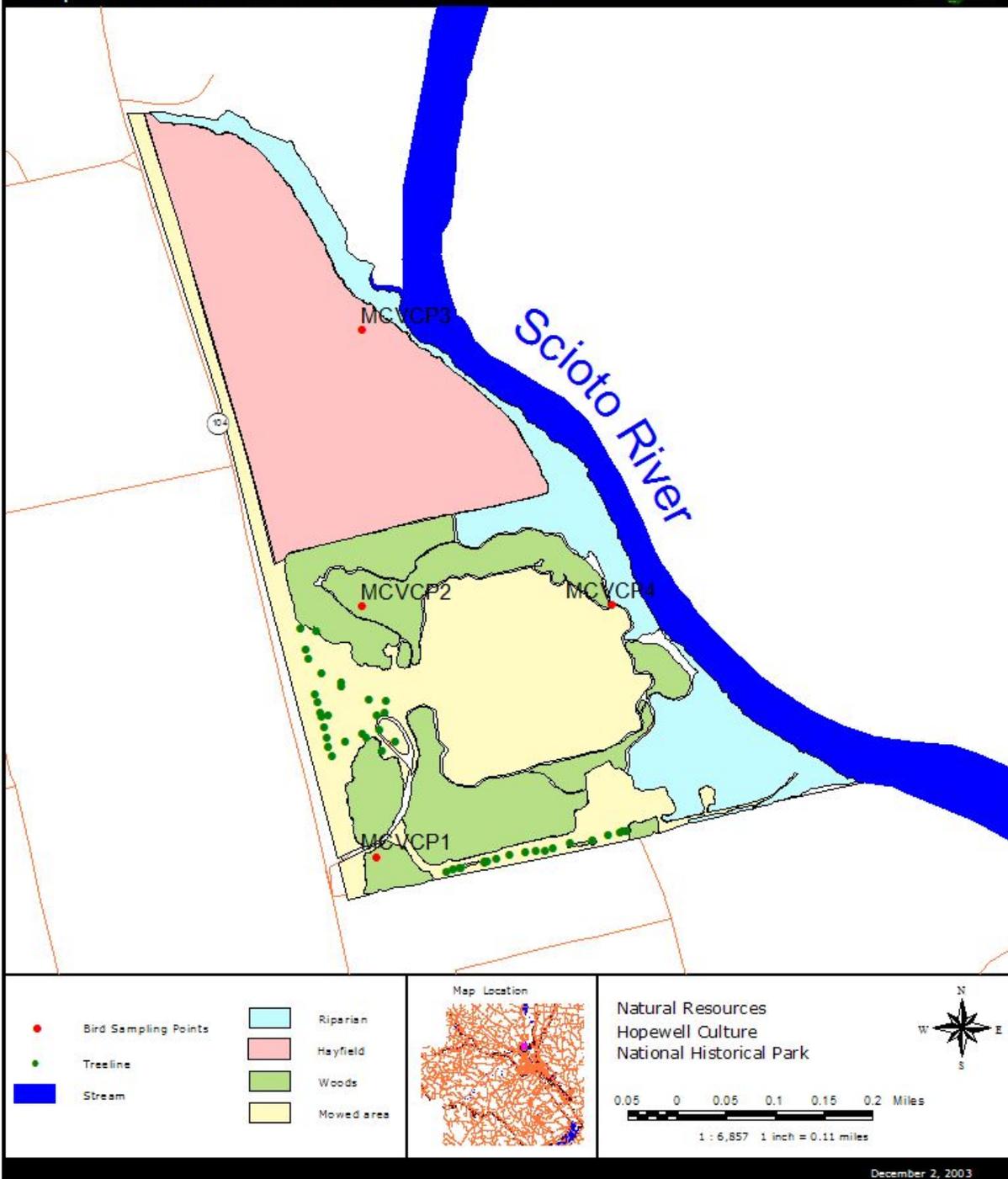


Figure 2: Map of Mound City Group with randomly selected Variable Circular Plot sites.

Hopeton Earthworks

Hopewell Culture National Historical Park

National Park Service
U.S. Department of the Interior

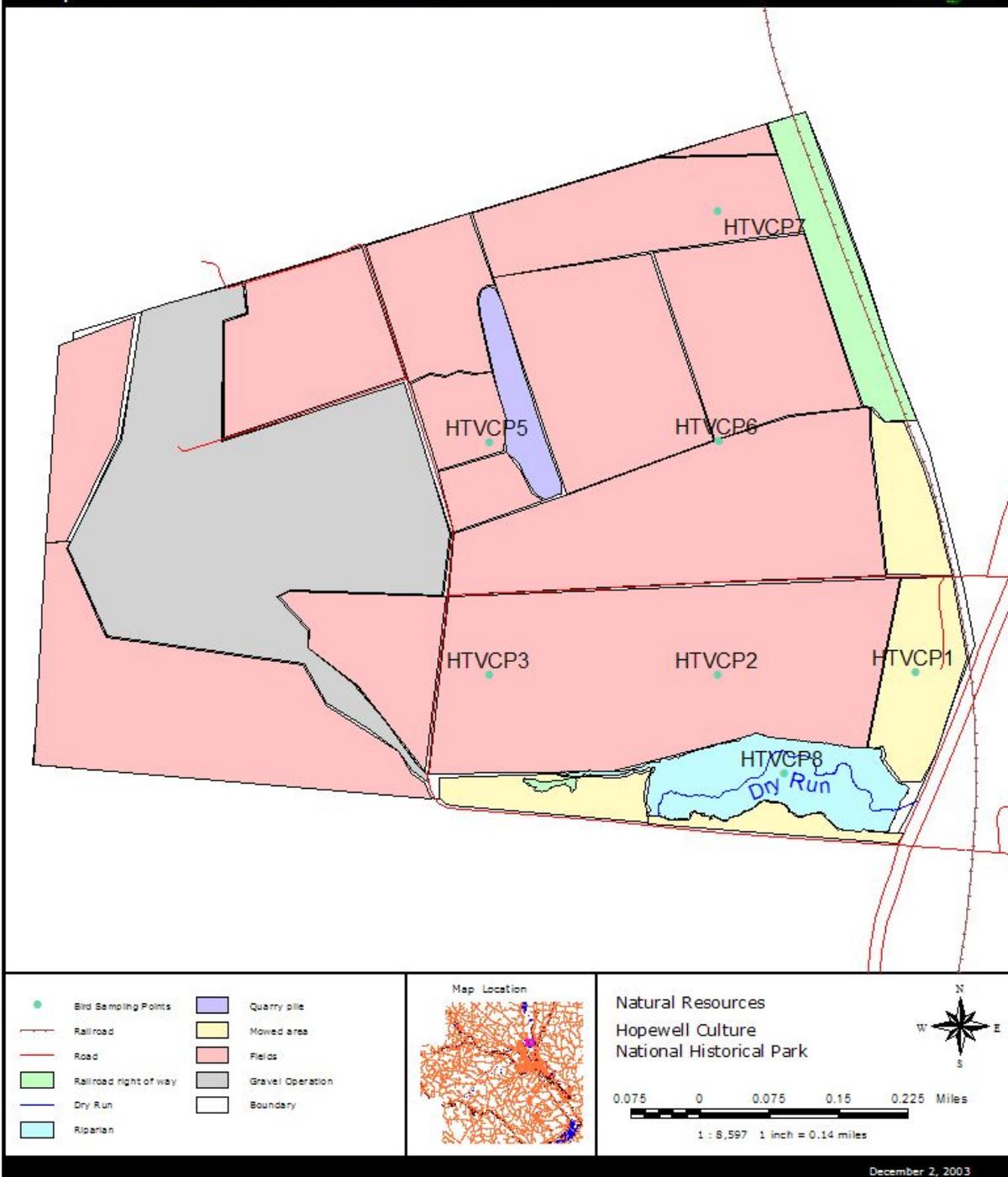


Figure 3: Map of Hopeton Earthworks with randomly selected Variable Circular Plot sites.

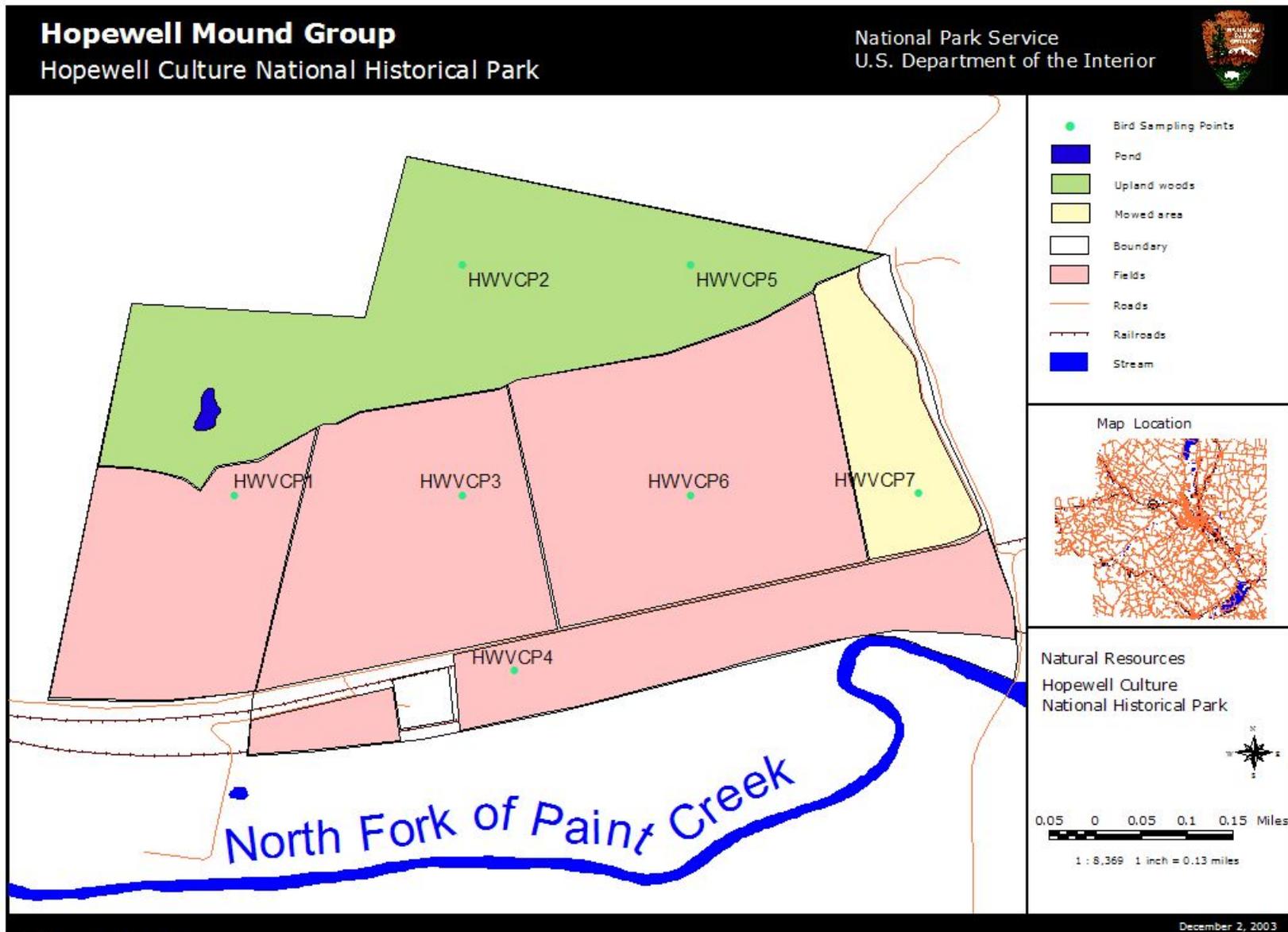


Figure 4: Map of Hopewell Mound Group with randomly selected Variable Circular Plot sites.

High Bank Works

Hopewell Culture National Historical Park

National Park Service
U.S. Department of the Interior

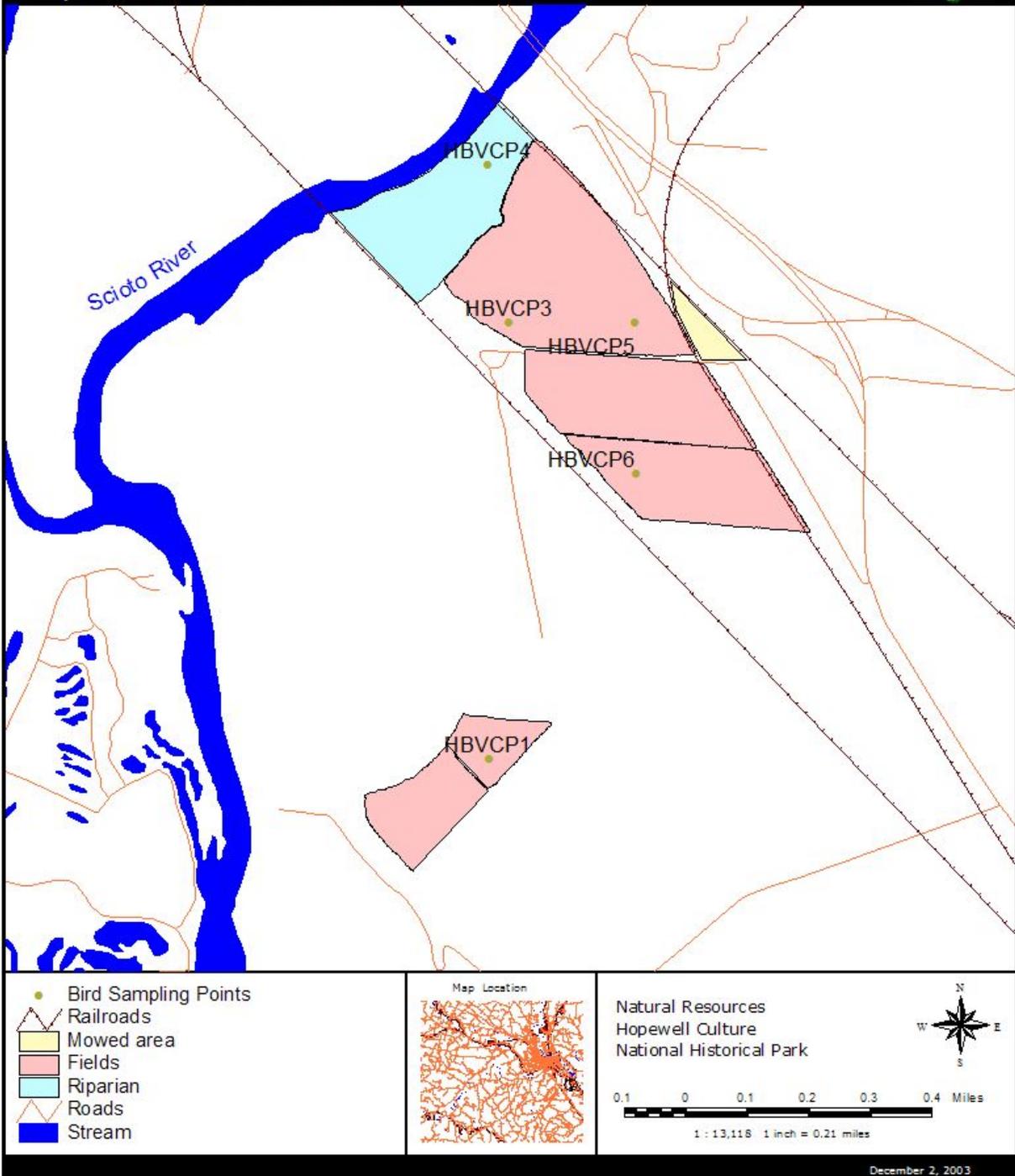


Figure 5: Map of High Bank Earthworks with randomly selected Variable Circular Plot sites.

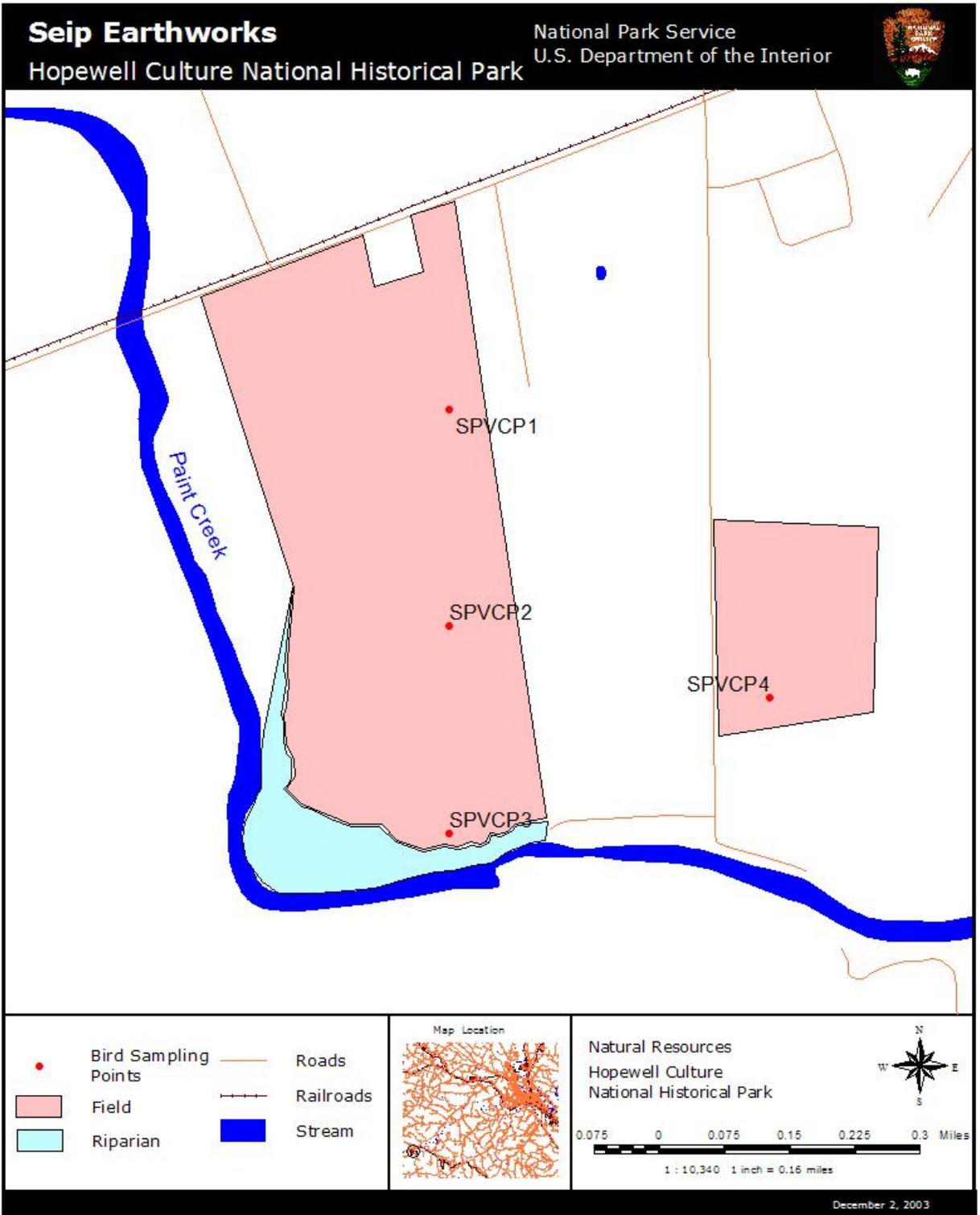


Figure 6: Map of Seip Earthworks with randomly selected Variable Circular Plot sites.

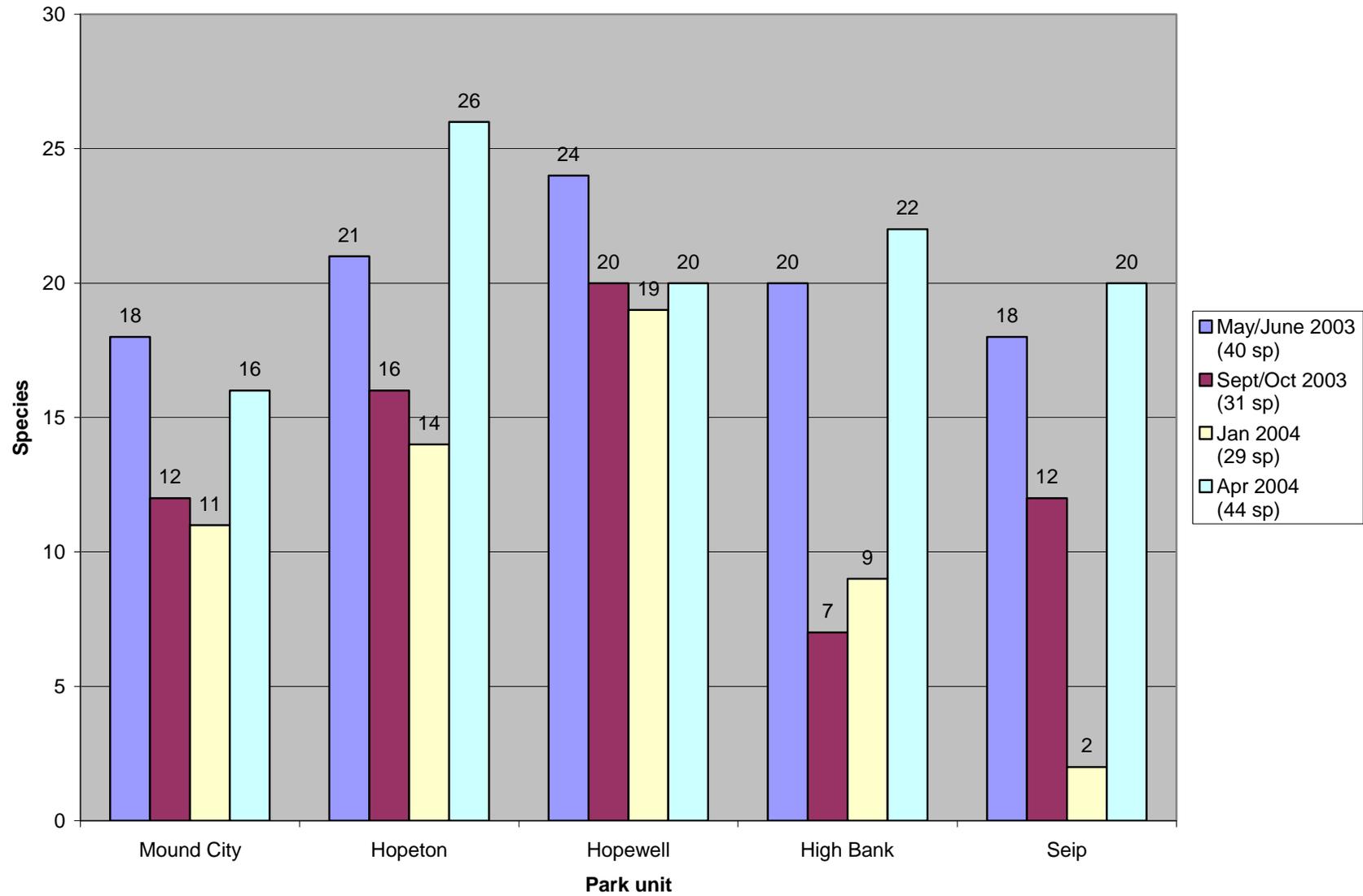


Figure 7: Graph of bird species documented based on time of year.

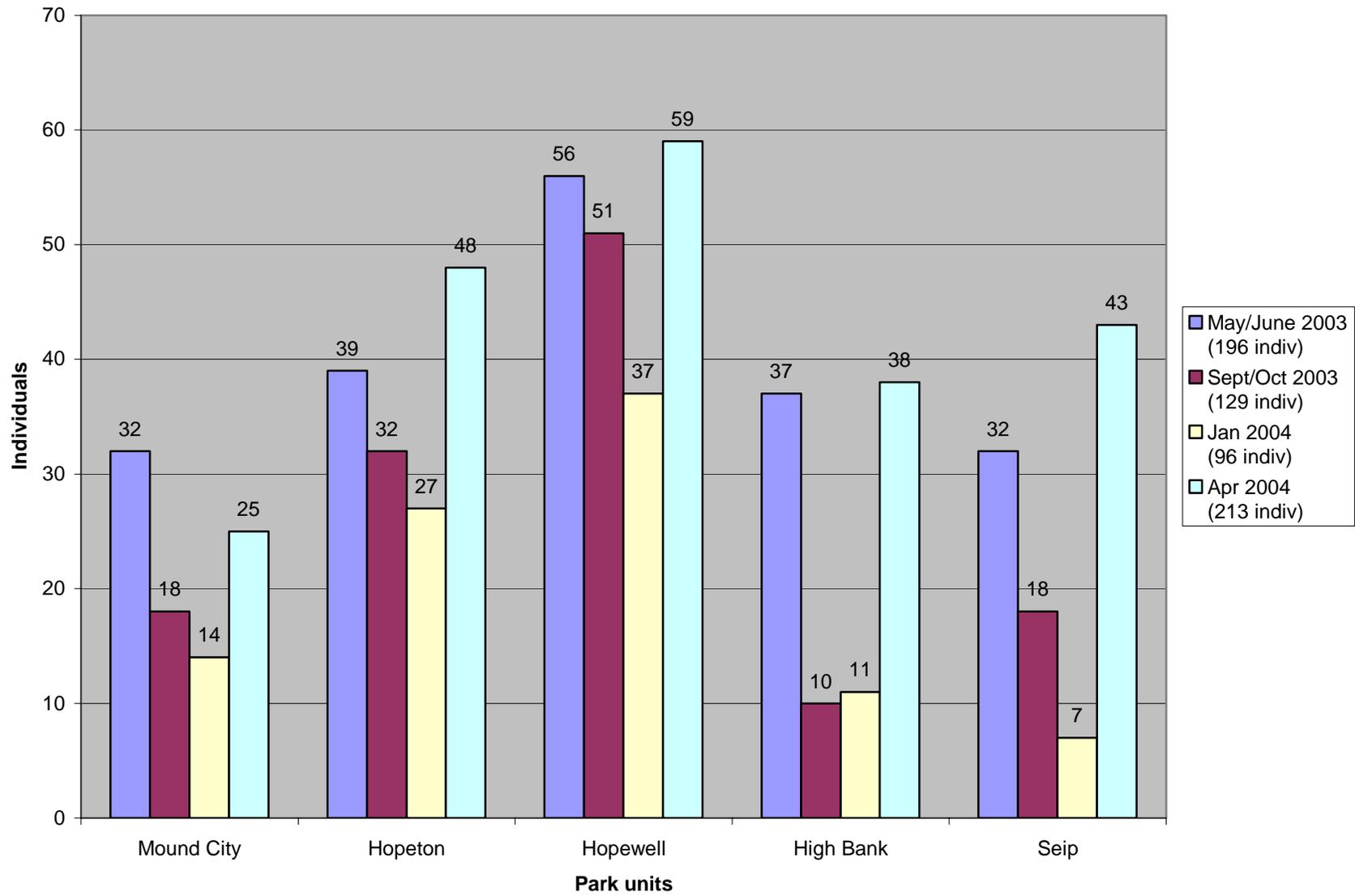


Figure 8: Graph of bird individuals observed based on time of year.

Table 1: Area and habitat types at Hopewell Culture National Historical Park

Unit/Strata	WOODS/UPLAND		RIPARIAN		AG/OLD FIELD		TOTAL	
	acres	hectares	acres	hectares	acres	hectares	acres	hectares
Mound City	23.4	9.5	18.4	7.4	39.1	15.8	80.9	32.8
High Bank			29.0	11.7	119.0	48.2	148.0	59.9
Hopeton			13.6	5.5	237.3	96.1	250.9	101.6
Hopewell	83.0	33.6			180.4	73.0	263.4	106.6
Seip			14.6	5.9	143.8	58.2	158.4	64.1
TOTAL	106.4	43.1	75.6	30.6	719.6	291.3	901.6	365.0

Table 2. Coordinates for each Variable Circular Plot site.

Unit	Site ID	NAD 1983 CONUS	
		Easting	Northing
Mound City	MCVCP1	327116.65	4360162.84
Mound City	MCVCP2	327116.65	4360562.01
Mound City	MCVCP4	327503.72	4360562.01
Mound City	MCVCP3	327116.65	4360953.62
Hopeton	HTVCP1	329876.42	4360965.01
Hopeton	HTVCP2	329534.06	4360965.01
Hopeton	HTVCP3	329135.98	4360965.01
Hopeton	HTVCP5	329135.98	4361364.53
Hopeton	HTVCP6	329534.06	4361364.53
Hopeton	HTVCP7	329534.06	4361765.48
Hopeton	HTVCP8	329648.18	4360790.86
Hopewell	HWVCP1	319135.00	4358980.00
Hopewell	HWVCP2	319534.00	4359380.00
Hopewell	HWVCP3	319534.00	4358980.00
Hopewell	HWVCP4	319625.00	4358670.00
Hopewell	HWVCP6	319933.00	4358980.00
Hopewell	HWVCP5	319933.00	4359380.00
Hopewell	HWVCP7	320332.00	4358980.00
High Bank	HBVCP1	334310.53	4350593.65
High Bank	HBVCP3	334364.53	4351727.86
High Bank	HBVCP4	334310.53	4352141.99
High Bank	HBVCP5	334693.86	4351727.86
High Bank	HBVCP6	334693.86	4351337.69
Seip	SPVCP1	308213.00	4345591.00
Seip	SPVCP2	308213.00	4345192.00
Seip	SPVCP3	308213.00	4344810.00
Seip	SPVCP4	308802.00	4345060.00

Table 3: Sampling schedule for bird survey.

Site	Code Name	Late Spring/ Early Summer	Fall	Winter	Spring
Mound City	MCVCP_	June 2003	October 2003	January 2004	April 2004
High Bank	HBVCP_	May 2003	September 2003	January 2004	April 2004
Hopeton	HTVCP_	May 2003	September 2003	January 2004	April 2004
Seip	SPVCP_	June 2003	October 2003	January 2004	April 2004
Hopewell	HWVCP_	May 2003	September 2003	January 2004	April 2004

Table 4: Total number of bird species and individuals surveyed at each park unit.

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	High Bank Works	Hopewell Mound Group	Hopeton Earthworks	Seip Earthworks	Mound City Group	Park Unit TOTALS
1.	<i>Corvus brachyrhynchos</i>	American crow			Y	c	pr	4	21	7	15	5	52
2.	<i>Agelaius phoeniceus</i>	Red-winged blackbird			Y	c	sr	10	10	15	7	5	47
3.	<i>Sturnella magna</i>	Eastern meadowlark			Y	i-fc	sr	8	14	9	7	3	41
4.	<i>Sturnus vulgaris</i>	European starling			Y	c	pr	8	4	9	5	9	35
5.	<i>Cardinalis cardinalis</i>	Northern cardinal			Y	c	pr	3	15	4	5	7	34
6.	<i>Spizella pusilla</i>	Field sparrow			Y	Fc-c	sr	4	10	7	6	1	28
7.	<i>Turdus migratorius</i>	American robin			Y	c	sr	6	8	7	0	7	28
8.	<i>Carduelis tristis</i>	American goldfinch			Y	c	sr	2	12	4	4	4	26
9.	<i>Cyanocitta cristata</i>	Blue jay			Y	c	pr	6	10	2	2	3	23
10.	<i>Tachycineta bicolor</i>	Tree swallow			Y	fc	sr	2	9	7	4	0	22
11.	<i>Icterus galbula</i>	Northern oriole			Y	Fc-c	sr	4	4	5	2	5	20
12.	<i>Geothlypis trichas</i>	Common yellowthroat				Fc-c	sr	1	8	4	4	2	19
13.	<i>Melospiza melodia</i>	Song sparrow			Y	c	sr	6	4	5	1	2	18
14.	<i>Zenaida macroura</i>	Mourning dove			Y	c	pr	1	6	10	0	0	17
15.	<i>Parus bicolor</i>	Tufted titmouse			Y	Fc-c	pr	0	5	3	6	2	16
16.	<i>Spiza americana</i>	Dickcissel				r	r-erratic sr	2	5	4	4	0	15
17.	<i>Branta canadensis</i>	Canada goose			Y	c	pr	1	2	9	0	2	14
18.	<i>Sialia sialis</i>	Eastern bluebird			Y	Fc-c	sr	2	3	3	2	2	12
19.	<i>Quiscalus quiscula</i>	Common grackle			Y	c	sr	3	0	1	3	4	11
20.	<i>Hylocichla mustelina</i>	Wood thrush			Y	Fc-c	sr	3	1	1	2	3	10
21.	<i>Ammodramus savannarum</i>	Grasshopper sparrow				r-i	sr	3	2	0	4	0	9
22.	<i>Pipilo erythrophthalmus</i>	Eastern Towhee				c	sr	1	6	0	0	2	9

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	High Bank Works	Hopewell Mound Group	Hopeton Earthworks	Seip Earthworks	Mound City Group	Park Unit TOTALS
23.	<i>Dumetella carolinensis</i>	Gray catbird			Y	Fc-c	sr	1	3	1	1	2	8
24.	<i>Thryothorus ludovicianus</i>	Carolina wren			Y	i-fc	pr	1	1	4	0	2	8
25.	<i>Sitta carolinensis</i>	White-breasted Nuthatch			Y	Fc-c	pr	1	5	0	0	1	7
26.	<i>Buteo jamaicensis</i>	Red-tailed Hawk			Y	fc-c	pr	0	4	2	0	0	6
27.	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker			Y	i	pr	1	2	0	3	0	6
28.	<i>Parus carolinensis</i>	Carolina chickadee			Y	fc-c	pr	1	2	1	0	2	6
29.	<i>Protonotaria citrea</i>	Prothonotary warbler		SOC	Y	r	i-local sr	2	0	1	1	2	6
30.	<i>Vireo olivaceus</i>	Red-eyed Vireo			Y	c	sr	0	2	1	2	1	6
31.	<i>Ardea herodias</i>	Great blue heron			Y	fc-lc	sr	1	0	3	0	1	5
32.	<i>Dryocopus pileatus</i>	Pileated woodpecker			Y	i	pr	0	2	0	3	0	5
33.	<i>Icteria virens</i>	Yellow-breasted chat			Y	i	sr	0	5	0	0	0	5
34.	<i>Picoides pubescens</i>	Downy woodpecker			Y	c	pr	1	0	2	1	1	5
35.	<i>Bombycilla cedrorum</i>	Cedar waxwing			Y	fc-c	sr	0	0	1	0	3	4
36.	<i>Columba livia</i>	Rock dove			Y	c	pr	0	0	4	0	0	4
37.	<i>Seiurus aurocapillus</i>	Ovenbird			Y	fc-c	i-sr	0	2	0	1	1	4
38.	<i>Anas platyrhynchos</i>	Mallard			Y	c	pr	2	0	1	0	0	3
39.	<i>Charadrius vociferus</i>	Killdeer			Y	c	sr	0	1	1	1	0	3
40.	<i>Circus cyaneus</i>	Northern harrier		E		i		0	2	0	0	0	2
41.	<i>Colaptes auratus</i>	Northern flicker			Y	c	sr	0	1	0	0	1	2
42.	<i>Contopus virens</i>	Eastern Wood-peewee			Y	fc	sr	0	0	0	2	0	2
43.	<i>Dendroica coronata</i>	Yellow-rumped Warbler				c		0	2	0	0	0	2

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	High Bank Works	Hopewell Mound Group	Hopeton Earthworks	Seip Earthworks	Mound City Group	Park Unit TOTALS
44.	<i>Dendroica discolor</i>	Prairie warbler				i	sr	0	0	0	0	2	2
45.	<i>Dendroica petechia</i>	Yellow warbler			Y	i-fc	sr	0	0	2	0	0	2
46.	<i>Larus delawarensis</i>	Ring-billed gull				c		0	0	1	0	1	2
47.	<i>Spizella arborea</i>	American tree sparrow				fc-c	wr	1	1	0	0	0	2
48.	<i>Toxostoma rufum</i>	Brown thrasher				fc	sr	1	0	1	0	0	2
49.	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow				fc-c		0	2	0	0	0	2
50.	<i>Accipiter striatus</i>	Sharp-shinned Hawk		SOC	Y	i		0	0	0	1	0	1
51.	<i>Anas rubripes</i>	American black duck				fc-c		0	0	1	0	0	1
52.	<i>Cathartes aura</i>	Turkey vulture			Y	fc-c	sr	0	0	1	0	0	1
53.	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo			Y	i	sr	0	1	0	0	0	1
54.	<i>Coragyps atratus</i>	Black vulture		SOC	Y	a-r	i-fc r	0	1	0	0	0	1
55.	<i>Dolichonyx oryzivorus</i>	Bobolink		SOC		r-i	sr	1	0	0	0	0	1
56.	<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher			Y	r-i		0	1	0	0	0	1
57.	<i>Eremophila alpestris</i>	Horned lark				c	pr	1	0	0	0	0	1
58.	<i>Falco sparverius</i>	American kestrel			Y	fc	pr	0	1	0	0	0	1
59.	<i>Icterus spurius</i>	Orchard oriole			Y	i	sr	0	1	0	0	0	1
60.	<i>Parula americana</i>	Northern parula				i	i-fc sr	0	1	0	0	0	1
61.	<i>Passer domesticus</i>	House sparrow			Y	c	pr	0	0	0	0	1	1
62.	<i>Passerina cyanea</i>	Indigo bunting			Y	c	sr	0	0	1	0	0	1
63.	<i>Phasianus colchicus</i>	Ring-necked Pheasant				i-fc	pr	0	1	0	0	0	1
64.	<i>Piranga olivacea</i>	Scarlet tanager				fc	sr	0	0	0	1	0	1
65.	<i>Sayornis phoebe</i>	Eastern phoebe			Y	i-fc	sr	1	0	0	0	0	1

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	High Bank Works	Hopewell Mound Group	Hopeton Earthworks	Seip Earthworks	Mound City Group	Park Unit TOTALS
66.	<i>Spizella passerina</i>	Chipping sparrow			Y	fc-c	sr	0	0	1	0	0	1
Species Total								35	44	39	29	32	

No Federally listed species
E= Ohio Endangered
SOC= Ohio Species of Concern
SI= Ohio Species of Interest

c=common
fc= fairly common
i=infrequent
r=rare
a=accidental

pr=permanent resident
sr=summer resident
wr=winter resident

Record, nesting, migration, residency information from Thomson, 1994.
Division of Wildlife, Ohio Department of Natural Resources Species list, May 2002.

Table 5: Total number of bird species from this survey and other studies done at Hopewell Culture National Historical Park

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
1.	<i>Zenaida macroura</i>	Mourning dove			Y	c	pr	17	1	20	28	0	7	357	1		431
2.	<i>Melospiza melodia</i>	Song sparrow			Y	c	sr	18	1	22	4	138	12	227	0		422
3.	<i>Cardinalis cardinalis</i>	Northern cardinal			Y	c	pr	34	1	11	18	0	13	320	0		397
4.	<i>Sturnus vulgaris</i>	European starling			Y	c	pr	34	1	17	22	0	8	284	1		367
5.	<i>Turdus migratorius</i>	American robin			Y	c	sr	28	1	13	15	0	9	292	1		359
6.	<i>Corvus brachyrhynchos</i>	American crow			Y	c	pr	53	1	16	21	0	7	258	1		357
7.	<i>Parus carolinensis</i>	Carolina chickadee			Y	fc-c	pr	6	1	3	8	0	2	308	0		328
8.	<i>Spizella pusilla</i>	Field sparrow			Y	fc-c	sr	28	1	14	11	42	8	208	0		312
9.	<i>Passer domesticus</i>	House sparrow			Y	c	pr	1	1	6	3	0	2	293	1		307
10.	<i>Carduelis tristis</i>	American goldfinch			Y	c	sr	26	1	18	10	0	8	223	3		289
11.	<i>Quiscalus quiscula</i>	Common grackle			Y	c	sr	11	1	16	7	0	1	246	1		283
12.	<i>Thryothorus ludovicianus</i>	Carolina wren			Y	i-fc	pr	8	1	12	4	0	6	250	0		281
13.	<i>Parus bicolor</i>	Tufted titmouse			Y	fc-c	pr	16	1	4	5	0	8	243	2		279
14.	<i>Agelaius phoeniceus</i>	Red-winged blackbird			Y	c	sr	47	1	13	10	0	11	180	0		262
15.	<i>Cyanocitta cristata</i>	Blue jay			Y	c	pr	23	1	5	9	0	2	213	2		255
16.	<i>Colaptes auratus</i>	Northern flicker			Y	c	sr	2	1	5	5	0	2	233	1		249
17.	<i>Picoides pubescens</i>	Downy woodpecker			Y	c	pr	5	1	1	0	1	1	227	1		237
18.	<i>Cathartes aura</i>	Turkey vulture			Y	fc-c	sr	1	1	7	19	0	2	202	0		232
19.	<i>Pipilo erythrophthalmus</i>	Eastern Towhee				c	sr	9		8	2	0	5	200	0		224
20.	<i>Sturnella magna</i>	Eastern meadowlark			Y	i-fc	sr	41	1	13	19	0	9	136	0		219
21.	<i>Sialia sialis</i>	Eastern bluebird			Y	fc-c	sr	12	1	13	13	0	14	163	0		216
22.	<i>Sitta carolinensis</i>	White-breasted Nuthatch			Y	fc-c	pr	7	1	0	1	0	0	193	0		202
23.	<i>Dumetella carolinensis</i>	Gray catbird			Y	fc-c	sr	8	1	13	9	0	0	157	0		188
24.	<i>Stelgidopteryx serripennis</i>	Northern rough-winged Swallow			Y	fc	sr	0	1	7	7	0	2	155	0		172
25.	<i>Toxostoma rufum</i>	Brown thrasher				fc	sr	2	1	5	2	0	1	152	1		164
26.	<i>Chaetura pelagica</i>	Chimney swift				c	sr	0		4	0	0	0	154	1		159
27.	<i>Charadrius vociferus</i>	Killdeer			Y	c	sr	3	1	15	18	0	0	120	1		158
28.	<i>Geothlypis trichas</i>	Common yellowthroat				fc-c	sr	19		13	0	6	4	113	1		156
29.	<i>Passerina cyanea</i>	Indigo bunting			Y	c	sr	1	1	15	10	16	3	109	1		156
30.	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker			Y	i	pr	6	1	6	0	0	1	136	1		151

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
31.	<i>Icterus galbula</i>	Northern oriole			Y	fc-c	sr	20	1	4	3	0	4	118	0		150
32.	<i>Troglodytes aedon</i>	House wren				fc-c	sr	0		8	2	0	6	130	0		146
33.	<i>Molothrus ater</i>	Brown-headed cowbird			Y	c	sr	0	1	9	4	0	2	121	0		137
34.	<i>Buteo jamaicensis</i>	Red-tailed Hawk			Y	fc-c	pr	6	1	16	15	0	6	92	0		136
35.	<i>Bombycilla cedrorum</i>	Cedar waxwing			Y	fc-c	sr	4	1	4	0	0	1	123	0		133
36.	<i>Ardea herodias</i>	Great blue heron			Y	fc-lc	sr	5	1	7	5	0	3	105	1		127
37.	<i>Zonotrichia albicollis</i>	White-throated Sparrow				c		0		2	0	3	0	121	0		126
38.	<i>Contopus virens</i>	Eastern Wood-peewee			Y	fc	sr	2	1	0	0	0	2	117	2		124
39.	<i>Hylocichla mustelina</i>	Wood thrush			Y	fc-c	sr	10	1	5	0	0	3	92	0		111
40.	<i>Spizella passerina</i>	Chipping sparrow			Y	fc-c	sr	1	1	6	2	0	2	97	1		110
41.	<i>Vireo gilvus</i>	Warbling vireo			Y	fc	sr	0	1	0	0	0	1	101	0		103
42.	<i>Junco hyemalis</i>	Dark-eyed Junco		T		c	wr	0		0	0	0	0	96	0		96
43.	<i>Tyrannus tyrannus</i>	Eastern kingbird			Y	i-fc	sr	0	1	12	3	0	2	77	1		96
44.	<i>Columba livia</i>	Rock dove			Y	c	pr	4	1	13	5	0	0	71	0		94
45.	<i>Hirundo rustica</i>	Barn swallow			Y	c	sr	0	1	9	7	0	2	75	0		94
46.	<i>Vireo griseus</i>	White-eyed Vireo			Y	fc	sr	0	1	2	0	0	1	90	0		94
47.	<i>Ceryle alcyon</i>	Belted kingfisher			Y	fc	sr	0	1	0	2	0	1	86	0		90
48.	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo			Y	i-fc	sr	0	1	0	0	0	0	88	1		90
49.	<i>Branta canadensis</i>	Canada goose			Y	c	pr	14	1	12	3	0	2	56	0		88
50.	<i>Dendroica coronata</i>	Yellow-rumped Warbler				c		2		0	0	0	2	83	1		88
51.	<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher			Y	i-fc	sr	0	1	4	1	0	1	80	0		87
52.	<i>Dendroica petechia</i>	Yellow warbler			Y	i-fc	sr	2	1	0	0	0	0	76	0		79
53.	<i>Icterus spurius</i>	Orchard oriole			Y	i	sr	1	1	5	1	0	2	56	0		66
54.	<i>Carpodacus mexicanus</i>	House finch			Y	c	pr	0	1	4	2	0	0	57	0		64
55.	<i>Vireo olivaceus</i>	Red-eyed Vireo			Y	c	sr	6	1	0	0	0	1	54	1		63
56.	<i>Icteria virens</i>	Yellow-breasted chat			Y	i	sr	5	1	4	0	0	5	47	0		62
57.	<i>Tachycineta bicolor</i>	Tree swallow			Y	fc	sr	22	1	13	10	0	1	10	0		57
58.	<i>Passerculus sandwichensis</i>	Savannah sparrow				fc-c	sr	0		5	0	40	3	6	1		55
59.	<i>Sayornis phoebe</i>	Eastern phoebe			Y	i-fc	sr	1	1	6	4	0	2	39	0		53
60.	<i>Chordeiles minor</i>	Common nighthawk				fc	sr	0		0	1	0	0	47	0		48
61.	<i>Falco sparverius</i>	American kestrel			Y	fc	pr	1	1	13	17	0	0	15	1		48
62.	<i>Aix sponsa</i>	Wood duck				c	sr	0		4	0	0	0	41	0		45
63.	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow				fc-c		2		2	1	4	0	35	0		44

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
64.	<i>Protonotaria citrea</i>	Prothonotary warbler		SOC	Y	r	i-local sr	6	1	0	1	0	0	34	0		42
65.	<i>Archilochus colubris</i>	Ruby-throated Hummingbird				fc-c		0		7	0	0	0	29	0		36
66.	<i>Myiarchus crinitus</i>	Great crested flycatcher			Y	fc	sr	0	1	0	0	0	0	34	0		35
67.	<i>Anas platyrhynchos</i>	Mallard			Y	c	pr	3	1	9	7	0	0	14	0		34
68.	<i>Regulus calendula</i>	Ruby-crowned Kinglet				c		0		0	0	0	1	33	0		34
69.	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo			Y	i	sr	1	1	2	2	0	1	25	1		33
70.	<i>Picoides villosus</i>	Hairy woodpecker			Y	i	pr	0	1	0	0	0	0	31	1		33
71.	<i>Dendroica palmarum</i>	Palm warbler				fc-c		0		0	0	2	0	29	0		31
72.	<i>Melospiza lincolni</i>	Lincoln's sparrow				i-fc		0		1	0	28	0	2	0		31
73.	<i>Mimus polyglottos</i>	Northern mockingbird			Y	i-fc	pr	0	1	3	6	0	5	15	1		31
74.	<i>Seiurus aurocapillus</i>	Ovenbird			Y	fc-c	i-sr	4	1	0	0	0	2	22	0		29
75.	<i>Certhia americana</i>	Brown creeper		SI	Y	c	wr	0	1	0	0	0	0	26	1		28
76.	<i>Dendroica virens</i>	Black-throated green warbler				i-fc		0		1	0	0	0	27	0		28
77.	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker		E	Y	fc		0	1	0	0	0	3	23	1		28
78.	<i>Actitis macularia</i>	Spotted sandpiper				r		0		0	0	0	0	27	0		27
79.	<i>Piranga olivacea</i>	Scarlet tanager				fc	sr	1		4	0	0	1	20	1		27
80.	<i>Accipiter cooperii</i>	Cooper's hawk			Y	fc	pr	0	1	6	1	0	0	17	1		26
81.	<i>Ammodramus savannarum</i>	Grasshopper sparrow				r-i	sr	9		4	0	0	0	11	0		24
82.	<i>Spiza americana</i>	Dickcissel				r	r-erratic sr	15		4	3	0	0	2	0		24
83.	<i>Butorides striatus</i>	Green-backed heron				fc		0		1	0	0	0	21	0		22
84.	<i>Dendroica magnolia</i>	Magnolia warbler		SI		fc-c		0		0	0	0	0	22	0		22
85.	<i>Spizella arborea</i>	American tree sparrow				fc-c	wr	2		3	1	0	0	16	0		22
86.	<i>Catharus ustulatus</i>	Swainson's thrush				fc-c		0		0	0	0	0	21	0		21
87.	<i>Setophaga ruticilla</i>	American redstart				fc-c	i-sr	0		0	0	0	0	21	0		21
88.	<i>Dendroica striata</i>	Blackpoll warbler				fc-c		0		0	0	0	0	20	0		20
89.	<i>Vireo flavifrons</i>	Yellow-throated Vireo			Y	i-fc	sr	0	1	0	0	0	0	17	1		19
90.	<i>Dendroica castanea</i>	Bay-breasted Warbler				fc-c		0		0	0	0	0	18	0		18
91.	<i>Fulica americana</i>	American coot				c		0		11	0	0	0	7	0		18
92.	<i>Regulus satrapa</i>	Golden-crowned Kinglet		SI		c	i-fc wr	0		0	0	0	0	18	0		18
93.	<i>Dryocopus pileatus</i>	Pileated woodpecker			Y	i	pr	5	1	2	0	0	0	9	0		17
94.	<i>Melospiza georgiana</i>	Swamp sparrow				i	r-I sr	0		0	0	14	0	3	0		17
95.	<i>Riparia riparia</i>	Bank swallow			Y	fc	i-sr	0	1	3	3	0	0	9	1		17

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
96.	<i>Mniotilta varia</i>	Black-and-white warbler			Y	fc		0	1	0	0	0	0	15	0		16
97.	<i>Dendroica fusca</i>	Blackburnian warbler		SI		fc-c		0		0	0	0	0	15	0		15
98.	<i>Vermivora peregrina</i>	Tennessee warbler				c		0		0	0	0	0	15	0		15
99.	<i>Dolichonyx oryzivorus</i>	Bobolink		SOC		r-i	sr	1		2	1	0	1	8	0		13
100.	<i>Wilsonia pusilla</i>	Wilson's warbler			Y	i-fc		0	1	0	0	0	1	11	0		13
101.	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker				i	pr	0		1	0	0	0	11	0		12
102.	<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler				fc-c		0		0	0	0	0	11	0		11
103.	<i>Empidonax traillii</i>	Willow flycatcher				i	sr	0		9	0	0	1	1	0		11
104.	<i>Guiraca caerulea</i>	Blue grosbeak		SI		r	r-breeding	0		11	0	0	0	0	0		11
105.	<i>Pheucticus ludovicianus</i>	Rose-breasted grosbeak				fc-c	r	0		1	0	0	0	10	0		11
106.	<i>Circus cyaneus</i>	Northern harrier		E		i		2		0	1	0	0	7	0		10
107.	<i>Dendroica discolor</i>	Prairie warbler				i	sr	2		0	0	0	0	8	0		10
108.	<i>Parula americana</i>	Northern parula				i	i-fc sr	1		0	0	0	1	7	1		10
109.	<i>Vermivora ruficapilla</i>	Nashville warbler				c		0		0	0	0	0	10	0		10
110.	<i>Accipiter striatus</i>	Sharp-shinned Hawk		SOC	Y	i		1	1	2	1	0	1	2	1		9
111.	<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher			Y	r-i		1	1	1	2	0	1	3	0		9
112.	<i>Phalacrocorax auritus</i>	Double-crested Cormorant				i-fc		0		0	0	0	1	7	1		9
113.	<i>Vermivora pinus</i>	Blue-winged warbler				i	sr	0		0	0	0	0	9	0		9
114.	<i>Vireo philadelphicus</i>	Philadelphia vireo				r-i		0		4	2	0	0	3	0		9
115.	<i>Catharus minimus</i>	Gray-cheeked Thrush				i		0		0	0	0	0	8	0		8
116.	<i>Colinus virginianus</i>	Northern bobwhite		SOC	Y	r-i	sr	0	1	1	2	0	0	3	1		8
117.	<i>Coragyps atratus</i>	Black vulture		SOC	Y	a-r	i-fc r	1	1	0	2	0	0	3	1		8
118.	<i>Eremophila alpestris</i>	Horned lark				c	pr	1		6	0	0	0	1	0		8
119.	<i>Anas discors</i>	Blue-winged Teal				fc-c		0		1	0	0	0	6	0		7
120.	<i>Carpodacus purpureus</i>	Purple finch		SI		i	rare-sr	0		2	0	0	0	5	0		7
121.	<i>Phasianus colchicus</i>	Ring-necked Pheasant				i-fc	pr	1		0	0	0	4	2	0		7
122.	<i>Catharus guttatus</i>	Hermit thrush		T		fc-c	rare wr	0		0	0	0	0	6	0		6
123.	<i>Dendroica dominica</i>	Yellow-throated warbler				r-i	sr	0		0	0	0	0	6	0		6
124.	<i>Dendroica pinus</i>	Pine warbler				r-i	sr	0		0	0	0	0	6	0		6
125.	<i>Pandion haliaetus</i>	Osprey		E		i		0		0	0	0	0	6	0		6
126.	<i>Anas rubripes</i>	American black duck				fc-c		1		0	0	0	0	4	0		5

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
127.	<i>Dendroica tigrina</i>	Cape may warbler				fc-c		0		0	0	0	0	5	0		5
128.	<i>Otus asio</i>	Eastern Screech-owl				fc	pr	0		0	0	0	0	4	0	1	5
129.	<i>Passerella iliaca</i>	Fox sparrow			Y	i-fc		0	1	2	2	0	0	0	0		5
130.	<i>Tringa solitaria</i>	Solitary sandpiper				i-fc		0		0	0	0	0	5	0		5
131.	<i>Bucephala clangula</i>	Common goldeneye				fc-c		0		0	0	0	0	4	0		4
132.	<i>Casmerodius albus</i>	Great egret		SOC	Y	r-i		0	1	1	1	0	0	1	0		4
133.	<i>Catharus fuscescens</i>	Veery				fc-c	rare sr	0		0	0	0	0	4	0		4
134.	<i>Cistothorus platensis</i>	Sedge wren		SOC		r	local sr	0		4	0	0	0	0	0		4
135.	<i>Oporornis formosus</i>	Kentucky warbler				r-i	fc-c pr	0		1	0	0	0	3	0		4
136.	<i>Podilymbus podiceps</i>	Pied-billed Grebe				fc-c		0		1	0	0	0	3	0		4
137.	<i>Seiurus noveboracensis</i>	Northern waterthrush		SI		i-fc		0		0	0	0	0	4	0		4
138.	<i>Wilsonia canadensis</i>	Canada warbler		SI		i-fc		0		0	0	0	0	4	0		4
139.	<i>Anthus rubescens</i>	American pipit				uncommon		0		0	0	0	0	3	0		3
140.	<i>Buteo lagopus</i>	Rough-legged Hawk			Y	i		0	1	1	1	0	0	0	0		3
141.	<i>Dendroica caerulescens</i>	Black-throated blue warbler		SI		i					0		0	3	0		3
142.	<i>Larus delawarensis</i>	Ring-billed gull				c		2		0	0	0	0	1	0		3
143.	<i>Progne subis</i>	Purple martin				i-lc	sr	0		1	0	0	0	2	0		3
144.	<i>Sitta canadensis</i>	Red-breasted Nuthatch		SI		i-fc sporadic	wr	0		0	0	0	0	3	0		3
145.	<i>Vireo solitarius</i>	Solitary vireo				fc		0		1	0	0	0	2	0		3
146.	<i>Wilsonia citrina</i>	Hooded warbler				r-u	sr	0		0	0	0	0	3	0		3
147.	<i>Bubo virginianus</i>	Great horned owl				fc-c	pr	0		0	0	0	0	2	0		2
148.	<i>Buteo platypterus</i>	Broad-winged Hawk			Y	i	i-sr	0	1	0	0	0	0	1	0		2
149.	<i>Dendroica cerulea</i>	Cerulean warbler		SOC		i	sr	0		0	0	0	0	2	0		2
150.	<i>Haliaeetus leucocephalus</i>	Bald eagle	T	E	Y	r	pr	0	1	0	0	0	0	1	0		2
151.	<i>Hirundo pyrrhonota</i>	Cliff swallow				r-i	sr	0		1	0	0	0	1	0		2
152.	<i>Mergus merganser</i>	Common merganser				fc		0		0	0	0	0	2	0		2
153.	<i>Piranga rubra</i>	Summer tanager				r-i	sr	0		0	0	0	0	2	0		2
154.	<i>Strix varia</i>	Barred owl				fc	pr	0		0	0	0	0	1	0	1	2
155.	<i>Troglodytes troglodytes</i>	Winter wren		SI		i-fc	r sr	0		0	0	2	0	0	0		2
156.	<i>Vermivora chrysoptera</i>	Golden-winged warbler		E		r	sr	0		0	0	0	0	2	0		2
157.	<i>Anas acuta</i>	Northern pintail		SI		i-c		0		0	0	0	0	1	0		1
158.	<i>Aythya americana</i>	Redhead		SI		fc-c		0		0	0	0	0	0		1	1
159.	<i>Aythya affinis</i>	Lesser scaup				c		0		0	0	0	0	1	0		1

	Scientific Name	Common	Fed Status	State Status	Record	migrant	residency	Heartland Inventory	MC/HT Survey	2004 HT surveys	2000-2002 HT	Banding Hopeton	Hopewell	Mound City	Seip 2003	other records	TOTALS
160.	<i>Aythya collaris</i>	Ring-necked Duck				c		0		0	0	0	0	1	0		1
161.	<i>Bartramia longicauda</i>	Upland sandpiper		T		r-i		0		0	1	0	0	0	0		1
162.	<i>Botaurus lentiginosus</i>	American bittern		E		r-i	sr	0		0	0	0	0	1	0		1
163.	<i>Calidris alpina</i>	Dunlin				fc-c		0		1	0	0	0	0	0		1
164.	<i>Caprimulgus vociferus</i>	Whip-poor-will				i-fc	sr	0		0	0	0	0	0	0	1	1
165.	<i>Chondestes grammacus</i>	Lark sparrow		E		a-r		0		1	0	0	0	0	0		1
166.	<i>Empidonax minimus</i>	Least flycatcher		T		fc-c		0		0	0	0	0	1	0		1
167.	<i>Empidonax virescens</i>	Acadian flycatcher				fc	sr	0		0	0	0	0	1	0		1
168.	<i>Mergus serrator</i>	Red-breasted Merganser				fc		0		0	0	0	0	1	0		1
169.	<i>Parus atricapillus</i>	Black-capped Chickadee				i-fc		0		0	0	0	0	1	0		1
170.	<i>Scolopax minor</i>	American woodcock				fc	sr	0		0	0	0	0	1	0		1
171.	<i>Sterna caspia</i>	Caspian tern				i		0		1	0	0	0	0	0		1
172.	<i>Vireo bellii</i>	Bell's vireo		SI		r		0		0	0	0	0	1	0		1
TOTAL Individuals								634	76	582	408	296	227	9764	45	4	12,056
TOTAL Species								66	76	91	64	12	63	161	40	4	172

Heartland Inventory: (All park units) Survey conducted from 2003 to 2004 by park staff and volunteers; MC/HT Survey: (Mound City Group and Hopeton Earthworks); MacArthur, J. 2000. The Birds Species of Hopewell Culture National Historical Park, Ross County, Ohio, a biological survey for the National Park System. Unpublished species list. ; 2004 HT surveys: (Hopeton Earthworks) Surveys conducted by park staff and volunteers; 2000-2002 HT: (Hopeton Earthworks) Surveys conducted by park staff and volunteers; Banding Hopeton: (Hopeton Earthworks) October 2004 banding conducted by park staff and volunteers; Hopewell: (Hopewell Mound Group) Birds walks conducted by park staff and volunteers; Mound City: (Mound City Group) Bird walks conducted by park staff and volunteers spanning 1979 to 2004; Seip 2003: (Seip Earthworks) Surveys conducted by park staff and volunteers; other records: (Mound City Group) Birds observed during the course of other activities by park staff and volunteers; TOTALS: Hopewell Culture National Historical Park totals of bird species documented

* Federally listed threatened species

E= Ohio Endangered

T= Ohio Threatened

SOC= Ohio Species of Concern

SI= Ohio Species of Interest

Record, nesting, migration, residency information from Thomson, 1994.

Division of Wildlife, Ohio Department of Natural Resources Species list, May 2002.

c=common

fc= fairly common

i=infrequent

r=rare

a=accidental

pr=permanent resident

sr=summer resident

wr=winter resident

Table 6: Comparison of birds documented throughout the seasons.

	Scientific Name	Common	May/June 2003	Sept/Oct 2003	Jan 2004	Apr/May 2004	Total
1.	<i>Corvus brachyrhynchos</i>	American crow	9	14	17	12	52
2.	<i>Agelaius phoeniceus</i>	Red-winged blackbird	22	0	3	22	47
3.	<i>Sturnella magna</i>	Eastern meadowlark	11	10	1	19	41
4.	<i>Sturnus vulgaris</i>	European starling	6	12	10	7	35
5.	<i>Cardinalis cardinalis</i>	Northern cardinal	11	8	4	11	34
6.	<i>Spizella pusilla</i>	Field sparrow	10	5	0	13	28
7.	<i>Turdus migratorius</i>	American robin	11	8	1	8	28
8.	<i>Carduelis tristis</i>	American goldfinch	5	9	5	7	26
9.	<i>Cyanocitta cristata</i>	Blue jay	3	13	4	3	23
10.	<i>Tachycineta bicolor</i>	Tree swallow	10	5	0	7	22
11.	<i>Icterus galbula</i>	Northern oriole	13	0	0	7	20
12.	<i>Geothlypis trichas</i>	Common yellowthroat	6	1	0	12	19
13.	<i>Melospiza melodia</i>	Song sparrow	7	1	2	8	18
14.	<i>Zenaidura macroura</i>	Mourning dove	1	6	5	5	17
15.	<i>Parus bicolor</i>	Tufted titmouse	4	0	0	12	16
16.	<i>Spiza americana</i>	Dickcissel	10	4	0	1	15
17.	<i>Branta canadensis</i>	Canada goose	1	4	7	2	14
18.	<i>Sialia sialis</i>	Eastern bluebird	8	1	1	2	12
19.	<i>Quiscalus quiscula</i>	Common grackle	5	1	0	5	11
20.	<i>Hylocichla mustelina</i>	Wood thrush	3	0	0	7	10
21.	<i>Ammodramus savannarum</i>	Grasshopper sparrow	5	0	0	4	9
22.	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	3	4	0	2	9
23.	<i>Dumetella carolinensis</i>	Gray catbird	3	4	0	1	8
24.	<i>Thryothorus ludovicianus</i>	Carolina wren	0	1	4	3	8
25.	<i>Sitta carolinensis</i>	White-breasted Nuthatch	0	3	4	0	7
26.	<i>Buteo jamaicensis</i>	Red-tailed Hawk	0	0	3	3	6
27.	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	4	0	2	0	6
28.	<i>Parus carolinensis</i>	Carolina chickadee	1	1	3	1	6
29.	<i>Protonotaria citrea</i>	Prothonotary warbler	5	0	0	1	6
30.	<i>Vireo olivaceus</i>	Red-eyed Vireo	4	0	0	2	6
31.	<i>Ardea herodias</i>	Great blue heron	3	0	0	2	5
32.	<i>Dryocopus pileatus</i>	Pileated woodpecker	1	1	2	1	5
33.	<i>Icteria virens</i>	Yellow-breasted chat	1	0	0	4	5
34.	<i>Picoides pubescens</i>	Downy woodpecker	0	0	3	2	5
35.	<i>Bombycilla cedrorum</i>	Cedar waxwing	1	3	0	0	4
36.	<i>Columba livia</i>	Rock dove	1	1	2	0	4
37.	<i>Seiurus aurocapillus</i>	Ovenbird	0	3	0	1	4
38.	<i>Anas platyrhynchos</i>	Mallard	1	0	1	1	3

	Scientific Name	Common	May/June 2003	Sept/Oct 2003	Jan 2004	Apr/May 2004	Total
39.	<i>Charadrius vociferus</i>	Killdeer	0	1	0	2	3
40.	<i>Circus cyaneus</i>	Northern harrier	0	0	2	0	2
41.	<i>Colaptes auratus</i>	Northern flicker	0	1	0	1	2
42.	<i>Contopus virens</i>	Eastern Wood-peewee	1	1	0	0	2
43.	<i>Dendroica coronata</i>	Yellow-rumped Warbler	0	0	0	2	2
44.	<i>Dendroica discolor</i>	Prairie warbler	0	0	0	2	2
45.	<i>Dendroica petechia</i>	Yellow warbler	0	0	0	2	2
46.	<i>Larus delawarensis</i>	Ring-billed gull	0	0	2	0	2
47.	<i>Spizella arborea</i>	American tree sparrow	0	0	2	0	2
48.	<i>Toxostoma rufum</i>	Brown thrasher	0	0	0	2	2
49.	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	0	0	2	0	2
50.	<i>Accipiter striatus</i>	Sharp-shinned Hawk	0	1	0	0	1
51.	<i>Anas rubripes</i>	American black duck	0	0	1	0	1
52.	<i>Cathartes aura</i>	Turkey vulture	1	0	0	0	1
53.	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	1	0	0	0	1
54.	<i>Coragyps atratus</i>	Black vulture	0	0	1	0	1
55.	<i>Dolichonyx oryzivorus</i>	Bobolink	0	0	0	1	1
56.	<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher	0	1	0	0	1
57.	<i>Eremophila alpestris</i>	Horned lark	0	0	1	0	1
58.	<i>Falco sparverius</i>	American kestrel	0	0	1	0	1
59.	<i>Icterus spurius</i>	Orchard oriole	0	0	0	1	1
60.	<i>Parula americana</i>	Northern parula	0	0	0	1	1
61.	<i>Passer domesticus</i>	House sparrow	1	0	0	0	1
62.	<i>Passerina cyanea</i>	Indigo bunting	1	0	0	0	1
63.	<i>Phasianus colchicus</i>	Ring-necked Pheasant	1	0	0	0	1
64.	<i>Piranga olivacea</i>	Scarlet tanager	1	0	0	0	1
65.	<i>Sayornis phoebe</i>	Eastern phoebe	0	0	0	1	1
66.	<i>Spizella passerina</i>	Chipping sparrow	0	1	0	0	1
Total individuals			196	129	96	213	634
Total species			40	31	29	44	66

Table 7. Comprison of birds documented by habitat.

	Scientific name	Common name	Woods/ upland	Agriculture/ old field	Riparian	Mowed	Total
1.	<i>Corvus brachyrhynchos</i>	American crow	7	35	8	2	52
2.	<i>Agelaius phoeniceus</i>	Red-winged blackbird	4	34	5	4	47
3.	<i>Sturnella magna</i>	Eastern meadowlark	2	32	2	5	41
4.	<i>Sturnus vulgaris</i>	European starling	4	27	3	1	35
5.	<i>Cardinalis cardinalis</i>	Northern cardinal	10	16	5	3	34
6.	<i>Spizella pusilla</i>	Field sparrow	4	21	2	1	28
7.	<i>Turdus migratorius</i>	American robin	5	14	6	3	28
8.	<i>Carduelis tristis</i>	American goldfinch	8	15	2	1	26
9.	<i>Cyanocitta cristata</i>	Blue jay	5	13	4	1	23
10.	<i>Tachycineta bicolor</i>	Tree swallow	0	20	2	0	22
11.	<i>Icterus galbula</i>	Northern oriole	4	8	8	0	20
12.	<i>Geothlypis trichas</i>	Common yellowthroat	4	10	4	1	19
13.	<i>Melospiza melodia</i>	Song sparrow	2	13	3	0	18
14.	<i>Zenaida macroura</i>	Mourning dove	2	9	1	5	17
15.	<i>Parus bicolor</i>	Tufted titmouse	3	8	3	2	16
16.	<i>Spiza americana</i>	Dickcissel	0	13	1	1	15
17.	<i>Branta canadensis</i>	Canada goose	1	12	0	1	14
18.	<i>Sialia sialis</i>	Eastern bluebird	1	7	1	3	12
19.	<i>Quiscalus quiscula</i>	Common grackle	1	8	1	1	11
20.	<i>Hylocichla mustelina</i>	Wood thrush	2	6	2	0	10
21.	<i>Ammodramus savannarum</i>	Grasshopper sparrow	0	9	0	0	9
22.	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	7	2	0	0	9
23.	<i>Dumetella carolinensis</i>	Gray catbird	4	2	2	0	8
24.	<i>Thryothorus ludovicianus</i>	Carolina wren	0	4	4	0	8
25.	<i>Sitta carolinensis</i>	White-breasted Nuthatch	1	2	2	2	7
26.	<i>Buteo jamaicensis</i>	Red-tailed Hawk	0	6	0	0	6
27.	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	1	2	3	0	6
28.	<i>Parus carolinensis</i>	Carolina chickadee	1	2	3	0	6
29.	<i>Protonotaria citrea</i>	Prothonotary warbler	1	1	4	0	6
30.	<i>Vireo olivaceus</i>	Red-eyed Vireo	1	0	4	1	6
31.	<i>Ardea herodias</i>	Great blue heron	1	3	0	1	5
32.	<i>Dryocopus pileatus</i>	Pileated woodpecker	1	3	1	0	5
33.	<i>Icteria virens</i>	Yellow-breasted chat	3	2	0	0	5
34.	<i>Picoides pubescens</i>	Downy woodpecker	0	0	4	1	5
35.	<i>Bombycilla cedrorum</i>	Cedar waxwing	2	0	2	0	4
36.	<i>Columba livia</i>	Rock dove	0	1	0	3	4

	Scientific name	Common name	Woods/ upland	Agriculture/ old field	Riparian	Mowed	Total
37.	<i>Seiurus aurocapillus</i>	Ovenbird	2	1	1	0	4
38.	<i>Anas platyrhynchos</i>	Mallard	0	2	1	0	3
39.	<i>Charadrius vociferus</i>	Killdeer	0	1	0	2	3
40.	<i>Circus cyaneus</i>	Northern harrier	1	0	0	1	2
41.	<i>Colaptes auratus</i>	Northern flicker	1	1	0	0	2
42.	<i>Contopus virens</i>	Eastern Wood-peewee	0	1	1	0	2
43.	<i>Dendroica coronata</i>	Yellow-rumped Warbler	1	1	0	0	2
44.	<i>Dendroica discolor</i>	Prairie warbler	0	1	1	0	2
45.	<i>Dendroica petechia</i>	Yellow warbler	0	2	0	0	2
46.	<i>Larus delawarensis</i>	Ring-billed gull	1	1	0	0	2
47.	<i>Spizella arborea</i>	American tree sparrow	0	2	0	0	2
48.	<i>Toxostoma rufum</i>	Brown thrasher	0	2	0	0	2
49.	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	1	0	0	1	2
50.	<i>Accipiter striatus</i>	Sharp-shinned Hawk	0	0	1	0	1
51.	<i>Anas rubripes</i>	American black duck	0	1	0	0	1
52.	<i>Cathartes aura</i>	Turkey vulture	0	1	0	0	1
53.	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	0	1	0	0	1
54.	<i>Coragyps atratus</i>	Black vulture	0	1	0	0	1
55.	<i>Dolichonyx oryzivorus</i>	Bobolink	0	1	0	0	1
56.	<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher	1	0	0	0	1
57.	<i>Eremophila alpestris</i>	Horned lark	0	1	0	0	1
58.	<i>Falco sparverius</i>	American kestrel	0	1	0	0	1
59.	<i>Icterus spurius</i>	Orchard oriole	0	1	0	0	1
60.	<i>Parula americana</i>	Northern parula	1	0	0	0	1
61.	<i>Passer domesticus</i>	House sparrow	1	0	0	0	1
62.	<i>Passerina cyanea</i>	Indigo bunting	0	0	1	0	1
63.	<i>Phasianus colchicus</i>	Ring-necked Pheasant	1	0	0	0	1
64.	<i>Piranga olivacea</i>	Scarlet tanager	0	0	1	0	1
65.	<i>Sayornis phoebe</i>	Eastern phoebe	0	1	0	0	1
66.	<i>Spizella passerina</i>	Chipping sparrow	0	1	0	0	1
Individuals			103	385	99	47	634
Species			39	54	36	24	66

Table 8: Birds not documented at Hopewell Culture National Historical Park

	Common name	Reason birds were not documented
1.	Henslow's sparrow	Should be observed, present in other areas of Ross County
2.	Louisiana waterthrush	
3.	Red-shouldered Hawk	
4.	Wild turkey	
5.	Vesper sparrow	Should be observed, summer resident
6.	Short-eared Owl	Should be observed, winter resident, partly diurnal
7.	Common loon	Diving birds, migrant, lacking habitat
8.	Horned grebe	
9.	Ruffed grouse	Edge of range
10.	Snow bunting	
11.	Bonaparte's gull	Gull, migrant, lacking habitat
12.	Common tern	
13.	Herring gull	
14.	Forster's tern	Gull, migrant, lacking habitat, edge of range
15.	Franklin's gull	
16.	Olive-sided Flycatcher	Migrant
17.	Orange-crowned warbler	
18.	Rusty blackbird	
19.	Black-crowned night heron	Migrant, lacking habitat
20.	Evening grosbeak	
21.	Marsh wren	
22.	Red crossbill	
23.	Chuck-will's Widow	Nocturnal
24.	Long-eared Owl	Nocturnal, migrant
25.	Northern Saw-whet Owl	
26.	Lapland longspur	Out of range
27.	Sora	Rail, migrant, lacking habitat
28.	Virginia rail	
29.	Greater yellowlegs	Shorebird, migrant
30.	Lesser yellowlegs	
31.	American Golden-plover	Shorebird, migrant, lacking habitat
32.	Black-bellied Plover	
33.	Common snipe	
34.	Least sandpiper	
35.	Pectoral sandpiper	
36.	Semipalmated plover	
37.	Semipalmated sandpiper	
38.	Short-billed Dowitcher	
39.	Stilt sandpiper	
40.	Sanderling	Shorebird, migrant, lacking habitat, edge of range
41.	Black tern	Tern, migrant, lacking habitat
42.	Mute swan	Waterfowl, lacking habitat

	Common name	Reason birds were not documented
43.	American wigeon	Waterfowl, migrant, lacking habitat
44.	Bufflehead	
45.	Canvasback	
46.	Gadwall	
47.	Hooded merganser	
48.	Northern shoveler	
49.	Ruddy duck	
50.	Snow goose	
51.	Tundra swan	
52.	Green-winged Teal	Waterfowl, migrant, lacking habitat, may winter along mainstem of Scioto River
53.	Pine siskin	Winter resident, lacking habitat

Appendix 1: Terrestrial Habitat Data Form

Date: _____ Park: HB HT HW MC SP Plot ID #: _____

Surveyors: _____

UTM Zone: 17N Datum: NADCON 1983 Easting: _____ Northing: _____ Project File: _____ WP#: _____

Location Description: _____

Quad: ___ T: ___ R: ___ S: ___ Plot size, length (m):___ width (m):___ radius (m):___ Photo Roll ID:___ Photo #:___

Site Characteristics:

Elevation (ft): _____ Slope: _____ Var: high med low Aspect: _____ Var: high med low

Topographic position: level toe slope lower-slope mid-slope upper-slope escarpment/face ledge crest depression draw

Slope-shape, Horizontal (30m): concave straight convex Vertical (30m): concave straight convex Surface water: in plot <50m >50m

Hydrologic regime: permanently flooded semi-permanently flooded seasonally/temporarily flooded intermittently flooded seep upland

Ground Cover: bryophyte/lichen 1 2 3 4 5 woody debris 1 2 3 4 5 grass litter 1 2 3 4 5 tree leaf litter 1 2 3 4 5
bedrock/boulder 1 2 3 4 5 gravel/cobble 1 2 3 4 5 sand/soil 1 2 3 4 5
(cover classes 1: <1%, 2: 1-5% 3: 5-25% 4: 25-50% 5: 50-100%)

Vegetation Description:
Leaf phenology (of uppermost stratum having > 10% cover):

Trees and shrubs
 Evergreen
 Deciduous
 Mixed (evergreen, deciduous)
 Herbs
 Annual
 Perennial

Physiognomic class (see definitions):
 Forest
 Woodland
 Sparse Woodland
 Shrubland
 Sparse Shrubland
 Herbaceous
 Sparse Vegetation

Strata	Stratum Height ¹	Stratum Cover Class ²	Dominant Species (list top 3-5 species in order; use = sign to indicate equal importance)
Canopy	1 2 3 4 5 6	A B C D	_____
Sub-canopy	1 2 3 4 5 6	A B C D	_____
Shrub	1 2 3 4 5 6	A B C D	_____
Herbaceous	1 2 3 4 5 6	A B C D	_____

¹Stratum Height Classes: 1: <.5m 2: .5-5m 3: 5-10m 4: 10-20m 5: 20-30m 6: >30m
²Stratum Cover Classes: A: <10% B: 10-25% C: 25-60% D: >60

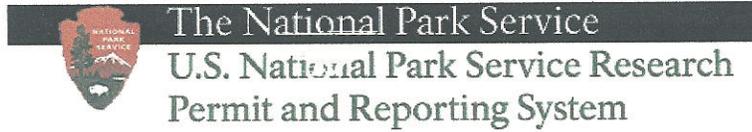
Appendix 3: Scanned copy of National Park Service collection permit

NPS Research Applications

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SCIENTIFIC RESEARCH AND COLLECTING PERMIT

Grants permission in accordance with the attached general and special conditions



United States Department of the Interior
National Park Service

Hopewell Culture NHP

Study#: HOCU-00004
Permit#: HOCU-2003-SCI-0001
Start Date: May-14-2003
Expiration Date: Nov-14-2004
Coop Agreement#: n/a
Optional Park Code: n/a

Name of principal investigator:

Name: Mrs Myra Vick Phone: 740-774-1126 Email: Myra_Vick@nps.gov

Name of institution represented:

Hopewell Culture National Historical Park

Additional investigator(s):

Name: Constance Jones Phone: 740-774-1126 Email: Constance_Jones@nps.gov

Project title:

Occurrence, Distribution, and Relative Abundance of Birds at Hopewell Culture National Historical Park within the Heartland Network Inventory and Monitoring Program.

Purpose of study:

Widespread declines in neotropical migrant, national, and local bird populations have prompted concerns about bird dynamics at Hopewell Culture National Historical Park (HOCU). Currently, the park has little information on the occurrence and species of birds present in the park. A bird survey in the park will provide baseline data on bird species composition, relative abundance, and habitat use. This inventory will provide a foundation for future avian population monitoring and will help the park better manage resources and predict potential impacts of management decisions on avian species. It will also provide managers with information about future research needs, such as fecundity surveys on species of concern, or other important questions.

Locations authorized:

Surveying will be conducted at all five park units.

Transportation method to research site(s):

Access will involve the use of vehicles and travel on foot.

Collection of the following specimens or materials, quantities, and any limitations on collecting:

n/a

Name of repository for specimens or sample materials if applicable:

Specific conditions or restrictions (also see attached conditions):

n/a

<https://science1.nature.nps.gov/permits/nps/PermitFormSearchViewServlet?permitId=HOCU-20...> 12/2/2003

Appendix 4: Scanned copy of Ohio Department of Natural Resources Division of Wildlife collection permit.



DIVISION OF WILDLIFE

Ohio Department of Natural Resources

Division of Wildlife Headquarters
1840 Belcher Drive
Columbus, Ohio 43224-1300
1-800-WILDLIFE

WILD ANIMAL PERMIT: 326

H.
MYRA H. VICK
16062 ST. RT. 104
CHILLICOTHE, OH 45601

SOCIAL SECURITY NUMBER: 575-90-3642

SCIENTIFIC COLLECTION
Others authorized on permit
NO

STEVEN A GRAY
Chief, Division of Wildlife

6/2/2003
DATE ISSUED

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit.

This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective from: 3/16/2003 to: 3/15/2004

This permit must be carried while collecting wild animals and be exhibited to any person on demand.

THIS PERMIT IS RESTRICTED TO THE FOLLOWING

1. Permittee must notify the Wildlife District office at least 24 hours prior to collecting. When collecting in Lake Erie, permittee must notify the Lake Erie Enforcement office at (419) 625-8062
2. Permittee must consult with Wildlife's Environmental Section prior to conducting any wild animal work associated with compliance requirements of the Clean Water Act (CWA), Section 401 and/or 404. The Fish Management Section can be reached at (614) 265-6308 (Bob Fletcher) or (614) 265-6631 (Becky Jenkins).
3. All gill nets must be marked with an 18" square yellow flag identifying the agency/institution/organization, name and permit number.
4. Collection is prohibited in Big Darby, Little Darby and Fish Creeks without explicit permission from the Division of Wildlife.
5. Previously unreported state fish and aquatic invertebrate species must be reported to the Division of Wildlife within 24 hours of collection.

Locations of Collecting:

MOUND CITY, HOPEWELL MOUND GROUP, HOPETON EARTHWORKS, HIGH BANK, SEIP EARTHWORKS

Equipment and method used in collection:

BIRDS, FISH, MAMMALS

Name and number of each species to be collected:

FISH MAY BE TAKEN BY SEINES AND ELECTROSHOCKER, BIRD & MAMMALS ARE SALVAGE

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? NO

This permit is not valid for collecting migratory birds, their nests, or eggs unless a current permit from the U.S. Fish and Wildlife Service has been obtained.

NO ENDANGERED SPECIES MAY BE TAKEN

Appendix 5: Scanned copy of Federal Fish and Wildlife Permit.

DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE		3-201 (1/97)
 FEDERAL FISH AND WILDLIFE PERMIT		RECEIVED DEC 09 2003
1. PERMITTEE HOPEWELL CULTURE NATL HISTORICAL PARK 16062 STATE ROUTE 104 CHILLICOTHE, OH 45601 U.S.A.		2. AUTHORITY-STATUTES 16 USC 703-712 REGULATIONS (Attached) 50 CFR Part 13 50 CFR 21.27
		3. NUMBER MB080608-0
4. RENEWABLE <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		5. MAY COPY <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
6. EFFECTIVE 12/04/2003		7. EXPIRES 03/31/2006
8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business) MYRA H. VICK BIOLOGIST		9. TYPE OF PERMIT SPECIAL PURPOSE SALVAGE
10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED OHIO		
11. CONDITIONS AND AUTHORIZATIONS: A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS. B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW. C. VALID FOR USE BY PERMITTEE NAMED ABOVE. D. AUTHORIZED TO SALVAGE MIGRATORY BIRD FOUND DEAD IN WHICH THE PERMITTEE HAD NO PART IN THE KILLING OR DEATH THEREOF. ALSO AUTHORIZED TO SALVAGE ADDLED EGGS AND ABANDONED NESTS SALVAGED AFTER THE NESTING SEASON. THIS EXCLUDES NESTS AND EGGS OF EAGLES, THREATENED AND ENDANGERED SPECIES. E. ALL SPECIMENS SALVAGED MUST BE DEPOSITED WITH HOPEWELL CULTURE NATIONAL HISTORICAL PARK, CHILLICOTHE, OH, FOR EDUCATIONAL DISPLAY ONLY. F. CONCURRENT AUTHORITY IS GRANTED TO THOSE IDENTIFIED IN WRITING BY THE PERMITTEE TO THE ISSUING OFFICE. G. PERMITTEE MUST ALSO COMPLY WITH ATTACHED SALVAGE STANDARD CONDITIONS.		
<input checked="" type="checkbox"/> ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY		
12. REPORTING REQUIREMENTS ANNUAL REPORT DUE: 1/31		
ISSUED BY 	TITLE CHIEF - PERMIT SECTION	DATE 12/04/2003