AVIAN INVENTORY

OF

HUBBELL TRADING POST NATIONAL HISTORIC SITE

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ABSTRACT

The Navajo Natural Heritage Program of the Navajo Nation Department of Fish and Wildlife contracted the primary author to complete avian inventories at Hubbell Trading Post National Historic Site as part of the National Park Service Inventory and Monitoring Program. The goals of this study were to document at least 90% of the extant breeding and migrant birds through visual and/or aural observations; and to provide baseline information, and make recommendations, as warranted, for development of future management of zoological resources within the park. Prior to field studies, it was estimated that 56 avian species could potentially occur at the park based on species-area models.

Breeding bird inventories were conducted from 13 May to 24 June 2003 with the completion of 14 point count surveys (triple-replicated) and recording of incidental sightings. Migrant and wintering birds were inventoried on 16 September and 5 December 2003.

We documented a total of 66 avian species at the Monument, of which 46 were detected during point count surveys. Of the 66 species, 71.4% were determined to be breeding there, or probably so; the remainder were migrant or wintering species. Our survey efforts detected 117.9% of the number of species (56) estimated to occur there based on species-area models, and 71.4% of those were confirmed or probable breeders within the park.

Seven-minute point count surveys alone detected a total of 46 species. An analysis of these point count surveys, revealed that 87.0% (40) of the 46 species were accounted for during the first 3 minutes of surveys. Fall and winter area searches combined, yielded 34 unique species, and added an additional 20 species to the total list of species, most of which were migrants or winter residents.

The Ash-throated Flycatcher, American Crow, Bullock's Oriole, and Common Raven were the most commonly detected species with point count surveys. The 10 most commonly detected species comprised 53.5% of total detections, while the 15 most common species accounted for 70.7% of all detection. Twenty species were detected only once during point counts.

No Navajo-, state of Arizona-, and/or federally-listed endangered and threatened species were detected during this inventory; however, one Navajo-listed candidate, the Yellow Warbler, was detected.

Key Words: avian, bird, Hubbell Trading Post National Historic Site, inventory, Inventory and Monitoring Program, National Park Service, Southern Colorado Plateau Network, point count surveys, variable circular plot.

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INTRODUCTION

The National Park Omnibus Management Act, passed by the U.S. Congress in 1998, has provided federal support for a "program of inventory and monitoring of National Park Service (NPS) resources to establish baseline information and to provide information on the long-term trends in the condition of National Park Service resources." This Act also provides the basis for Congressional funding for the NPS-Servicewide Inventory and Monitoring Program (I&M). This nationwide I&M program is currently compiling and organizing existing resource data for 265 NPS units, and completing inventory and monitoring data to fill data gaps in existing information. The I&M program will provide NPS land managers with comprehensive, scientifically-based information about the nature and status of natural resources within their jurisdictions for the purposes of management decision-making, scientific research, and public education.

The Navajo Natural Heritage Program (NNHP) of the Navajo Nation Department of Fish and Wildlife agreed with the Southern Colorado Plateau Network (SCPN) of the NPS to perform vertebrate and plant inventories of the three national parks that are contained within Navajo Nation lands in Arizona. These parks include Canyon de Chelly National Monument (CACH), Hubbell Trading Post National Historic Site (HUTR) in Apache County, and Navajo National Monument (NAVA) in Navajo and Coconino counties. The Navajo Nation is situated within the south-central part of the Colorado Plateau, and has an elevation range between 853 m (2,800 ft) at the mouth of the Little Colorado River, to 3,175 m (10,416 ft) at the summit of Navajo Mountain. Within this elevation range, there are three recognized ecological zones of (1) cold temperate mountain forest and woodland, (2) intermediate steppe grassland, and (3) arid desert lands. These zones are composed of mosaics of the following biotic communities (Brown 1982):

petran sub-alpine and petran montane conifer forest types; Great Basin desert-scrub and conifer woodlands; and plains and Great Basin Grasslands and sub-alpine grasslands. Annual precipitation ranges from an average of 15 cm (6 in) per year in the desert lands to over 61 cm (24 in) per year in the mountainous areas.

Hubbell Trading Post National Historic Site (HUTR) is located within the town of Ganado on the Navajo Nation in northern Apache County, AZ. This National Historic Landmark is a culturally-significant feature in that it is a continuously-operating Native American trading post since the late 1870s. It was strategically placed along a major stream, Pueblo Colorado Wash, which drains most of the Defiance Plateau and surrounding areas into the Little Colorado River. This unit encompasses 64.8 ha (160 ac), including the structural components of the Trading Post, and nearby residential habitat, plus an 880-m (2880 ft) section of Pueblo Colorado Wash. The portion of Pueblo Colorado Wash within the HUTR boundaries is undergoing a restoration project which is designed to replace non-native vegetation with native riparian species. The elevation within the unit boundaries ranges from approximately 1920 to 1940 m (6300 to 6365 ft). The wash and its alluvial banks compose approximately 6.4 ha (16 acres) of HUTR. Because of the cultural preservation focus of the park, little attention has been directed towards natural resources until recent years.

A number of reports have addressed the status and distribution of birds in the region (Woodbury and Russell 1945, Phillips et.al. 1964, Brown et.al. 1984, Jacobs 1986, Rosenberg and Terrill 1986, LaRue 1994, Rosenberg and Witzeman 1998 and 1999, Sogge et.al. 1998, Rosenberg 2001, Corman and Wise-Gervais 2005). Only one inventory of HUTR's riparian birds had been completed (Shaw et.al. 2005) prior to this inventory of the entire park. Shaw et.al. (2005) provided documentation of 85 bird species observed during surveys in 2002 and

2004. He noted considerable variability in species composition, with only 51 of the 85 species being documented in both years. A total of 71 species were detected in 2002, while 69 species were recorded in 2004.

While the general bird distribution and habitat association for the region is known, HUTR has never been completely inventoried. The objectives of this portion of the NPS I&M inventories were to: 1) document at least 90 percent of the avian species occurring within Hubbell Trading Post National Historic Site using existing, verifiable documentation and taxa-specific, field surveys with methodologies consistent with other NPS units in the SCPN; 2) complete and transfer all documentation of species presence, and collected data to hard-copy and digital formats usable by the NPS; 3) complete the NPS's database using these data; and 4) identify species of concern, provide baseline information, and make recommendations, as warranted, for development of future management and monitoring schemes of avian resources within the park. These objectives emphasized inventory of the breeding birds within HUTR, with a minor focus on migratory and wintering birds.

METHODS

Based on species-area models, Stuart (2000) predicted that there were 56 avian species likely to occur at HUTR. We employed standardized inventory methods that were used at other NPS units in the Southern Colorado Plateau, following a stratified-sampling scheme (by habitat) as outlined in Stuart (2000). We used triple-replicated point counts (PCSs) during May and June to document breeding birds, supplemented with area searches and incidental record-keeping. Area searches were also performed during September and December to document migrant and wintering birds. Most effort was placed on inventory of breeding birds as this was the emphasis

of the inventory. Detecting non-breeding birds during the migration and wintering periods was the secondary goal.

Point counts are a type of Variable Circular Plot (VCP) count, which are preferred to line transects under a variety of conditions: for habitat types that are more 'patchy' throughout the landscape, for correlating habitat measures with bird species, and for dense or rugged terrain. Plot counts may provide more representative data if points are well-spaced within the study area (Bibby et.al. 1992). Ideally, points were located at least 250 m apart to minimize the chance of double-counting birds. A 200-m buffer separates habitat types to maximize accurate habitat/species correlations (Stuart, 2000).

The PCSs were performed by one person recording all detections of birds that were heard or seen at a pre-selected location for a total of seven minutes. Bird detections were segmented into three periods of 0-3, 3-5, and 5-7 minutes. Extreme care was taken during each point count survey so that individual birds within and between survey periods would not be double-counted. The distance to each bird that was detected during counts was determined using a rangefinder and/or simple estimates. Initially the rangefinder was used extensively; but later, distance estimates were based on previous experience with its use. Birds flying-over the survey point were recorded; however, distance to the bird was not estimated. Additional notes on weather conditions, habitat variables, and the type of observation (visual, aural, or both) were also recorded. Each point was sampled three times in one year during the months of May and June, the peak time to determine breeding status for most species in northeastern Arizona. Further, to maximize the potential of detecting birds, PCSs were performed during the peak activity period for diurnal birds of between 05.00 and 08.00 hrs.

The number of PCS sample sites was selected, and provided to NNHP by the I&M Planning Team. The number of sites needed was estimated as the number of sample points needed to detect 90% of the estimated number of species. A total of 14 PCS locations were determined necessary for HUTR. We determined the location of plots, and attempted to provide sufficient coverage to the major habitat types by placing a number of plots in each habitat approximately equal to their proportion of land coverage.

We performed PCSs at 14 locations (Figure 1, Table 1, Appendix B) and documented the actual habitat components to accurately identify the habitat type. Point count surveys were performed during 13 May, 3 June and 24 June in 2003. A Garmin Etrex GPS (Global Positioning System) unit was used to record the exact coordinates of each survey point. Because of HUTR's rather small size and number of habitats, only one year of survey was deemed necessary to complete bird surveys at HUTR.

Diurnal and nocturnal area searches, including incidental record-keeping, were effective at detecting birds not documented by other methods, and were used primarily for collecting presence/absence data and increasing the species list. These surveys were systematic and/or opportunistic in nature and were conducted outside of the peak activity period for birds.

Non-breeding area searches were performed during fall and winter to detect migratory and wintering birds. Two survey trips were conducted on 16 September and 5 December 2003.

Close observation of bird behavior was used to determine breeding status. These behaviors include: actual nests or nest-building, adults carrying food, defensive and/or distraction behavior of adults, observations of fledglings (including remains), vocalizations of fledglings, etc. These determinations are further substantiated by the known breeding status and habitat preferences for birds in this region.

RESULTS

A total of 284 minutes (4.7 hrs) over 3 days were spent performing PCSs in 2003. An additional 85 and 80 minutes were spent conducting inventories of fall migrants and wintering birds respectively, during the September and December trips. The amount of time spent performing area searches was not quantified.

We documented the presence of 66 avian species (Table 2, Appendix A) at HUTR, of which 40 species were confirmed or probable breeders (Table 2, Seasonal Status = Summer & Permanent). An additional 23 species detected during this inventory were determined to be migrants to HUTR, while 3 species were wintering birds there. Including migrant and wintering birds, this inventory detected 117.9% of the number of species (56) estimated to occur by Stuart (2000). The total number of confirmed and probable breeding species from this inventory was 71.4 % of the 56 birds that Stuart (2000) estimated to occur at HUTR.

The PCSs alone yielded a total of 46 species (Table 3, Appendix C), and accounted for 85.0% (34 species) of those determined as summer and permanent residents. Survey period analyses (Table 3) revealed that 87.0% of these (40 species) were detected during at least 1 first-survey-period (0-3 min). The first and second (3-5 min) survey periods accounted for 91.3% of the 46 species detected by point count surveys. Four species, Bewick's Wren, Common Nighthawk, Northern Flicker, and Spotted Towhee, were only detected during the third survey period.

Analysis of the species detected during point count surveys (Table 3) revealed that the 10 most frequently detected species comprised 53.5% of all detections. Further, the 15 most frequent species accounted for 70.7% of detections. A total of 20 species were detected only once during point count surveys. The 15 most frequently-detected species (Table 3) comprised

the core of the breeding population. Of these, 11 (73.3%) species were nesting in foliage, and 4 (26.7%) were ground-nesting species. And of the top 15 species, ground-feeding species comprised the single-largest foraging guild (6 species, or 40%).

Non-breeding season area searches conducted during the fall and winter detected 21 species each, for a cumulative total of 34 unique bird species (Table 2). These area searches, plus keeping records of incidental sightings during all parts of the year, added another 20 bird species to the total list.

We derived species accumulation curves (Figure 3a,b,c) based on the cumulative number of species versus the number of survey hours, survey minutes and number of PCSs. Despite changes to the unit measured, the number of species accumulated during this inventory exhibit the same trend. A large number of species were detected in the very early stages of inventory. In fact, half of total number of species detected by PCSs were recorded within the first 30 minutes (4 PCSs) of survey, and 90% of the final species count were accounted for within the first one-third of the study. All graphs exhibit a second sharp increase during the second and third hour of survey at the 14th PCS. This increase is followed by a broad plateau extending to the terminus of each graph.

No Navajo Nation-listed endangered or threatened species (Navajo Nation Department of Fish and Wildlife, 2005) were found at HUTR during this inventory; however, one candidate species, the Yellow Warbler, was detected. Further no federally-listed species, nor any birds listed as Wildlife of Special Concern by the state of Arizona (Arizona Game and Fish Department 2006) were detected during this inventory.

DISCUSSION

The implementation of this inventory plan and protocol detected more than the expected number of bird species at HUTR. We detected 117.9% of the 56 species estimated to occur there by a species-area model (Stuart 2000). The expected number of species was based on the number of species in the sample area at a given time, and the average number expected to be detected at each sampling point. This information was then used to calculate the number of sample points needed to achieve 90% completeness of inventory. The extrapolation estimated the number of species available for detection at any given point during the spring-summer sampling period (C. Drost, pers. comm.). Most of the bird species (71%) detected during this inventory were determined to be breeding, or probably so, at HUTR. Given HUTR's rather small size and structurally-simple habitats, one could anticipate a relatively low number of breeding species there.

Other than the larger-than-expected species count, the species accumulation curves (Fig. 2) are a second measure of success for this inventory. These graphs were derived from the spring point count surveys, and are therefore, primarily designed to monitor breeding species detections. All graphs have sharp increases in the number of species early in the inventory, followed by broad plateaus as survey effort increases. In fact, 90% of the final species count were accounted for within the first one-third of the study. This is a strong indication that the number of species had reached near maximum, and that additional survey effort would detect few additional breeding species. Therefore, we feel confident that the large majority of HUTR's breeding species were detected during this inventory. Further, the results of this work, and those of Shaw et.al. (2005), make a strong foundation for the creation of an updated checklist of the birds of HUTR.

In comparing our results to those of Shaw et.al. (2005), we found considerable agreement in the species abundance and composition at HUTR. In fact, our count of 66 bird species was nearly identical to Shaw's reported totals of 71 and 69 species in 2002 and 2004, respectively. Also, our count of 40 confirmed or probable breeding species corresponds closely with Shaw's total of 36 species found at HUTR during summer surveys. Lastly, both studies had 51 species in common despite having different goals, study areas, and methods. Shaw et.al. (2005) found 34 species not detected during this inventory, while we detected 15 species not detected during his study. Most of the additional species from both studies were non-breeding (migrant or wintering) birds, or those attracted to the area because of the adjacent sewage-treatment ponds. Shaw et.al. (2005) concluded there was considerable variation in bird species over time at HUTR, with only 60% of (51 species) of his total count being detected during both years of his survey. Additionally, Shaw et.al. (2005) calculated his highest species richness and number of species during the peak migration times of May and September. His winter counts also yielded large numbers of individuals during both years of study.

Based on all information presented above, HUTR has shown a rather consistent compilation of 40 to 50 breeding bird species. The core of the breeding species is composed of the 15 to 17 most-commonly-detected species (as ranked in Table 3). These species accounted for over 70% of the breeding season detections. Bird community composition is often significantly influenced by habitat distribution, structure, and composition (MacArthur and MacArthur 1961, MacArthur 1964, Karr and Roth 1971, Willson 1974, and Roth 1976). Because these variables were relatively uniform throughout HUTR, we expected a low diversity of breeding birds. In general, the greatest bird diversity was concentrated in the riparian trees where habitat structure provided a variety of niches. Fewer birds were able to exploit the desert

scrub habitats within the fallow agricultural fields because the simple habitat structure provided few niches. Overall, the pool of species detected, and their habitat associations, were as expected based on prior regional surveys and the known bird distribution in the Navajo Nation region (Woodbury and Russell 1945, Phillips et.al. 1964, Jacobs 1986, LaRue 1994, Corman and Wise-Gervais 2005).

Hubbell Trading Post National Historic Site does offer suitable migratory and wintering habitat for a large and diverse suite of birds. This inventory, and the work by Shaw et.al. (2005), revealed large variations in the number and species composition of migratory and wintering birds. The most obvious reasons for this are the location of HUTR along a major riparian system, and the close proximity of the sewage treatment ponds. Migratory birds tend to be attracted to riparian vegetation and sewage treatment ponds (above citations) because of the significant structural components (trees and water, respectively) these two habitats provide. Because the non-native riparian vegetation had been removed within HUTR just prior this inventory, a major habitat component that typically attracts various bird species was absent. Birds are still attracted to the area; however, because HUTR is part of the of the Pueblo Colorado Wash system and has riparian vegetation at its boundaries. The site still contains large cottonwood trees that create an attractive structural habitat component. We expect an increase in bird species diversity and abundance as the native riparian vegetation continues to grow and expand within HUTR. Such species would primarily involve foliage-nesting and foliage-gleaning forms. It is likely that future observers will also document increases in the densities of groups that are already present at HUTR (e.g. Blue Grosbeak, Bullock's Oriole, warblers, and finches).

Point count surveys accounted for 85% of the breeding species that were detected during this inventory. Further, 87% of all species were detected during at least 1 first-survey-period (0-3 min), and 91% were detected with the first and second survey periods combined. We suspect this resulted from placement of a large number of survey points covering a relatively small area and few habitat types. This result suggests that shortening the length of time spent at each site to five, or even three, minutes may benefit future monitoring efforts in terms of greater efficiency. However, we caution that the sample size of PCS sites must be sufficient so that a balance is reached between the number of survey minutes and the number of points to yield the desired results. Area searches during the fall and winter were crucial for detecting migrant and wintering birds, and yielded a large number of species not found breeding at HUTR.

RECOMMENDATIONS

1) As the newly-planted native riparian vegetation continues to grow and expand with Pueblo Colorado Wash, bird inventory and monitoring efforts would be helpful to fully inventory HUTR's birds. This will help to build HUTR's bird list, gain knowledge of avian repatriation into native vegetation, and evaluate effectiveness of the riparian restoration project.
2) Annual cultivation activities within HUTR's agricultural fields should also result in changes to bird abundance, diversity, and species composition. Monitoring the bird usage of these areas, or keeping lists of note-worthy birds, may be useful to further build HUTR's bird list.

3) Efficiency in future monitoring efforts may be gained by shortening the length of point count surveys to 5, or even 3 minutes, provided that a sufficient number of points are surveyed.
4) Transects are not necessary to inventory breeding birds if point counts are the primary survey method; however, area searches during winter and spring / fall migrations are important to accumulate species lists.
5) The Hubbell Trading Post bird field checklist should be revised to incorporate the information obtained as a result of this inventory. Additional information such as that from Shaw et.al. (2005), and future observations, should be incorporated.
6) Since this inventory emphasized the breeding birds, non-breeding surveys addressing migrants and wintering birds would help to fully inventory the year-round bird assemblage in the park.

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Table 1. Locations, habitat parameters, and summarized results of 14 point count surveys (with 3 repetitions) performed in 2003 at Hubbell Trading Post National Historic Site.

Point I.D.	UTM: Easting	Northing	Habitat	Percent Cover (%)	Average Height (m)	No. Species Each Survey	No. Individuals Each Survey
HUTR 01	630470	3952500	Riparian/Residential	15	6.0	5, 6, 8	10, 18, 20
HUTR 02	630675	3952588	Riparian	20	4.0	8, 5, 5	10, 6, 6
HUTR 03	630927	3952625	Riparian	15	4.0	11, 7, 4	13, 10, 5
HUTR 04	630913	3952373	Desert Scrub/Residential	5	0.5	7, 4, 4	10, 9, 7
HUTR 05	630789	3952248	Pinyon-Juniper	10	1.0	7, 4, 5	14, 9, 12
HUTR 06	630676	3952347	Fallow Cultivated Field	15	1.0	7, 3, 5	9, 4, 9
HUTR 07	630522	3952136	Fallow Cultivated Field	10	1.0	4, 2, 1	9, 2, 2
HUTR 08	630479	3951925	Fallow Cultivated Field	10	0.5	1, 1, 1	1, 1, 1
HUTR 09	630272	3951834	Fallow Cultivated Field	5	0.1	2, 3, 0	3, 4, 0
HUTR 10	630060	3951831	Fallow Cultivated Field	25	0.8	3, 1, 0	3, 1, 0
HUTR 11	630115	3952000	Fallow Cultivated Field	10	0.8	4, 3, 2	4, 4, 14
HUTR 12	629868	3952226	Riparian	5	0.5	6, 5, 1	6, 8, 1
HUTR 13	630291	3952277	Fallow Cultivated Field	5	0.5	3, 5, 3	4, 6, 3
HUTR 14	630174	3952606	Pinyon-Juniper/Desert Scrub	10	3.0	11, 7, 8	43, 13, 87

Table 2. List of birds detected at Hubbell Trading Post National Historic Site during this inventory in 2003, including status categories and season of detection for each species (species are listed in the A.O.U. check-list order (American Ornithologists' Union 2006). Also included are season(s) each species was detected by Shaw et.al. (2005).

FAMILY **Common Name**	**Seasonal Status**	**Nesting Substrate**	**Foraging Guild**	**Breeding Season Point Count**	**Fall**	**Winter**	**Shaw et.al. (2005)[1]**
ANATIDAE							
Gadwall	Migrant	Water	Aquatic	Yes -STP[2]	--	--	--
Mallard	Summer	Ground	Aquatic	Yes -STP[2]	--	--	Sp
Cinnamon Teal	Migrant	Water	Aquatic	Yes -STP[2]	--	--	--
CATHARTIDAE							
Turkey Vulture	Summer	Ledge	Predator/Scavenger	--	Yes	--	Sp,Su,F
ACCIPITRIDAE							
Cooper's Hawk	Permanent	Foliage	Predator/Scavenger	--	--	Yes	Fa
FALCONIDAE							
American Kestrel	Permanent	Ledge	Predator/Scavenger	Yes	--	--	Sp,Su,F
RALLIDAE							
American Coot	Summer	Ground	Aquatic	Yes -STP[2]	--	--	--
CHARADRIIDAE							
Killdeer	Summer	Ground	Ground	Yes -STP[2]	--	--	Sp,Su
SCOLOPACIDAE							
Wilson's Phalarope	Migrant	N/A	Aquatic	Yes -STP[2]	--	--	--
LARIDAE							
Ring-billed Gull	Migrant	N/A	Aquatic	Yes -STP[2]	--	--	--
COLUMBIDAE							
Mourning Dove	Summer	Foliage	Ground	Yes	Yes	Yes	Sp,Su,F
CUCULIDAE							
Greater Roadrunner	Migrant	N/A	Ground	--	--	Yes	W

Table 2. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Breeding Season Point Count	Fall	Winter	Shaw et.al. (2005)[1]
CAPRIMULGIDAE							
Common Nighthawk	Summer	Ground	Aerial	Yes	--	--	--
TROCHILIDAE							
Black-chinned Hummingbird	Summer	Foliage	Nectar	Yes	--	--	Sp,Su
Broad-tailed Hummingbird	Migrant	N/A	Nectar	Yes	--	--	Sp,Su
PICIDAE							
Lewis's Woodpecker	Permanent	Cavity	Bark Gleaning	Yes	--	--	Sp,Su
Red-naped Sapsucker	Migrant	N/A	Bark Gleaning	--	Yes	--	--
Northern Flicker	Permanent	Cavity	Bark Gleaning	Yes	--	Yes	Su,F,W
TYRANNIDAE							
Say's Phoebe	Summer	Ledge	Sallying	Yes	--	--	Su,F
Ash-throated Flycatcher	Summer	Cavity	Sallying	Yes	--	--	Sp,Su
Cassin's Kingbird	Summer	Foliage	Sallying	Yes	--	--	F
Western Kingbird	Summer	Foliage	Sallying	Yes	--	--	Sp,Su,F
CORVIDAE							
Western Scrub-Jay	Permanent	Foliage	Ground	--	Yes	Yes	F,W
Pinyon Jay	Permanent	Foliage	Ground	Yes	--	--	Sp,Su,F,W
American Crow	Permanent	Foliage	Ground	Yes	Yes	Yes	Sp,Su,W
Common Raven	Permanent	Foliage	Predator/Scavenger	Yes	Yes	Yes	Sp,Su,F,W
HIRUNDINIDAE							
N.Rough-winged Swallow	Summer	Cavity	Aerial	Yes	--	--	--
Cliff Swallow	Summer	Ledge	Aerial	Yes	--	--	Sp,Su,F
PARIDAE							
Juniper Titmouse	Permanent	Cavity	Foliage Gleaning	--	Yes	--	Sp,Su,F
TROGLODYTIDAE							
Bewick's Wren	Permanent	Cavity	Foliage Gleaning	Yes	--	--	--
REGULIDAE							
Ruby-crowned Kinglet	Migrant	N/A	Foliage Gleaning	--	--	Yes	F

Table 2. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Breeding Season Point Count	Fall	Winter	Shaw et.al. (2005)[1]
TURDIDAE							
Western Bluebird	Permanent	Cavity	Ground	--	--	Yes	F,W
Townsend's Solitaire	Migrant	N/A	Foliage Gleaning	--	--	Yes	W
American Robin	Permanent	Foliage	Ground	Yes	Yes	Yes	Sp,Su,F,W
MIMIDAE							
Northern Mockingbird	Migrant	N/A	Ground	Yes	--	Yes	Sp,Su
STURNIDAE							
European Starling	Permanent	Cavity	Ground	Yes	--	Yes	Sp,Su,F,W
BOMBYCILLIDAE							
Cedar Waxwing	Migrant	N/A	Foliage Gleaning	Yes	--	--	Sp,Su,F,W
PTILOGONATIDAE							
Phainopepla	Migrant	N/A	Foliage Gleaning	Yes	--	--	--
PARULIDAE							
Orange-crowned Warbler	Migrant	N/A	Foliage Gleaning	--	Yes	--	F
Virginia's Warbler	Summer	Ground	Foliage Gleaning	--	Yes	--	F
Yellow Warbler	Summer	Foliage	Foliage Gleaning	Yes	--	--	Sp,F
Yellow-rumped Warbler	Migrant	Foliage	Foliage Gleaning	Yes	Yes	Yes	Sp,F,W
Townsend's Warbler	Migrant	Foliage	Foliage Gleaning	--	Yes	--	--
MacGillivray's Warbler [3]	Migrant	N/A	Foliage Gleaning	--	Yes	--	Sp,F
Wilson's Warbler	Migrant	N/A	Foliage Gleaning	--	Yes	--	Sp,F
Yellow-breasted Chat	Summer	Foliage	Foliage Gleaning	Yes	--	--	Sp,Su
THRAUPIDAE							
Western Tanager	Migrant	N/A	Foliage Gleaning	Yes	Yes	--	Su,F
EMBERIZIDAE							
Spotted Towhee	Permanent	Ground	Ground	Yes	--	Yes	Sp,W
Chipping Sparrow	Summer	Foliage	Ground	Yes	--	--	Su,F
Song Sparrow	Migrant	N/A	Ground	--	Yes	Yes	Sp,W
Lincoln's Sparrow	Migrant	N/A	Ground	--	Yes	--	--

Table 2. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Breeding Season Point Count	Fall	Winter	Shaw et.al. (2005)[1]
EMBERIZIDAE (continued)							
White-throated Sparrow	Winter	N/A	Ground	--	--	Yes	--
White-crowned Sparrow	Winter	N/A	Ground	--	Yes	Yes	Sp,F,W
Dark-eyed Junco	Winter	N/A	Ground	--	--	Yes	F,W
CARDINALIDAE							
Blue Grosbeak	Summer	Foliage	Foliage Gleaning	Yes	--	--	Sp,Su,F
Lazuli Bunting	Migrant	N/A	Ground	--	Yes	--	Sp,F
ICTERIDAE							
Red-winged Blackbird	Permanent	Foliage	Ground	Yes -STP[2]	--	Yes	Sp
Western Meadowlark	Summer	Ground	Ground	Yes	--	--	--
Yellow-headed Blackbird	Migrant	N/A	Ground	Yes -STP[2]	--	--	Sp,Su
Great-tailed Grackle	Summer	Ground	Ground	Yes	--	--	--
Brown-headed Cowbird	Summer	Foliage	Ground	Yes	--	--	Sp,Su
Bullock's Oriole	Summer	Foliage	Foliage Gleaning	Yes	--	--	Sp,Su,F
FRINGILLIDAE							
House Finch	Permanent	Foliage	Foliage Gleaning	Yes	--	Yes	Su,F,W
Pine Siskin	Migrant	N/A	Foliage Gleaning	Yes	--	--	W
Lesser Goldfinch	Summer	Foliage	Foliage Gleaning	Yes	Yes	--	Sp,Su,F
PASSERIDAE							
House Sparrow	Permanent	Cavity	Ground	Yes	Yes	--	Sp,Su,F,W

[1]Reported by Shaw et.al. (2005) as detected during Spring (Sp), Summer (Su), Fall (F), or Winter (W).
STP[2]: Detected during this inventory at Sewage Treatment Ponds.

Table 3. Avian species detected during Point Count Surveys in Hubbell Trading Post National Historic Site during 2003, including number of individuals and detections for each.

Species	No. of Detections	No. of Individuals	Spp. Only Detected in: 2nd period:	3rd period:
American Crow	12	21		
Ash-throated Flycatcher	12	13		
Bullock's Oriole	12	19		
Common Raven	12	28		
Black-chinned Hummingbird	11	31		
Western Kingbird	11	15		
European Starling	10	18		
House Sparrow	9	28		
Lesser Goldfinch	9	11		
American Kestrel	8	10		
Brown-headed Cowbird	8	22		
Blue Grosbeak	7	7		
House Finch	7	8		
Mourning Dove	6	6		
Pinyon Jay	6	8		
Say's Phoebe	5	5		
Western Meadowlark	5	5		
Mallard	4	16		
Northern Rough-winged Swallow	4	4		
Red-winged Blackbird	4	13		
Yellow Warbler	4	4		
American Robin	3	3		
Yellow-breasted Chat	3	3		
Killdeer	2	2		
Lewis's Woodpecker	2	3		
Spotted Towhee	2	2		X

Table 2. continued.

Species	No. of Detections	No. of Individuals	Spp. Only Detected in: 2nd period:	3rd period:
Bewick's Wren	1	1		X
Broad-tailed Hummingbird	1	1		
Cassin's Kingbird	1	1	X	
Cedar Waxwing	1	1		
Chipping Sparrow	1	1		
Cinnamon Teal	1	1	X	
Cliff Swallow	1	60		
Common Nighthawk	1	1		X
Gadwall	1	2		
Great-tailed Grackle	1	1		
Northern Flicker	1	1		X
Northern Mockingbird	1	1		
Phainopepla	1	1		
Pine Siskin	1	1		
Ring-billed Gull	1	1		
Western Tanager	1	1		
White-crowned Sparrow	1	1		
Wilson's Phalarope	1	8		
Yellow-headed Blackbird	1	1		
Yellow-rumped Warbler	1	1		

Figure 1. Map of Hubbell Trading Post National Historic Site with locations at which 14 point count surveys were conducted for birds in 2003.

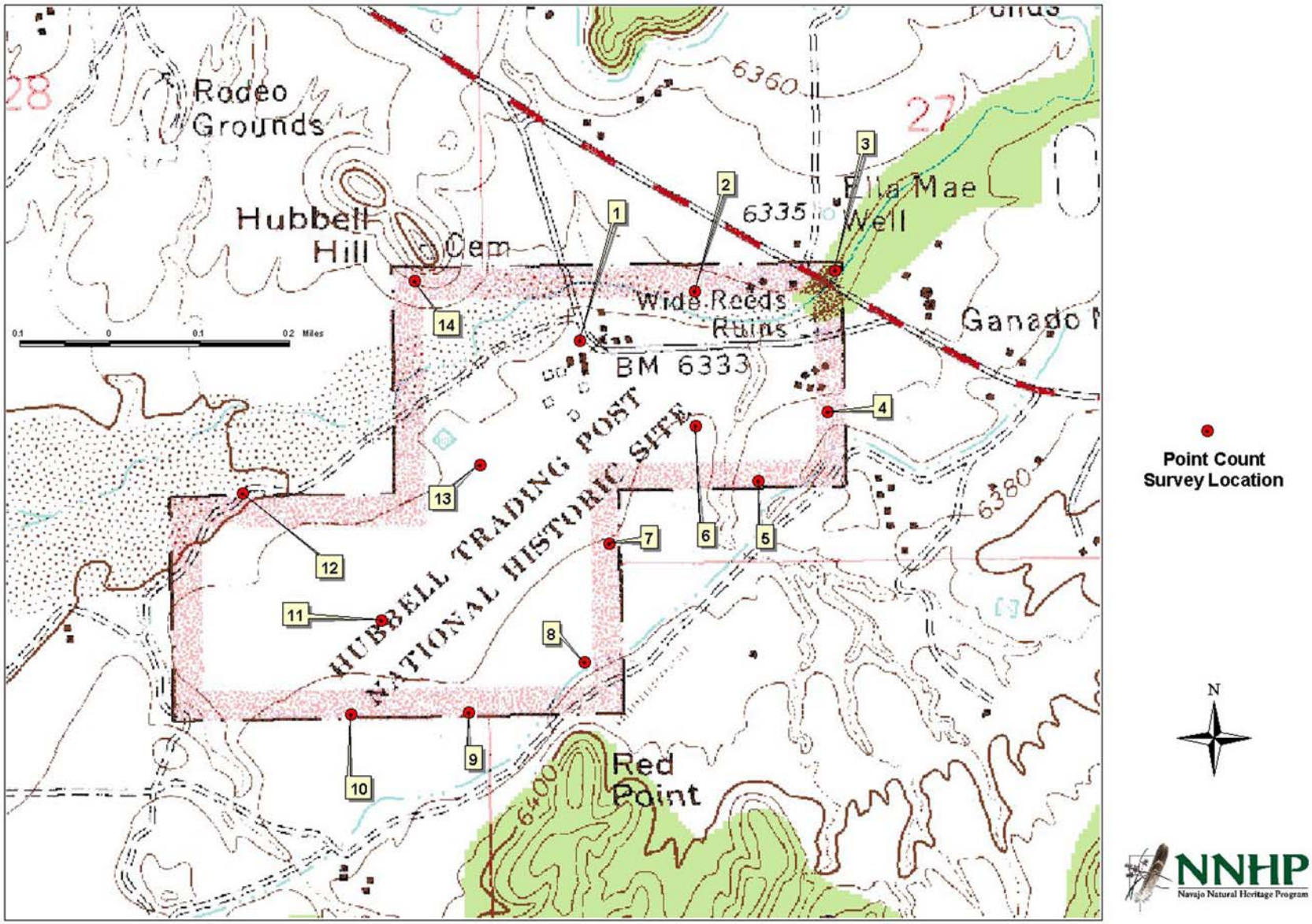


Figure 2. Species accumulation curve by: a) survey hours, b) survey minutes, and c) number of point counts for birds documented by Point Count Surveys at Hubbell Trading Post National Historic Site in 2003.

Figure 2.a.

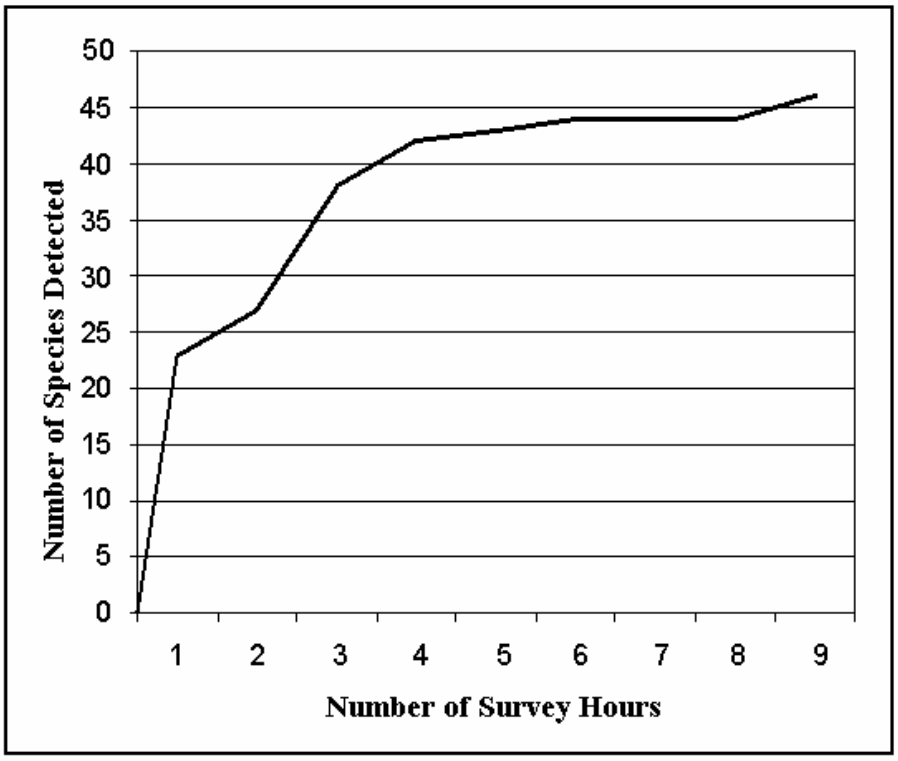


Figure 2.b.

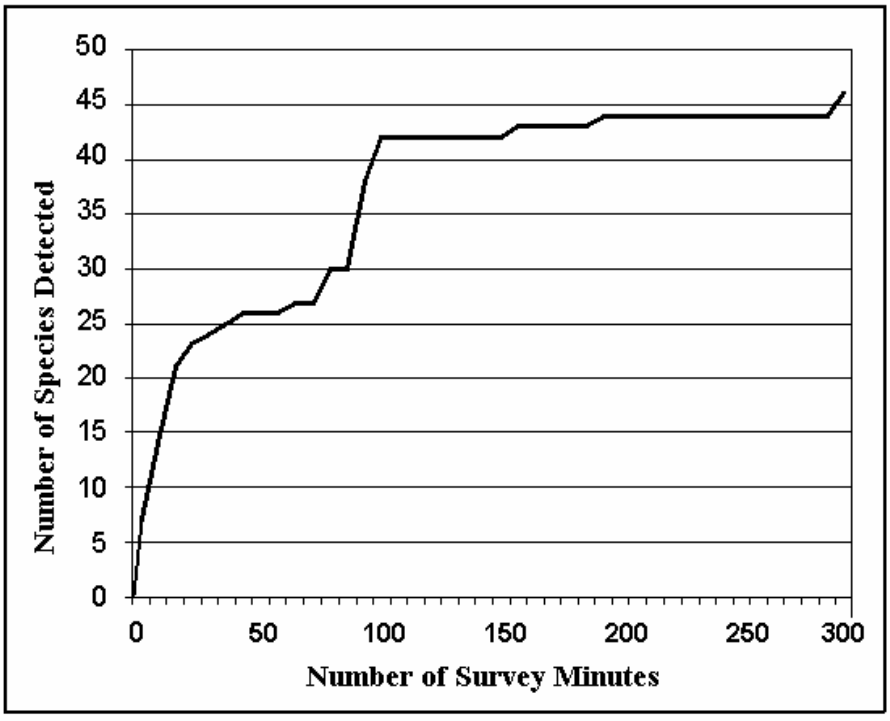


Figure 2.c.

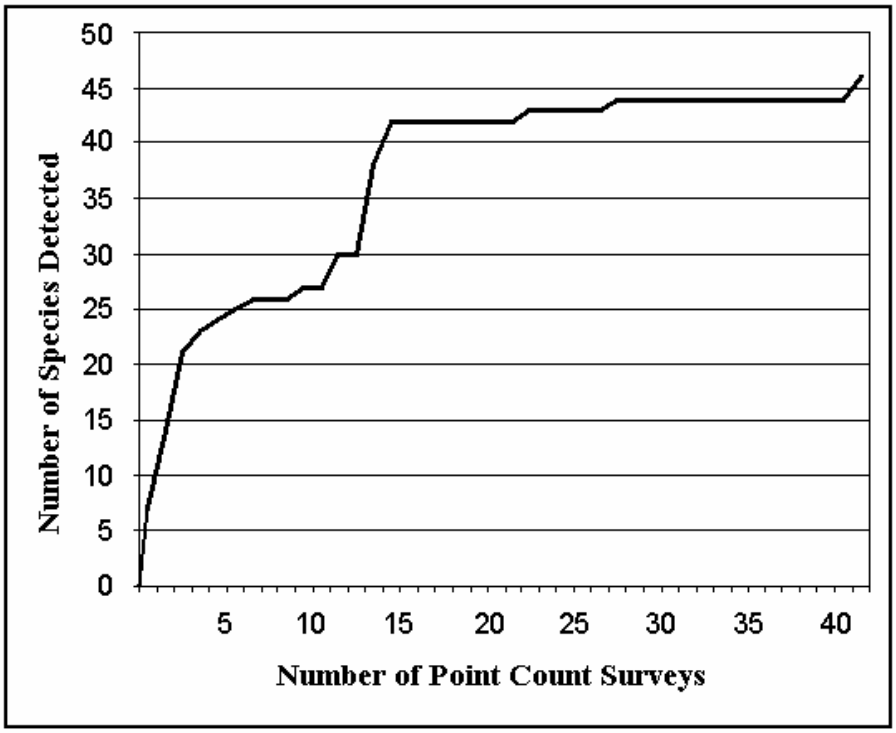
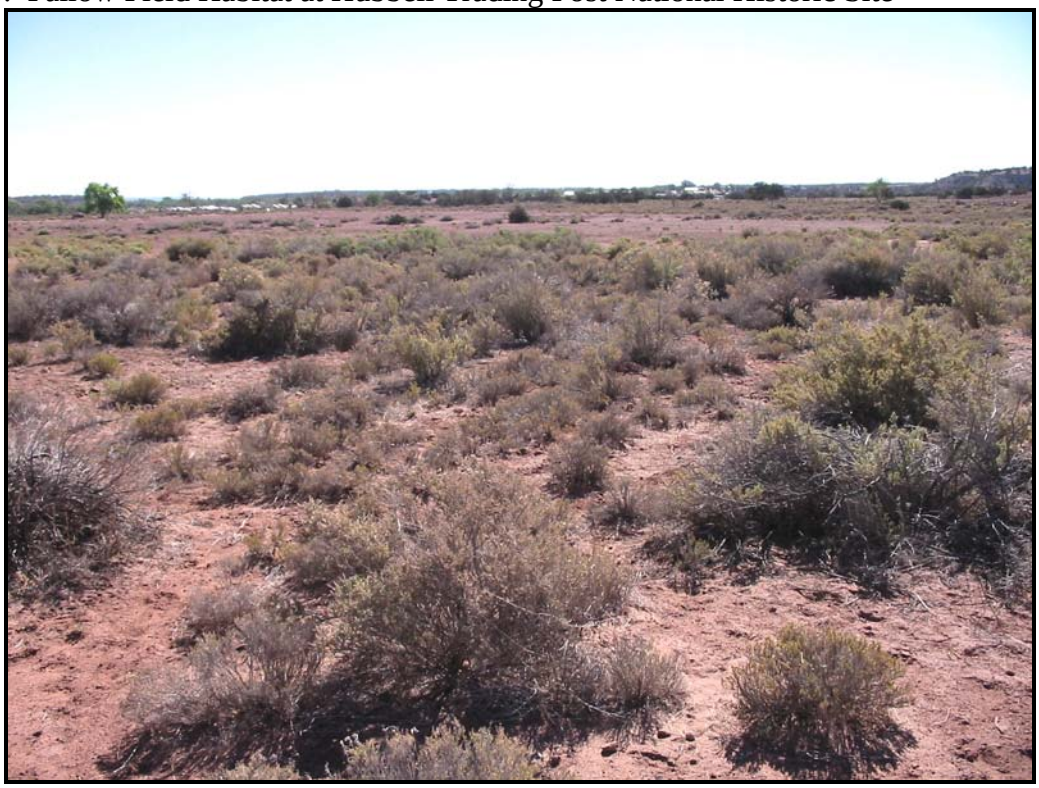


Figure 3. Riparian Habitat at Hubbell Trading Post National Historic Site

Figure 4. Pinyon-Juniper/Desert Scrub Habitat at Hubbell Trading Post National Historic Site

Figure 5. Fallow Field Habitat at Hubbell Trading Post National Historic Site



Appendix A. Index of common and scientific names, and species codes for birds in this report (species are listed in American Ornithologists' Union (A.O.U.) order).

Common Name	Scientific Name	Species Code
ANATIDAE		
Gadwall	*Anas strepera*	GADW
Mallard	*Anas platyrhynchos*	MALL
Cinnamon Teal	*Anas cyanoptera*	CITE
CATHARTIDAE		
Turkey Vulture	*Cathartes aura*	TUVU
ACCIPITRIDAE		
Cooper's Hawk	*Accipiter cooperii*	COHA
FALCONIDAE		
American Kestrel	*Falco sparverius*	AMKE
RALLIDAE		
American Coot	*Fulica americana*	AMCO
CHARADRIIDAE		
Killdeer	*Charadrius vociferous*	KILL
SCOLOPACIDAE		
Wilson's Phalarope	*Phalaropus tricolor*	WIPH
LARIDAE		
Ring-billed Gull	*Larus delawarensis*	RBGU
COLUMBIDAE		
Mourning Dove	*Zenaida macroura*	MODO
CUCULIDAE		
Greater Roadrunner	*Geococcyx californianus*	GRRO
CAPRIMULGIDAE		
Common Nighthawk	*Chordeiles minor*	CONI
TROCHILIDAE		
Black-chinned Hummingbird	*Archilochus alexandri*	BCHU
Broad-tailed Hummingbird	*Selasphorus platycercus*	BTHU
ALCEDINIDAE		
Belted Kingfisher	*Ceryle alcyon*	BEKI
PICIDAE		
Lewis's Woodpecker	*Melanerpes lewis*	LEWO
Red-naped Sapsucker	*Sphyrapicus nuchalis*	RNSA
Northern Flicker	*Colaptes auratus*	NOFL
TYRANNIDAE		
Say's Phoebe	*Sayornis saya*	SAPH
Ash-throated Flycatcher	*Myiarchus cinerascens*	ATFL
Cassin's Kingbird	*Tyrannus vociferans*	CAKI
Western Kingbird	*Tyrannus verticalis*	WEKI

Common Name	Scientific Name	Species Code
CORVIDAE		
Western Scrub-Jay	*Aphelocoma californica*	WESC
Pinyon Jay	*Gymnorhinus cyanocephalus*	PIJA
American Crow	*Corvus brachyrhynchos*	AMCR
Common Raven	*Corvus corax*	CORA
HIRUNDINIDAE		
North. Rough-winged Swallow	*Stelgidopteryx serripennis*	NRWS
Cliff Swallow	*Petrochelidon pyrrhonota*	CLSW
PARIDAE		
Juniper Titmouse	*Baeolophus ridgwayi*	JUTI
TROGLODYTIDAE		
Bewick's Wren	*Thryomanes bewickii*	BEWR
REGULIDAE		
Ruby-crowned Kinglet	*Regulus calendula*	RCKI
TURDIDAE		
Western Bluebird	*Sialia mexicana*	WEBL
Townsend's Solitaire	*Myadestes townsendi*	TOSO
American Robin	*Turdus migratorius*	AMRO
MIMIDAE		
Northern Mockingbird	*Mimus polyglottos*	NOMO
STURNIDAE		
European Starling	*Sturnus vulgaris*	EUST
BOMBYCILLIDAE		
Cedar Waxwing	*Bombycilla cedrorum*	CEWA
PTILOGONATIDAE		
Phainopepla	*Phainopepla nitens*	PHAI
PARULIDAE		
Orange-crowned Warbler	*Vermivora celata*	OCWA
Virginia's Warbler	*Vermivora virginiae*	VIWA
Yellow Warbler	*Dendroica petechia*	YEWA
Yellow-rumped Warbler	*Dendroica coronata*	YRWA
Townsend's Warbler	*Dendroica townsendi*	TOWA
MacGillivray's Warbler	*Oporornis tolmiei*	MAWA
Wilson's Warbler	*Wilsonia pusilla*	WIWA
Yellow-breasted Chat	*Icteria virens*	YBCH
THRAUPIDAE		
Western Tanager	*Piranga ludoviciana*	WETA
EMBERIZIDAE		
Spotted Towhee	*Pipilo maculates*	SPTO
Chipping Sparrow	*Spizella passerina*	CHSP
Song Sparrow	*Melospiza melodia*	SOSP
Lincoln's Sparrow	*Melospiza lincolnii*	LISP
White-throated Sparrow	*Zonotrichia albicollis*	WTSP
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP
Dark-eyed Junco	*Junco hyemalis*	DEJU

Common Name	Scientific Name	Species Code
CARDINALIDAE		
Blue Grosbeak	*Passerina caerulea*	BLGR
Lazuli Bunting	*Passerina amoena*	LABU
ICTERIDAE		
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL
Western Meadowlark	*Sturnella neglecta*	WEME
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	YHBL
Great-tailed Grackle	*Quiscalus mexicanus*	GRGR
Brown-headed Cowbird	*Molothrus ater*	BHCO
Bullock's Oriole	*Icterus bullockii*	BUOR
FRINGILLIDAE		
House Finch	*Carpodacus mexicanus*	HOFI
Pine Siskin	*Carduelis pinus*	PISI
Lesser Goldfinch	*Carduelis psaltria*	LEGO
PASSERIDAE		
House Sparrow	*Passer domesticus*	HOSP

Appendix B. Vegetation parameters for Point Count Survey sites for Hubbell Trading Post National Historic Site.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
HUTR-01	15	6.0	*Ulmus pumila*	85
			Other	15
HUTR-02	20	4.0	*Populus fremontii*	20
			Ericameria nauseosa	60
			Other	20
HUTR-03	15	4.0	*Populus fremontii*	50
			Ericameria nauseosa	50
HUTR-04	5	0.5	Misc. shrubs & grasses	100
HUTR-05	10	1.0	*Atriplex canescens*	50
			*Juniperus/Populus/*Other	50
HUTR-06	15	1.0	*Ericameria nauseosa*	50
			Erodium sp.	50
HUTR-07	10	1.0	*Atriplex canescens*	50
			Ericameria nauseosa	40
			Other	10
HUTR-08	10	0.5	*Atriplex canescens*	50
			Gutierrezia sarothrae	50
HUTR-09	5	0.1	Annual forbs	100
HUTR-10	25	0.8	*Atriplex canescens*	80
			Gutierrezia sarothrae	20
HUTR-11	10	0.8	*Gutierrezia sarothrae*	60
			Atriplex canescens	40
HUTR-12	5	0.5	*Atriplex canescens*	34
			Ericameria nauseosa	33
			Gutierrezia sarothrae	33
HUTR-13	5	0.5	*Atriplex canescens*	50
			Ericameria nauseosa	50
HUTR-14	10	3.0	*Juniperus osteosperma*	30
			*Hilaria/Ericameria/Gutierrezia/*Other	70

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 01

Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 5:10
Stop Time: 5:17 Temp: Wind: 1 Sky: 10

Period	Species	No.	Distance	Detection Type	Comments
1	YRWA	1	35	Aural	
1	BUOR	3	25	Visual	
1	CEDW	1			migrant
1	BTHU	1			migrant
1	HOSP	1	45	Aural	
1	HOSP	2	70	Aural	
1	WCSP	1	45	Aural	
2	WEKI	2	35	Aural	
3	NONE	1			

Location HUTR 01

Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 5:03
Stop Time: 5:10 Temp: 14 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	WETA	1			migrant
1	BUOR	4	35	Aural	
1	PHAI	1			female
1	EUST	3	35	Visual	
1	YWAR	1	35	Song	
1	HOSP	8	35	Call	
2	WEME	1	300	Song	
3	NOFL	1	400	Call	

Location HUTR 01

Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 5:03
Stop Time: 5:10 Temp: 14 Wind: 3 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	HOSP	8	35	Call	
1	WEKI	2	35	Call	
1	YWAR	1	80	Song	
1	SAPH	1	40	Visual	
1	LEGO	2	25	Call	
2	ATFL	1	80	Call	
2	CORA	4	65	Aural & Visual	
3	BUOR	1	50	Call	

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 02
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 5:20
Stop Time: 5:27 Temp: 14 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	BUOR	1	200	Aural	
1	BCHU	1	25	Aural	
1	BLGR	1	0	Aural	
1	PISI	1	0	Flyover	
1	CORA	2	100	Visual	adult pair, alarmed
1	BHCO	1	35	Aural	
2	ATFL	1	25	Visual	
2	HOFI	2		Flyover	
3	NONE	1			

Location HUTR 02
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 5:16
Stop Time: 5:23 Temp: 11 Wind: 1 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	EUST	1	30	Call	
1	CORA	2	25	Visual	pair
1	BHCO	1	25	Call	
1	BUOR	1	125	Song	
2	NONE	1			
3	AMKE	1	200	Visual	flutter display poss.for female

Location HUTR 02
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 5:19
Stop Time: 5:26 Temp: 12 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	BHCO	1	30	Call	
1	AMKE	2	250	Visual	pair
1	EUST	2	250	Visual	pair
2	BUOR	2	60	Call	
2	BCHU	1	20	Aural	male
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 03
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 5:35
Stop Time: 5:42 Temp: 12 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	EUST	3	62	Aural	nestling under bridge
1	WEME	1	350	Song	
1	GRGR	1	0	Flyover	
1	AMRO	1	75	Call	
1	ATFL	1	100	Aural	
2	CAKI	1	100	Call	
2	BHCO	1	75	Call	
2	WEKI	1	75	Flyover	
3	HOFI	1	100	Call	
3	BEWR	1	200	Song	
3	SPTO	1	150	Song	

Location HUTR 03
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 5:29
Stop Time: 5:36 Temp: 10 Wind: 1 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	BLGR	1	200	Song	
1	YWAR	1	45	Song	
1	AMRO	1	45	Aural	
1	AMCR	2	350	Call	
1	EUST	1	50	Call	nestling
1	BUOR	1	150	Song	
1	AMRO	1		Flyover	
2	AMCR	1	125	Call	
3	CORA	1		Flyover	

Location HUTR 03
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 5:31
Stop 5:38 Temp: 12 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	YWAR	1	40	Song	
1	EUST	2	45	Aural	1 adult, 1 nestling
1	LEGO	1	50	Call	
1	AMCR	3	150	Call	2 calling plus juvenile
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 04
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 5:55
Stop Time: 6:02 Temp: 12 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	WEME	1	150	Song	
1	WEKI	1	200	Call	
1	SAPH	1	200	Song	
1	HOSP	1	100	Call	
1	PIJA	3	75	Flyover	
1	EUST	1	150	Call	
2	WEKI	1	250	Call	
2	BUOR	1	0	Flyover	
3	NONE	1			

Location HUTR 04
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 5:42
Stop Time: 5:49 Temp: 13 Wind: 1 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	EUST	3	30	Visual	pair with juvenile
1	WEKI	1		Flyover	
1	HOSP	4	1	Call	
1	CORA	1		Flyover	
2	NONE	1			
3	HOSP	1		Flyover	

Location HUTR 04
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 5:46
Stop Time: 5:53 Temp: 14 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	HOSP	1	75	Call	
1	EUST	1	75	Call	
1	LEWO	2		Flyover	2 adults at cavity in cottonwood
2	NONE	1			
3	ATFL	1	150	Call	

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 05
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 6:16
Stop Time: 6:13 Temp: 13 Wind: 2 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	BCHU	8	30	Visual	8+ coming to feeder
1	NOMO	1	250	Song	
1	BUOR	1	10	Visual	
1	SAPH	1	10	Visual	
1	WEKI	1	150	Call	
1	WEME	1	150	Song	
2	HOFI	1	100	Call	
3	NONE	1			

Location HUTR 05
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 5:53
Stop Time: 6:00 Temp: 12 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	SAPH	1	80	Call	
1	BUOR	1	35	Visual	male
1	BCHU	6	25	Visual	at feeder
2	NONE	1			
3	ATFL	1	100	Call	

Location HUTR 05
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 5:59
Stop Time: 6:06 Temp: 16 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	SAPH	1	120	Call	
1	HOFI	1	65	Call	
1	LEGO	1	50	Call	
1	BCHU	7	35	Visual	at feeder
2	NONE	1			
3	ATFL	2	25	Aural & Visual	

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 06
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 6:17
Stop Time: 6:24 Temp: 16 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	WEME	1	300	Song	
1	PIJA	1	500	Call	
1	BUOR	2	100	Aural	
1	WEKI	1	200	Call	
1	HOSP	2	300	Call	
2	AMKE	1	150	Visual	male
2	CORA	1	500	Visual	
3	NONE	1			

Location HUTR 06
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 6:05
Stop Time: 6:12 Temp: 15 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	BCHU	1		Flyover	male
1	WEKI	2	300	Call	
2	NONE	1			
3	HOFI	1		Flyover	

Location HUTR 06
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 6:11
Stop Time: 6:18 Temp: 15 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	UNKN	2		Flyover	
1	BCHU	2	20	Visual	male display to female
1	AMCR	3	350	Visual	
2	LEGO	1		Flyover	
3	HOFI	1	75	Song	

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 07

Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 6:29
Stop Time: 6:36 Temp: 14 Wind: 2 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	WEKI	2		Flyover	
1	BCHU	1		Flyover	male
1	ATFL	1	300	Call	
2	AMCR	5		Flyover	
3	NONE	1			

Location HUTR 07

Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 6:18
Stop Time: 6:25 Temp: 13 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	AMKE	1	300	Visual	male
1	AMCR	1	40	Call	
2	NONE	1			
3	NONE	1			

Location HUTR 07

Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 6:26
Stop Time: 6:33 Temp: 16 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	CORA	2	400	Aural & Visual	
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 08
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 6:40
Stop Time: 6:47 Temp: 16 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	ATFL	1	250	Call	
2	NONE	1			
3	NONE	1			

Location HUTR 08
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 6:30
Stop Time: 6:37 Temp: 15 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	ATFL	1	125	Call	
2	NONE	1			
3	NONE	1			

Location HUTR 08
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 6:37
Stop Time: 6:44 Temp: 16 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	BCHU	1	35	Visual	
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 09
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 6:51
Stop Time: 6:58 Temp: 14 Wind: 2 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	CORA	1	250	Call	
2	NONE	1			
3	CORA	1	500	Call	
3	AMCR	1		Flyover	

Location HUTR 09
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 6:42
Stop Time: 6:49 Temp: 15 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	AMCR	2		Flyover	
2	ATFL	1	100	Call	
3	CONI	1		Flyover	

Location HUTR 09
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 6:48
Stop Time: 6:55 Temp: 16 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	NONE	1			
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 10
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 7:01
Stop Time: 7:08 Temp: 11 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	AMKE	1	150	Visual	male
1	LEWO	1	200	Call	
2	PIJA	1	500	Call	
3	NONE	1			

Location HUTR 10
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 6:53
Stop Time: 7:00 Temp: 18 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	AMCR	1		Flyover	
2	NONE	1			
3	NONE	1			

Location HUTR 10
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 7:00
Stop Time: 7:07 Temp: 17 Wind: 2 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	NONE	1			
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 11
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 7:11
Stop Time: 7:18 Temp: 20 Wind: 1 Sky: 90

Period	Species	No.	Distance	Detection Type	Comments
1	WEKI	1	150	Visual	
2	BLGR	1	300	Song	
2	BHCO	1	250	Call	
3	SPTO	1	250	Song	

Location HUTR 11
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 7:04
Stop Time: 7:11 Temp: 21 Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	MODO	1		Wings	
2	LEGO	1		Flyover	
2	NRWS	1		Flyover	
3	MODO	1		Flyover	

Location HUTR 11
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 7:12
Stop Time: 7:19 Temp: 18 Wind: 3 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	AMCR	2	300	Visual	mobbing 3 ravens
1	CORA	9	100	Visual	feeding
1	CORA	3	300	Visual	along wash
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 12

Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 7:25
Stop Time: 7:32 Temp: Wind: Sky: 95

Period	Species	No.	Distance	Detection Type	Comments
1	YBCH	1	100	Song	
1	PIJA	1	100	Call	
2	BUOR	1	350	Call	
2	MODO	1	600	Song	
3	MALL	1	150	Aural	
3	AMCR	1	150	Visual	

Location HUTR 12

Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 7:17
Stop Time: 7:24 Temp: 20 Wind: 1 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	YBCH	1	250	Song	
1	BLGR	1	150	Song	
1	PIJA	1	500	Call	uncertain number
1	LEGO	2	75	Call	in wash
1	RWBL	1		Flyover	male
2	BLGR	1	75	Call	
2	PIJA	1	200	Call	
3	NONE	1			

Location HUTR 12

Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 7:26
Stop Time: 7:33 Temp: 18 Wind: 3 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	BLGR	1	100	Call	
2	NONE	1			
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 13

Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 7:38
Stop Time: 7:45 Temp: 20 Wind: 1 Sky: 95

Period	Species	No.	Distance	Detection Type	Comments
1	AMKE	1	250	Call	
1	MODO	1	250	Visual	
2	ATFL	1	250	Call	
3	AMKE	2	250	Aural	pair in dead cottonwoods

Location HUTR 13

Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 7:30
Stop Time: 7:37 Temp: 25 Wind: 1 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	EUST	1	150	Call	
2	AMKE	1	150	Visual	
2	MODO	1	150	Visual	
3	BHCO	1	150	Visual	male
3	MODO	1	250	Song	
3	LEGO	1		Flyover	

Location HUTR 13

Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 7:40
Stop Time: 7:47 Temp: 18 Wind: 3 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	NONE	1			
2	BCHU	1		Flyover	male
3	NRWS	1		Flyover	
3	LEGO	1		Flyover	

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location HUTR 14
Observer: CTL Date: 5/13/2003 **Visit: 1**
Start Time: 7:55
Stop Time: 8:02 Temp: 20 Wind: 1 Sky: 100

Period	Species	No.	Distance	Detection Type	Comments
1	RBGU	1	200	Visual	at STP outside HUTR
1	GADW	2	200	Visual	at STP outside HUTR
1	MALL	6	200	Visual	at STP outside HUTR
1	BHCO	5	200	Visual	at STP outside HUTR
1	RWBL	5	200	Visual	at STP outside HUTR
1	CHSP	1	15	Aural	
1	WIPH	8	200	Visual	at STP outside HUTR
1	NRWS	1		Flyover	
1	YHBL	1	200	Visual	at STP outside HUTR
2	NONE	1			
3	HOFI	1	250	Song	
3	BHCO	11		Flyover	
3	LEGO	1		Flyover	

Location HUTR 14
Observer: CTL Date: 6/3/2003 **Visit: 2**
Start Time: 7:45
Stop Time: 7:52 Temp: Wind: 2 Sky: 5

Period	Species	No.	Distance	Detection Type	Comments
1	CORA	1	200	Call	
1	KILL	1	200	Call	at STP
1	MALL	3	200	Visual	at STP
1	BLGR	1	200	Song	
1	RWBL	5	200	Aural	at STP
2	BCHU	1	20	Visual	male
3	ATFL	1	200	Call	

Location HUTR 14
Observer: CTL Date: 6/24/2003 **Visit: 3**
Start Time: 7:56
Stop Time: 8:03 Temp: 18 Wind: 3 Sky: 0

Period	Species	No.	Distance	Detection Type	Comments
1	CLSW	60	200	Flyover	flying from STP to hill
1	YBCH	1	175	Song	along wash
1	NRWS	1		Flyover	
1	RWBL	2	250	Visual	at STP
1	MALL	6	250	Visual	at STP
1	AMCR	1	250	Visual	at STP
2	KILL	1	250	Call	at STP
2	CITE	1	250	Visual	male at STP
3	NONE	1			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location **Fall Survey**

Observer: CTL Date: 9/16/2003
Start Time: 8:50
Stop Time: 10:15 Temp: Wind: Sky:

Period	Species	No.	Distance	Detection Type	Comments
1	OCWA	2			
1	MGWA	2			
1	RNSA	1			
1	WETA	2			
1	WCSP	19			
1	VIWA	1			
1	YRWA	4			
1	LEGO	7			
1	CORA	1			
1	MODO	2			
1	HOSP	1			
1	SPTO	5			
1	JUTI	1			
1	LAZB	2			
1	WESJ	3			
1	AMCR	48			
1	TUVU	1			
1	TOWA	1			
1	SOSP	2			
1	LISP	7			
1	WIWA	5			
1	AMRO	2			

Appendix C. Data from 14 point count surveys (triple-replicated) for birds at HUTR in 2003

Location **Winter Survey**

Observer: CTL Date: 12/5/2003
Start Time: 8:25
Stop Time: 9:45 Temp: Wind: 1 Sky:

Period	Species	No.	Distance	Detection Type	Comments
1	WTSP	1			
1	WESJ	1			
1	TOSO	1			
1	EUST	26			
1	RCKI	1			
1	DEJU	12			
1	CORA	5			
1	SPTO	6			
1	AMRO	20			
1	WCSP	53			
1	GRRO	1			tracks found
1	YRWA	3			
1	WEBL	21			
1	NOFL	7			
1	HOFI	5			
1	SOSP	8			
1	RWBL	1			
1	NOMO	1			
1	COHA	1			
1	MODO	1			
1	AMCR	7			