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Natural Resource Stewardship and Science

Landbird Monitoring in the Southern Plains Network

2012 Annual Report

Natural Resource Technical Report NPS/SOPN/NRTR—2012/656

ON THE COVER

Golden Eagle (*Aquila chrysaetos*), detected during point-count surveys in the Southern Plains Inventory & Monitoring Network for the first time. Photo © Robert Shantz.

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2012 Annual Report

Natural Resource Technical Report NPS/SOPN/NRTR—2012/656

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Brewer's Blackbird (*Euphagus cyanocephalus*) was a newly detected species at Bent's Old Fort NHS in 2012. 19

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Northern Cardinal (*Cardinalis cardinalis*) was the third most common species detected at Washita Battlefield NHS in 2012. 60

Acronyms

BEOL	Bent's Old Fort National Historic Site
CAVO	Capulin Volcano National Monument
CHIC	Chickasaw National Recreation Area
FOLS	Fort Larned National Historic Site
FOUN	Fort Union National Monument
LAMR	Lake Meredith National Recreation Area
LYJO	Lyndon B. Johnson National Historical Park
NHP	national historical park
NHS	national historic site
NM	national monument
NP	national park
NPS	National Park Service
PECO	Pecos National Historical Park
RMBO	Rocky Mountain Bird Observatory
SAND	Sand Creek Massacre National Historic Site
SOPN	Southern Plains Inventory & Monitoring Network
WABA	Washita Battlefield National Historic Site

Executive Summary

In 2012, landbirds were surveyed within all of the Southern Plains Inventory & Monitoring Network (SOPN) parks. However, Alibates Flint Quarries National Monument (NM) and Lake Meredith National Recreation Area (NRA) were treated as one park unit, and no sampling was specifically conducted at Alibates Flint Quarries NM. Sample points were located along a transect for linear features (e.g., most riparian habitats) or a grid for areal features. A total of 34 transects or grids were surveyed in 2012. Survey efforts were focused on the breeding season, when increased territorial behavior by songbirds results in higher detection rates and greater sampling efficiency. The window of primary breeding and, therefore, sampling, was from April through June, with adjustments made for individual park visits based on latitude and elevation. We used point-transect surveys to estimate and monitor landbird population parameters. Surveys were conducted three times for each transect or grid to facilitate estimates of occupancy, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability.

There was a total of 1,675 point visits (the number of unique points multiplied by the number of visits) on the 34 transects or grids. Of these, 1,237 were point visits in grassland habitats (including 51 point visits in pinyon-juniper woodland habitat) and 438 were point visits in riparian habitats. We recorded a total of 15,435 individual birds of 162 species on our points, with an additional 231 individual birds detected as flyovers. Pecos National Historical Park (NHP) had the highest number of individual birds counted (n = 2,321). Lyndon B. Johnson NHP had the lowest number of birds counted (n = 632). Species richness and community composition varied widely among the parks surveyed. We observed the greatest number of species at Pecos NHP (n = 70) and the fewest at Fort Union NM (n = 35). The number of individuals or species detected is influenced not only by the number of points, but also by the size and diversity of available habitats. Western Meadowlark was the most commonly detected species within the SOPN (n = 1,931), followed by Mourning Dove, Northern Cardinal, and Red-winged Blackbird. Two species, Brown-headed Cowbird and Mourning Dove, were detected at every park in the network, and nearly 50 species were detected at only one of the ten parks during surveys. New species, previously unverified in a given park, were recorded for 10 parks.

No changes were made to the protocol in 2012. The Rocky Mountain Bird Observatory (RMBO), our primary cooperator for this project, manages the network's bird monitoring data. Other networks using RMBO also use this service and have found it to be efficient and effective. This enables SOPN data to be in the same database as those of several other networks and organizations, which in turn allows for a more comprehensive regional assessment.

1 Introduction

1.1 Background

The mission of the National Park Service (NPS) is to manage park resources "unimpaired for future generations." Protecting and managing some of our nation's most significant natural resources requires basic knowledge of the condition of ecosystems and species that occur in national parks. In order to better meet this mission, the Inventory & Monitoring (I&M) Program was established to determine status and trends in ecological resources (NPS 1992). Established in 2002, the Southern Plains Inventory & Monitoring Network (SOPN) includes 11 parks in southeastern Colorado, Kansas, New Mexico, Oklahoma, and Texas (Table 1.1-1). The SOPN consists of mostly mixed- and shortgrass ecosystems. It is bordered on the east by tallgrass prairie, and on the west by the forested systems of the Rocky Mountains (NPS, SOPN 2008).

Monitoring changes in landbird population and community parameters can be an important element of a comprehensive, long-term monitoring program, such as that being implemented for the SOPN parks. Landbirds are a conspicuous component of many ecosystems and have high body temperatures, rapid metabolisms, and occupy high trophic levels. As such, changes in landbird populations may be indicators of changes in the biotic or abiotic components of the environment upon which they depend (Canterbury et al. 2000; Bryce et al. 2002). Relative to other vertebrates, landbirds are also highly detectable and can be efficiently surveyed with the use of numerous standardized methods (Bibby et al. 2000; Buckland et al. 2001).

Birds select habitat based on the presence of behavioral cues triggered by the environment (Hutto 1985; Alcock 2005). In some environments, however, especially those that vary unpredictably, habitat may not be saturated and changes in resources may not always be tracked by changes in animal populations (Wiens 1985). In these situations, relating changes in bird populations to environmental features can be complex, especially when confounded by time lags that are characteristic of site-tenacious bird species. Additional complications occur if birds respond more sensitively to environmental change than we can detect and when cyclical environmental changes result in erratic changes in population size that are ultimately inconsequential. However, the utility of monitoring landbirds is strengthened by concurrent monitoring of a broad suite of environmental parameters (Dale and Beyeler 2001) that may assist with elucidating changes in the bird community to other environmental factors. Such a broad-based approach is now being undertaken by the SOPN (NPS 2008) and other broad-based monitoring approaches (e.g., Ringold et al. 1996; Stevens and Gold 2003; Barrows et al. 2005).

Perhaps the most compelling reason to monitor landbird communities is that birds themselves are

Table 1.1-1. Parks in the Southern Plains Inventory & Monitoring Network (SOPN)

Park	Park Acronymn	Area (Acres)	Acres (Hectares)
Alibates Flint Quarries National Monument	ALFL	1,371	555
Bent's Old Fort National Historic Site	BEOL	799	323
Capulin Volcano National Monument	CAVO	793	321
Chicasaw National Recreation Area	CHIC	9,889	4,002
Fort Larned National Historic Site	FOLS	718	291
Fort Union National Monument	FOUN	721	292
Lake Meredith National Recreation Area	LAMR	46,349	18,757
Lyndon B. Johnson National Historical Park	LYJO	674	273
Pecos National Historical Park	PECO	6,670	2,699
Sand Creek Massacre National Historic Site	SAND	2,400	971
Washita Battlefield National Historic Site	WABA	326	132

inherently valuable. The high aesthetic and spiritual values that humans place on native wildlife are acknowledged in the agency's Organic Act: "to conserve . . . the wild life therein . . . unimpaired for the enjoyment of future generations." Birdwatching, in particular, is a popular, long-standing recreational pastime in the U.S., and it forms the basis of a large and sustainable industry (Sekercioglu 2002).

The SOPN began monitoring birds in 2009; this effort is now part of a collaboration among the Southern Plains, Sonoran Desert, and Chihuahuan Desert networks.

1.2 Program Goals and Objectives

The overall goal of the SOPN landbird monitoring program is to detect biologically significant changes in population parameters over time. This collaborative program is intended to maximize the strength of inferences within the context of finite resources. The monitoring design is a multitiered, flexible framework that will enable efficient estimation and monitoring of population parameters, periodic evaluation of assumptions, and the opportunity for adaptation to meet additional needs.

We have selected three primary monitoring objectives, described below, that are complementary and together provide a comprehensive assessment of changing bird populations and communities. Although we have selected these objectives, it is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

1.2.1 Objective 1: Occupancy

We will estimate the proportion of points occupied for most species in most parks. Occupancy is a measure of presence or absence of a species in space that indicates changes in the distribution of a species when evaluated across time. Recent advancements in occupancy theory and modeling have provided sound justification of its application in monitoring programs (MacKenzie et al. 2003; Field et al. 2005; MacKenzie et al. 2006).

1.2.2 Objective 2: Bird species richness and composition

We will estimate parameters related to community dynamics, particularly species richness and species composition. Monitoring the richness and composition of native communities of concern, and the changes occurring within and among these communities, provides a valuable complement to population-based parameters. Species richness data are essential to understanding the effects of changing landscapes on native biodiversity. Species composition helps us to understand the effects of management and other changes by assessing which species are or are not responding to changes in the environment.

1.2.3 Objective 3: Density (when feasible)

We will estimate density of the most common species using the point-transect distance-sampling method at fixed points and the Distance program (Thomas et al. 2005) for subsequent analyses. Provided that assumptions are reasonably met, distance-sampling methods allow researchers to model a detection function that adjusts for imperfect detectability; the methods are robust and widely accepted for estimating landbird abundance (Buckland et al. 2001). With reasonable effort, we will likely only be able to estimate density annually for the most common species in larger parks.

2 Methods

2.1 Methods

2.1.1 Sampling design

The details of our sampling design and field methods are presented in Powell et al. (2007) and Bennetts et al. (2012, in review). Our intention for monitoring landbirds extends beyond the birds themselves, and includes a broader vision of landbirds as indicators of the ecosystems they inhabit. This dual purpose influences our sampling design, especially in light of our funding and logistical limitations. In some cases, trade-offs have been made to accommodate particular habitat types or park resources that are considered particularly important to a given park.

We sampled primarily in two habitat classes: grassland and riparian, which are the dominant vegetation communities within the SOPN. One pinyon-juniper woodland transect at Capulin Volcano National Monument (NM) was also sampled, however, because the area had been targeted to become grassland; that management strategy may no longer be planned. Within the broad habitat classes, there is considerable variation; SOPN parks can be further stratified into six more specific habitat types (Table 2.1.1-1, -2).

Table 2.1.1-2. Number of transects of each habitat class surveyed in each SOPN park unit, 2012

Park unit	Grassland	PJ Woodland [1]	Riparian
BEOL	4	--	1
CAVO	1	1	--
CHIC	4	--	--
FOLS	2	--	1
FOUN	3	--	--
LAMR	2	--	2
LYJO	1	--	1
PECO	4	--	2
SAND	2	--	1
WABA	2	--	--

[1]Some pinyon-juniper woodlands that were targeted for conversion to grassland prior to 2010 sampling were surveyed.

In 2012, we surveyed landbirds within all of the SOPN park units (Lake Meredith National Recreation Area [NRA] and Alibates Flint Quarries NM were treated as one park unit, and no sampling was specifically done at Alibates Flint Quarries NM). Sample points were located along a transect for linear features (e.g., most riparian habitats) or a grid for area features. Note that in Chapter 3 we may use the terms "transect" and

Table 2.1.1-1. Habitat classes and types by park

Habitat classes	Habitat types	Parks
Grassland	Shortgrass prairie	• BEOL • CAVO • FOUN • PECO • SAND
Grassland	Upland grassland	• CHIC • FOLS • LAMR • LYJO • WABA
Woodland	Pinyon-juniper	• CAVO
Riparian	Bottomland grassland	• LAMR • LYJO • WABA
Riparian	Cottonwood bottom	• BEOL • LAMR • PECO • SAND
Riparian	Riparian woodland	• FOLS

"grid" interchangeably. A total of 34 transects or grids were surveyed in 2012 (Table 2.1.1-2). In most parks, we used sites selected with methodology outlined in Powell et al. (2007).

2.1.2 Seasonal timing of surveys

During the breeding season, increased territorial behavior by songbirds results in higher detection rates and greater sampling efficiency. Additionally, occupancy estimates assume that a bird detected is present for the entire period being surveyed. Thus, our surveys were focused on the primary breeding season in order to account for the greatest number of species in each park, recognizing that some species (e.g., migrants) may not have been adequately surveyed because of this restricted window. Although migrants are certainly an important component of bird communities, their presence can be highly variable and substantially influenced by external factors. Focusing on the breeding population is expected to provide the most reliable information about changes in bird populations related to changes in condition of SOPN parks.

The timing of breeding varies among species and depends on a number of factors, including latitude and elevation. The window of primary breeding and sampling was from April through late June, with adjustments, as described above, for individual park visits based on latitude and elevation (Figure 2.1.2).

2.2 Bird Surveys

We used point-transect surveys to estimate and monitor landbird population parameters (Buckland et al. 2001). The point-transect approach evolved from the variable circular plot approach (Reynolds et al. 1980) and distance sampling of line transects (Burnham et al. 1980), where points are considered as a transect with zero distance (Buckland et al. 2001). For density estimates, the method involves estimating the linear distance to individual birds while standing for a predetermined period of time at a fixed point in space (Figure 2.2). For groups of birds, we estimated the distance to the group and the number of birds in the group. Estimating the distance to each bird allows the observer to approximate density via a species-specific detection function that accounts

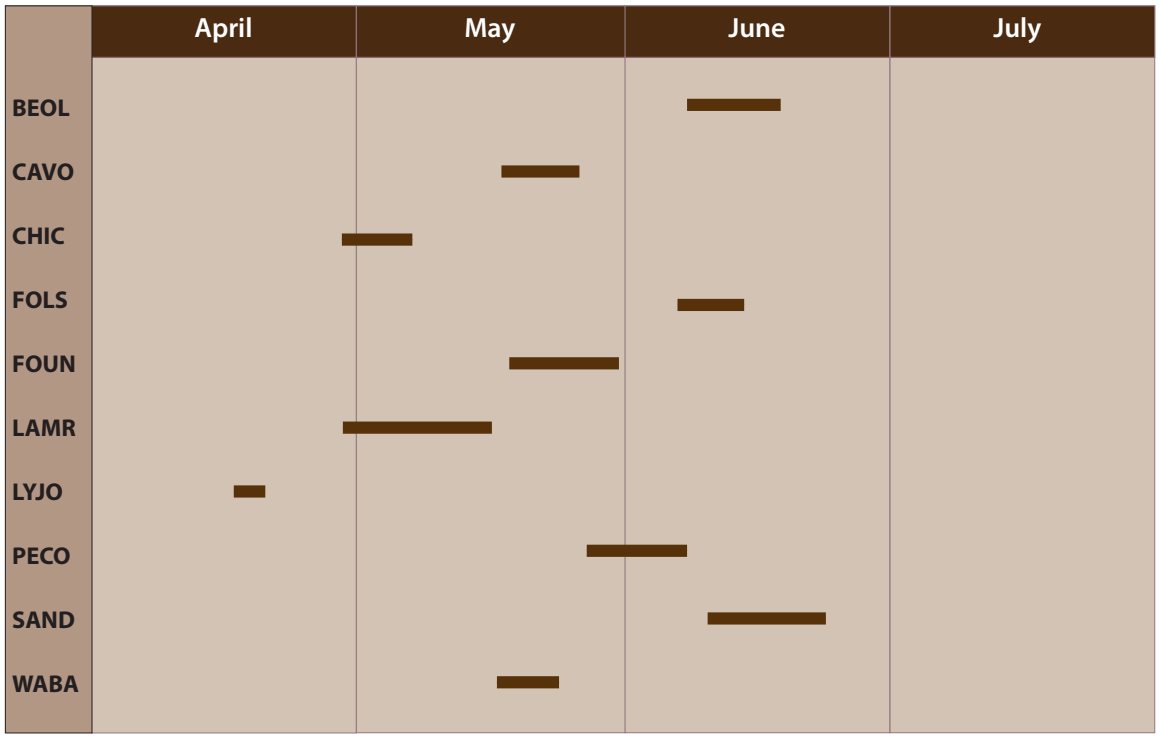

Figure 2.1.2. Dates when sampling was conducted in SOPN parks, 2012.

for variation in detectability due to surveyor, environmental, or weather-related factors (Buckland et al. 2001; Diefenbach et al. 2003).

All birds detected at a given point were recorded. After counts were completed, observers used a handheld GPS (Global Positioning System) unit to locate successive survey points. While walking between points, observers recorded species that were either previously unconfirmed or that had not been detected on previous point-transect surveys in a particular park.

Surveys were conducted three times for each transect or grid to facilitate occupancy estimates, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability. Note that in the report we use the terms "points" and "point visits." "Points" are the unique sampling points on transects or grids, while "point visits" are the number of unique points multiplied by the number of visits.

We spent six minutes at each point along the transect or grid and used a rangefinder to estimate the linear distance to each bird or group detected. Six minute counts are consistent with region-wide bird monitoring efforts being conducted by Rocky Mountain Bird Observatory (RMBO) and its partners.

2.3 Additional Monitoring to Augment Bird Sampling

It is well known that landbird populations are particularly influenced by changes in vegetation structure and composition (Holmes and Sherry 2001; Krueper et al. 2003). Considering environmental data, such as vegetation, will allow us to aggregate (i.e., to stratify, post-hoc) survey sites that share similar characteristics. For this purpose, we will use data collected through the network's vegetation monitoring efforts. We will also use other data (e.g., climate) collected by SOPN and other organizations as covariates when assessing population trends for birds. Finally, land-

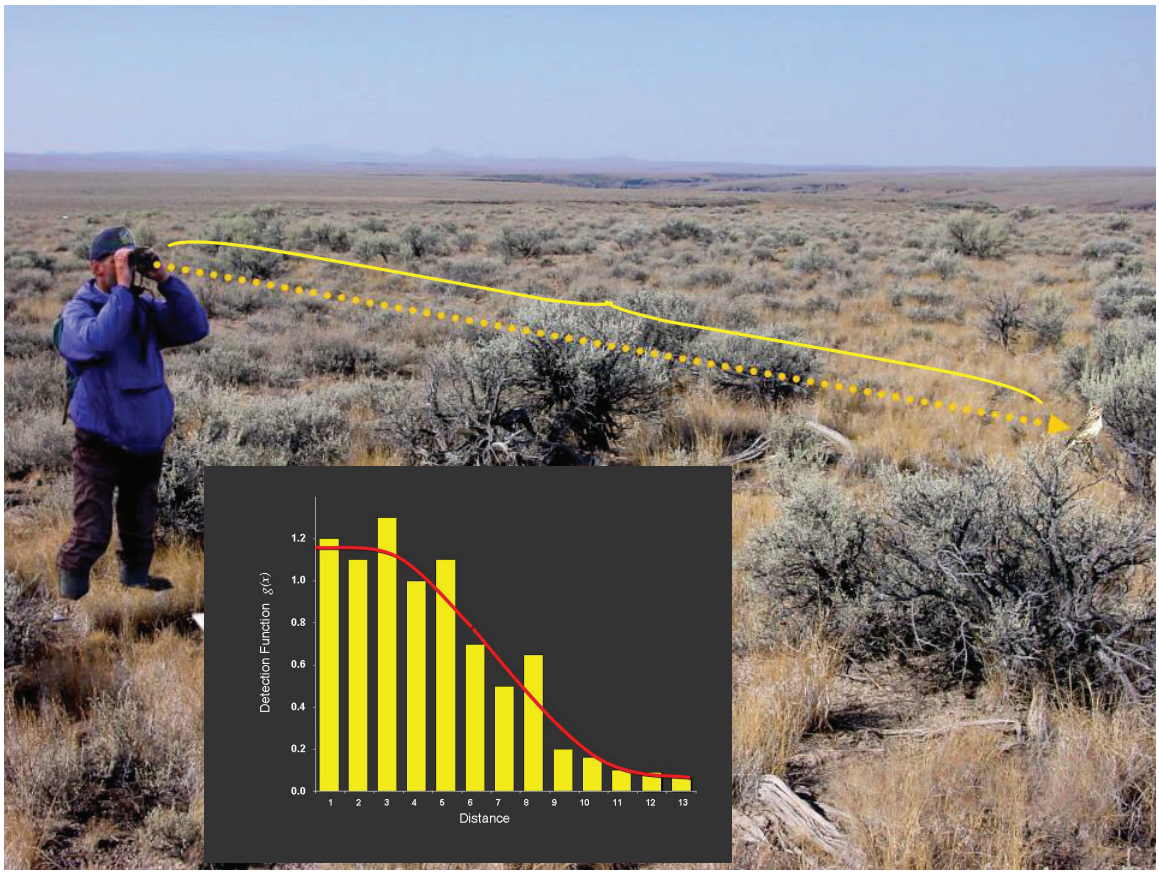

Figure 2.2. Distance sampling works by estimating a detection profile (graph) as a function of distance from which either individual or groups of birds are observed from the transect.

bird population parameters, coupled with detailed environmental information, can be used to build habitat-association models (e.g., Manley et al. 2004) that can inform conservation efforts and scientific inquiry throughout the region.

2.4 Reporting

The primary monitoring objectives focus on long-term changes and trends, and monitoring must be conducted for a number of years before meaningful estimates related to trends are feasible. Consequently, it is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

It is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

Field methods for estimating all three primary objectives are essentially the same; analyses and evaluation procedures used to estimate trends will differ.

2.5 Accessing the Data

RMBO, our primary cooperator for this project, manages the bird monitoring data associated with it. Other networks using RMBO also use this service and have found it to be efficient and effective. This enables SOPN data to be stored in the same database as that of several other networks and organizations, which in turn allows for a more comprehensive regional assessment. SOPN and its parks will have easy access to the data upon completion of the new Avian Data Center, expected in early 2013.

3 Results and Discussion

We had a total of 1,675 point visits (the number of unique points multiplied by the number of visits) on 34 transects or grids in 2012 (Table 3-1). Of these, 1,237 were point visits in grassland habitats (including 51 in pinyon-juniper woodland habitat), and 438 were point visits in riparian habitats. We recorded a total of 15,435 individual birds (of 162 species) during our point visits, with an additional 231 individual birds detected as flyovers.

Pecos National Historical Park (NHP) had the highest number of individual birds counted (n = 2,321). Lyndon B. Johnson NHP had the lowest number of birds counted (n = 632). Species richness and community composition varied widely among the parks surveyed. We observed the greatest number of species at Pecos NHP (n = 70) and the fewest at Fort Union National Monument (NM) (n = 35) (Table 3-2). The number of individuals or species detected is influenced not only by the number of points and visits, but also by the size and diversity of available habitats.

Western Meadowlark was the most commonly detected species within the SOPN (n = 1,931), followed by Mourning Dove, Northern Cardinal, and Red-winged Blackbird (Table 3-3). Two species, Brown-headed Cowbird and Mourning Dove, were detected at every park in the network, and nearly 50 species were detected at only one of the ten parks during surveys (see Table 3-4).

Table 3-2. Number of species observed in each habitat class (grassland, pinyon-juniper woodland, and riparian) at each park, 2012

Park	Species detected			
	Grass.	Wood.	Rip.	Total[1]
Bent's Old Fort NHS	57	--	54	66
Capulin Volcano NM	45	37[2]	--	48
Chickasaw NRA	65	--	--	65
Fort Larned NHS	36	--	38	45
Fort Union NM	35	--	--	35
Lake Meredith NRA	41	--	52	65
Lyndon B. Johnson NHP	23	--	30	38
Pecos NHP	52	--	60	70
Sand Creek Massacre NHS	28	--	32	39
Washita Battlefield NHS	45	--	--	45
Total[1]	**145**	**37**	**120**	**162**

[1] Totals do not necessarily equal the sum of the numbers shown for parks or habitat classes, as a single species may have been observed in more than one park or habitat class. Numbers do not include incidental observations.

[2]Some pinyon-juniper woodlands that were targeted for conversion to grassland prior to 2010 sampling were sampled in 2010-2012.

Table 3-1. The number of point visits (# of unique points multiplied by # of visits) and individual birds counted in each habitat class at each SOPN park, 2012

Park	Grassland		Pinyon-Juniper Woodland		Riparian		Total birds detected
	# Point Visits	# Birds	# Point Visits	# Birds	# Point Visits	# Birds	
Bent's Old Fort NHS	114	1,286	---	---	69	983	**2,269**
Capulin Volcano NM	84	978	51	481	---	---	**1,459**
Chickasaw NRA	204	1,967	---	---	---	---	**1,967**
Fort Larned NHS	75	736	---	---	54	598	**1,334**
Fort Union NM	180	1,088	---	---	---	---	**1,088**
Lake Meredith NRA	114	727	---	---	111	831	**1,558**
Lyndon B. Johnson NHP	18	137	---	---	51	495	**632**
Pecos NHP	167	1,281	---	---	105	1,040	**2,321**
Sand Creek Massacre NHS	120	989	---	---	48	657	**1,646**
Washita Battlefield NHS	110	1,161	---	---	---	---	**1,161**
Total	**1,186**	**10,350**	**51**	**481**	**438**	**4,604**	**15,435**

Note: Bird counts reported here do not include birds observed flying overhead that did not use the habitat (i.e., flyovers).

Table 3-3. Total number of individual birds observed of each species during surveys in all SOPN parks, 2012

Common name	# of birds
Western Meadowlark	1931
Mourning Dove	987
Northern Cardinal	627
Red-winged Blackbird	594
Northern Mockingbird	588
Western Kingbird	428
Spotted Towhee	369
Dickcissel	367
Cassin's Sparrow	339
Northern Bobwhite	330
Western Wood-Pewee	329
Cassin's Kingbird	271
Lark Sparrow	264
American Crow	259
Field Sparrow	259
Painted Bunting	251
Eastern Meadowlark	248
Tufted Titmouse	247
Black-headed Grosbeak	243
House Wren	221
Common Raven	203
Brown-headed Cowbird	189
Barn Swallow	172
Pinyon Jay	171
Blue Grosbeak	170
American Robin	152
Yellow-breasted Chat	141
Bullock's Oriole	139
Cliff Swallow	137
Chipping Sparrow	122
Orchard Oriole	121
Yellow Warbler	120
Ring-necked Pheasant	119
Turkey Vulture	115
Blue Jay	114
Indigo Bunting	114
Common Grackle	110
Western Scrub-Jay	110
Baltimore Oriole	102
Carolina Wren	102
Eastern Kingbird	101
Red-bellied Woodpecker	101
Bewick's Wren	90

Common name	# of birds
Violet-green Swallow	84
Plumbeous Vireo	83
Great Crested Flycatcher	82
Ash-throated Flycatcher	78
Northern Flicker	75
Vesper Sparrow	75
Horned Lark	73
Yellow-billed Cuckoo	72
Common Nighthawk	70
Summer Tanager	67
Warbling Vireo	64
Yellow-rumped Warbler	64
Red-headed Woodpecker	61
Carolina Chickadee	60
Common Yellowthroat	58
Franklin's Gull	56
Brewer's Blackbird	55
Rufous-crowned Sparrow	55
Lark Bunting	53
Hepatic Tanager	52
Eastern Bluebird	51
Scissor-tailed Flycatcher	51
European Starling	50
Black-crested Titmouse	48
House Finch	48
Rock Wren	47
Killdeer	46
Brown Thrasher	43
White-eyed Vireo	43
Wild Turkey	42
Yellow-throated Vireo	42
Juniper Titmouse	41
Say's Phoebe	40
Eurasian Collared-Dove	39
Grasshopper Sparrow	38
Gray Catbird	38
American Kestrel	36
American Goldfinch	35
American Coot	33
Canada Goose	33
Mallard	33
Mississippi Kite	33
Song Sparrow	33

Table 3-3. Total number of individual birds observed of each species during surveys in all SOPN parks, 2012, cont.

Common name	# of birds
Downy Woodpecker	29
Chihuahuan Raven	26
Western Bluebird	24
Lesser Goldfinch	23
Red-tailed Hawk	23
Blue-gray Gnatcatcher	22
Great Horned Owl	21
Ladder-backed Woodpecker	21
Mountain Bluebird	21
Great Blue Heron	20
White-breasted Nuthatch	20
Eastern Phoebe	19
Great-tailed Grackle	19
Mountain Chickadee	19
House Sparrow	18
Red-eyed Vireo	18
Western Tanager	16
Black Phoebe	13
Spotted Sandpiper	13
Lincoln's Sparrow	11
Swainson's Thrush	10
Black Vulture	9
Black-billed Magpie	8
Hairy Woodpecker	8
Northern Rough-winged Swallow	8
Swainson's Hawk	8
Cooper's Hawk	7
Purple Martin	7
Broad-tailed Hummingbird	6
Green Heron	6
White-winged Dove	6
Red-shouldered Hawk	5
Bell's Vireo	4
Black-throated Gray Warbler	4
Gray Flycatcher	4
Green-tailed Towhee	4
Pileated Woodpecker	4
Rock Pigeon	4
Scaled Quail	4
Black-capped Chickadee	3
Black-chinned Hummingbird	3
Burrowing Owl	3
Bushtit	3
Canyon Towhee	3
Canyon Wren	3
Common Poorwill	3
Great Egret	3
Lazuli Bunting	3
Northern Harrier	3
Osprey	3
White-faced Ibis	3
Wilson's Warbler	3
Black-and-white Warbler	2
Black-crowned Night-Heron	2
Clay-colored Sparrow	2
Cordilleran Flycatcher	2
Double-crested Cormorant	2
Ferruginous Hawk	2
Least Flycatcher	2
Northern Parula	2
Northern Shoveler	2
Olive-sided Flycatcher	2
Ruby-crowned Kinglet	2
Yellow-throated Warbler	2
Belted Kingfisher	1
Black-throated Sparrow	1
Broad-winged Hawk	1
Golden Eagle	1
Greater Roadrunner	1
Loggerhead Shrike	1
Rose-breasted Grosbeak	1
Ruby-throated Hummingbird	1
Savannah Sparrow	1
Virginia's Warbler	1
White-crowned Sparrow	1
Willow Flycatcher	1
Unidentified birds	*401*
Total	15,435

Note: Species are listed in rank order from most to least commonly detected. No. of birds is the total no. of individuals counted. Due to the potential to confound future comparisons, these values exclude birds flying overhead/not using the habitat. Unidentified birds were included in the total no. of birds recorded during surveys, but not in counts of the no. of species detected per park.

Table 3-4. Parks where each species was detected, April through June 2012

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Acadian Flycatcher	*Empidonax virescens*			o							
American Avocet	*Recurvirostra americana*	o					o				
American Bittern	*Botaurus lentiginosus*	o						o			
American Coot	*Fulica americana*	o		o			●	o			
American Crow	*Corvus brachyrhynchos*	●		●	o	o	●	●	●		●
American Goldfinch	*Spinus tristis*	●		●	●		o	o	●	o	●
American Kestrel	*Falco sparverius*	●	o			●	●	o	o	o	o
American Pipit	*Anthus rubescens*							o			
American Redstart	*Setophaga ruticilla*	o									
American Robin	*Turdus migratorius*	●	●	●	●	●	o	o	●	o	
American Tree Sparrow	*Spizella arborea*						o				o
American Wigeon	*Anas americana*							o			
Ash-throated Flycatcher	*Myiarchus cinerascens*	●	●			●	●	o	●		
Bald Eagle	*Haliaeetus leucocephalus*							o			
Baltimore Oriole	*Icterus galbula*			o	●					●	
Barn Owl	*Tyto alba*					o	o			o	
Barn Swallow	*Hirundo rustica*	●	●	o	●	●	●	●	●	●	●
Barred Owl	*Strix varia*			o							o
Bell's Vireo	*Vireo bellii*	o			●		o	o			o
Belted Kingfisher	*Megaceryle alcyon*	o		o			o		o		●
Bewick's Wren	*Thryomanes bewickii*		●	●			●	●	●		●
Black Phoebe	*Sayornis nigricans*								●		
Black Rail	*Laterallus jamaicensis*	o									
Black Tern	*Chlidonias niger*	o									
Black Vulture	*Coragyps atratus*			●				●			
Black-and-white Warbler	*Mniotilta varia*			●				o			
Black-billed Cuckoo	*Coccyzus erythropthalmus*				o						
Black-billed Magpie	*Pica hudsonia*				o	●			o		
Blackburnian Warbler	*Dendroica fusca*							o			
Black-capped Chickadee	*Poecile atricapillus*		●		o						
Black-capped Gnatcatcher	*Polioptila nigriceps*			o							
Black-chinned Hummingbird	*Archilochus alexandri*		o			o		o	●		
Black-crested Titmouse	*Baeolophus atricristatus*							●			

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Black-crowned Night-heron	*Nycticorax nycticorax*	o		●			o				
Black-headed Grosbeak	*Pheucticus melanocephalus*	●	●			●	o		●		
Black-necked Stilt	*Himantopus mexicanus*						o				
Black-throated Gray Warbler	*Dendroica nigrescens*								●		
Black-throated Green Warbler	*Dendroica virens*							o			
Black-throated Sparrow	*Amphispiza bilineata*						●				
Blue Grosbeak	*Passerina caerulea*	●	o	o		●	●	●	●	●	●
Blue Jay	*Cyanocitta cristata*	●		●	●		●	●		●	●
Blue-gray Gnatcatcher	*Polioptila caerulea*		●	●		o		o	●		●
Blue-headed Vireo	*Vireo solitarius*							o			
Blue-winged Teal	*Anas discors*	o					o	o		o	
Blue-winged Warbler	*Vermivora cyanoptera*							o			
Boat-tailed Grackle	*Quiscalus major*			o							
Brewer's Blackbird	*Euphagus cyanocephalus*	●				o		o	●	o	
Brewer's Sparrow	*Spizella breweri*		o			o					
Broad-tailed Hummingbird	*Selasphorus platycercus*		●			o			●		
Broad-winged Hawk	*Buteo platypterus*			●				o			
Bronzed Cowbird	*Molothrus aeneus*							o			
Brown Creeper	*Certhia americana*		o					o			
Brown Thrasher	*Toxostoma rufum*	●		o	●		o	o		●	●
Brown-headed Cowbird	*Molothrus ater*	●	●	●	●	●	●	●	●	●	●
Bullock's Oriole	*Icterus bullockii*	●	●			●	●	o	●	●	o
Burrowing Owl	*Athene cunicularia*	o					●			o	
Bushtit	*Psaltriparus minimus*								●		
Cactus Wren	*Campylorhynchus brunneicapillus*						o				
Calliope Hummingbird	*Stellula calliope*		o								
Canada Goose	*Branta canadensis*	●		●		●	o		o		o
Canyon Towhee	*Melozone fusca*		o			o			●		
Canyon Wren	*Catherpes mexicanus*		o			o	●		o		
Carolina Chickadee	*Poecile carolinensis*			●			o	●			●
Carolina Wren	*Thryothorus ludovicianus*			●	●			●			●
Cassin's Kingbird	*Tyrannus vociferans*	●	●			●			●		
Cassin's Sparrow	*Peucaea cassinii*	●	●			o	●		●	●	●

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Cattle Egret	*Bubulcus ibis*			o				o			
Cedar Waxwing	*Bombycilla cedrorum*			o				o	o		o
Chestnut-sided Warbler	*Dendroica pensylvanica*							o		o	
Chihuahuan Raven	*Corvus cryptoleucus*	●	●				●	●			
Chimney Swift	*Chaetura pelagica*	o		o	o			o			o
Chipping Sparrow	*Spizella passerina*	●	●	●		●	●	o	●	o	o
Chuck-will's-widow	*Caprimulgus carolinensis*			o				o			
Cinnamon Teal	*Anas cyanoptera*	o					o	o			
Clark's Nutcracker	*Nucifraga columbiana*								o		
Clay-colored Sparrow	*Spizella pallida*						o	o		o	●
Cliff Swallow	*Petrochelidon pyrrhonota*	●	o	●	o	●	●	●	●	o	o
Common Grackle	*Quiscalus quiscula*	●	o	●	●	o	●	●		●	●
Common Moorhen	*Gallinula chloropus*						o				
Common Nighthawk	*Chordeiles minor*	●	o	o	●	●	●	o	●	●	●
Common Poorwill	*Phalaenoptilus nuttallii*	o	●				o				
Common Raven	*Corvus corax*		●			●			●		
Common Snipe	*Gallinago gallinago*							o			
Common Yellowthroat	*Geothlypis trichas*	●		o	●	o	●	o	●	o	o
Cooper's Hawk	*Accipiter cooperii*		●	o			●	o	●		o
Cordilleran Flycatcher	*Empidonax occidentalis*		o						●		
Crested Caracara	*Caracara cheriway*							o			
Curve-billed Thrasher	*Toxostoma curvirostre*					o					
Dark-eyed Junco	*Junco hyemalis*		o				o	o	o		o
Dickcissel	*Spiza americana*	●		●	●		●	o		●	●
Double-crested Cormorant	*Phalacrocorax auritus*						o	●			
Downy Woodpecker	*Picoides pubescens*	●	●	●	●		●	o		●	●
Eastern Bluebird	*Sialia sialis*	●		●	●		●	o		o	●
Eastern Kingbird	*Tyrannus tyrannus*	●		●	●		●	●	●	●	o
Eastern Meadowlark	*Sturnella magna*			●	●		●	o			●
Eastern Phoebe	*Sayornis phoebe*			●	●	o	o	●			●
Eastern Screech-Owl	*Megascops asio*			o	o		o	o			
Eastern Towhee	*Pipilo erythrophthalmus*							o			
Eastern Wood-Pewee	*Contopus virens*			o	o			o			

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Eurasian Collared-Dove	*Streptopelia decaocto*	●	●	o	o	●	●	●	●	●	
European Starling	*Sturnus vulgaris*	●		o	o	o	o	o		●	
Ferruginous Hawk	*Buteo regalis*	o				●					
Field Sparrow	*Spizella pusilla*			●			●	●			●
Forster's Tern	*Sterna forsteri*	o						o			
Fox Sparrow	*Passerella iliaca*							o			
Franklin's Gull	*Leucophaeus pipixcan*			o			●	o			
Gadwall	*Anas strepera*						o	o			
Golden Eagle	*Aquila chrysaetos*		o			●					
Golden-crowned Kinglet	*Regulus satrapa*							o			
Golden-fronted Woodpecker	*Melanerpes aurifrons*							o			
Grace's Warbler	*Dendroica graciae*								o		
Grasshopper Sparrow	*Ammodramus savannarum*	o			●		o	●		●	●
Gray Catbird	*Dumetella carolinensis*			●	●			o	●		
Gray Flycatcher	*Empidonax wrightii*			o			o		●		
Gray Vireo	*Vireo vicinior*								o		
Gray-cheeked Thrush	*Catharus minimus*						o				
Great Blue Heron	*Ardea herodias*	●		●	●	o	●	●	●	o	o
Great Crested Flycatcher	*Myiarchus crinitus*	o		●	●			o			●
Great Egret	*Ardea alba*			●	o		o	o			o
Great Horned Owl	*Bubo virginianus*	●	●	o	o	o	●	o	●	●	o
Greater Roadrunner	*Geococcyx californianus*			●			o	o	o		o
Greater Yellowlegs	*Tringa melanoleuca*							o			
Great-tailed Grackle	*Quiscalus mexicanus*	●		o	o	●	●[2]	●	o		o
Green Heron	*Butorides virescens*	●		o			o	o	o		●
Green Kingfisher	*Chloroceryle americana*							o			
Green-tailed Towhee	*Pipilo chlorurus*		●			o			o		
Green-winged Teal	*Anas crecca*						o	o			
Hairy Woodpecker	*Picoides villosus*		o	●	●			o	o		o
Harris' Sparrow	*Zonotrichia querula*							o			o
Hepatic Tanager	*Piranga flava*		●						●		
Hermit Thrush	*Catharus guttatus*		o					o		o	
Hooded Warbler	*Wilsonia citrina*			o				o			

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Horned Lark	*Eremophila alpestris*	●	●		●[2]	●				●	
House Finch	*Carpodacus mexicanus*		o	●	o	o		o	●	●	
House Sparrow	Passer domesticus	●	o	o	o		o	●	●		o
House Wren	*Troglodytes aedon*	●	o	o	●	o		o	●	●	o
Hudsonian Godwit	*Limosa haemastica*							o			
Inca Dove	*Columbina inca*							o			
Indigo Bunting	*Passerina cyanea*	●		●	●		●	o		o	●
Juniper Titmouse	*Baeolophus ridgwayi*		o			o			●		
Killdeer	*Charadrius vociferus*	●		o	●	o	●	o	o	●	●
Ladder-backed Woodpecker	*Picoides scalaris*	o					●	●	o		
Lark Bunting	*Calamospiza melanocorys*	o			o	●[1]	●			●	o
Lark Sparrow	*Chondestes grammacus*	o	●	o		●	●	●	●	●	o
Lazuli Bunting	*Passerina amoena*	●									
Le Conte's Sparrow	*Ammodramus leconteii*							o			
Least Flycatcher	*Empidonax minimus*			●							
Least Sandpiper	*Calidris minutilla*			o				o			
Lesser Goldfinch	*Spinus psaltria*	●	o			●		o	●		o
Lesser Nighthawk	*Chordeiles acutipennis*							o			
Lesser Scaup	*Aythya affinis*							o			
Lesser Yellowlegs	*Tringa flavipes*							o			
Lewis's Woodpecker	*Melanerpes lewis*	o	o								
Lincoln's Sparrow	*Melospiza lincolnii*			●				o		o	o
Little Blue Heron	*Egretta caerulea*			o				o			
Loggerhead Shrike	*Lanius ludovicianus*	o				o	●	o		o	o
Long-billed Dowitcher	*Limnodromus scolopaceus*							o			
Louisiana Waterthrush	*Parkesia motacilla*			o				o			
MacGillivray's Warbler	*Oporornis tolmiei*		o					o	o		
Magnolia Warbler	*Dendroica magnolia*							o			
Mallard	*Anas platyrhynchos*	●			o	o	●	o	●	o	o
Mississippi Kite	*Ictinia mississippiensis*	●		●			●	o			●
Mountain Bluebird	*Sialia currucoides*		●			●			●		
Mountain Chickadee	*Poecile gambeli*		●						●		

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Mountain Plover	*Charadrius montanus*									o	
Mourning Dove	*Zenaida macroura*	●	●	●	●	●	●	●	●	●	●
Northern Bobwhite	*Colinus virginianus*	●		●	o		●	o	o		●
Northern Cardinal	*Cardinalis cardinalis*		o	●	●		●	●			●
Northern Flicker	*Colaptes auratus*	●	o	●	●	o	●	o	●	●	●
Northern Harrier	*Circus cyaneus*	●			o		o	o		o	o
Northern Mockingbird	*Mimus polyglottos*	●	●	●		●	●	●	●	●	●
Northern Parula	*Parula americana*			●							
Northern Pintail	*Anas acuta*							o			
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	o	●	o		o		o	●		o
Northern Shoveler	*Anas clypeata*	o					●	o			
Olive-sided Flycatcher	*Contopus cooperi*			●			o	o			
Orange-crowned Warbler	*Oreothlypis celata*							o			
Orchard Oriole	*Icterus spurius*	●		o	●		●	●		●	
Osprey	*Pandion haliaetus*							●	o		
Painted Bunting	*Passerina ciris*			●			●	o			●
Peregrine Falcon	*Falco peregrinus*		o								
Pied-billed Grebe	*Podilymbus podiceps*			o				o			
Pileated Woodpecker	*Dryocopus pileatus*			●							o
Pine Siskin	*Spinus pinus*		o					o	o		
Pinyon Jay	*Gymnorhinus cyanocephalus*		●			●			●		
Plumbeous Vireo	*Vireo plumbeus*		●						●		
Prairie Falcon	*Falco mexicanus*	o	o			o					
Prothonotary Warbler	*Protonotaria citrea*			o							
Purple Finch	*Carpodacus purpureus*							o			
Purple Martin	*Progne subis*			●				o			o
Red Crossbill	*Loxia curvirostra*								o		
Red-bellied Woodpecker	*Melanerpes carolinus*			●	o		●		o		●
Red-breasted Nuthatch	*Sitta canadensis*								o		
Red-eyed Vireo	*Vireo olivaceus*	●		●							
Redhead	*Aythya americana*							o			
Red-headed Woodpecker	*Melanerpes erythrocephalus*	●		o	●		●	o		●	o
Red-shouldered Hawk	*Buteo lineatus*			●				o			

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Red-tailed Hawk	*Buteo jamaicensis*	●	●	●	●	o	●	●	●	●	●
Red-winged Blackbird	*Agelaius phoeniceus*	●		o	●	●	●	●	●	●	●
Ringed Kingfisher	*Megaceryle torquata*							o			
Ring-necked Duck	*Aythya collaris*							o			
Ring-necked Pheasant	Phasianus colchicus	●		o	●		●			●	●
Rock Pigeon	*Columba livia*	●		●	o			o			
Rock Wren	*Salpinctes obsoletus*	o	●			●	●		o	o	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*				●		o	o			
Rough-legged Hawk	*Buteo lagopus*										o
Ruby-crowned Kinglet	*Regulus calendula*						●	o	o		
Ruby-throated Hummingbird	*Archilochus colubris*			●				o			o
Ruddy Duck	*Oxyura jamaicensis*						o	o			
Rufous Hummingbird	*Selasphorus rufus*		o	o							
Rufous-crowned Sparrow	*Aimophila ruficeps*			●			●	o	o		
Rusty Blackbird	*Euphagus carolinus*							o			
Sandhill Crane	*Grus canadensis*							o			
Savannah Sparrow	*Passerculus sandwichensis*							o			●
Say's Phoebe	*Sayornis saya*	●	●			●	o	o	●	●	
Scaled Quail	*Callipepla squamata*		●				●			o	
Scissor-tailed Flycatcher	*Tyrannus forficatus*			●	o		●	●			●
Screech-Owl[3]	*Megascops* sp.	●[1]									
Sharp-shinned Hawk	*Accipiter striatus*						o	o			
Short-eared Owl	*Asio flammeus*									o	o
Snowy Egret	*Egretta thula*			o				o			
Solitary Sandpiper	*Tringa solitaria*							o			
Song Sparrow	Melospiza melodia			o			o	o	●		o
Sora	*Porzana carolina*	o									
Spotted Sandpiper	*Actitis macularius*	o		o			o	o	●		
Spotted Towhee	*Pipilo maculatus*		●		o	●	o		●	o	o
Steller's Jay	*Cyanocitta stelleri*								o		
Stilt Sandpiper	*Calidris himantopus*							o			
Summer Tanager	*Piranga rubra*			●	●		●	●	●		o
Swainson's Hawk	*Buteo swainsoni*	●		o		o	o	o		●	o

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Swainson's Thrush	*Catharus ustulatus*			●						o	
Tennessee Warbler	*Oreothlypis peregrina*							o			
Tree Swallow	*Tachycineta bicolor*			o							o
Tricolored Heron	*Egretta tricolor*							o			
Tufted Titmouse	*Baeolophus bicolor*			●				o			●
Turkey Vulture	*Cathartes aura*	o	●	●	●	●	●	●	●	o	●
Upland Sandpiper	*Bartramia longicauda*							o			o
Veery	*Catharus fuscescens*							o			
Vermilion Flycatcher	*Pyrocephalus rubinus*							o			
Vesper Sparrow	*Pooecetes gramineus*		●	o		●	o	●	●	o	
Violet-green Swallow	*Tachycineta thalassina*	o	●			o			●		
Virginia Rail	*Rallus limicola*	o					o				
Virginia's Warbler	*Oreothlypis virginiae*		●			o			o		
Warbling Vireo	*Vireo gilvus*	●	o	●	●				●	●	
Western Bluebird	*Sialia mexicana*		●						●		
Western Kingbird	*Tyrannus verticalis*	●	●	o	●	●	●	o	●	●	o
Western Meadowlark	*Sturnella neglecta*	●	●		●	●	●	o	●	●	●
Western Sandpiper	*Calidris mauri*							o			
Western Scrub-Jay	*Aphelocoma californica*		●			●			●		
Western Tanager	*Piranga ludoviciana*	●	●						●		
Western Wood-Pewee	*Contopus sordidulus*	●	●			o	●		●	●	
White-breasted Nuthatch	*Sitta carolinensis*	o	o	o	●		o		●		
White-crowned Sparrow	*Zonotrichia leucophrys*			o			o	●	o	o	o
White-eyed Vireo	*Vireo griseus*	●		●				o			
White-faced Ibis	*Plegadis chihi*	o					●				
White-throated Sparrow	*Zonotrichia albicollis*							o			o
White-throated Swift	*Aeronautes saxatalis*		o								
White-winged Dove	*Zenaida asiatica*		o					●	o		
Wild Turkey	*Meleagris gallopavo*	●	●	o	●	o	●	●			●
Willet	*Tringa semipalmata*								o		
Willow Flycatcher	*Empidonax traillii*	●					o		o		
Wilson's Phalarope	*Phalaropus tricolor*							o			
Wilson's Warbler	*Wilsonia pusilla*			●				o	o		

Table 3-4. Parks where each species was detected, April through June 2012, cont.

Common name	Scientific name	BEOL	CAVO	CHIC	FOLS	FOUN	LAMR	LYJO	PECO	SAND	WABA
Winter Wren	*Troglodytes hiemalis*							o			
Wood Duck	*Aix sponsa*			o	o			o			
Yellow Warbler	*Dendroica petechia*	●		●	●	o	o	o	●	●	o
Yellow-bellied Flycatcher	*Empidonax flaviventris*							o			
Yellow-bellied Sapsucker	*Sphyrapicus varius*							o			
Yellow-billed Cuckoo	*Coccyzus americanus*	●		●	●		o	o		●	●
Yellow-breasted Chat	*Icteria virens*	●		●			o		●		
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	o						o			o
Yellow-rumped Warbler	*Dendroica coronata*		●	o			o	o	●		o
Yellow-throated Vireo	*Vireo flavifrons*			●				o			
Yellow-throated Warbler	*Dendroica dominica*			●							

Note: Unverified observations of additional species in a park are not included.

● = species detected in 2012 survey

●[1] = species detected in 2012 incidental to the survey

●[2] = species detected adjacent to, but outside of, park boundaries

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

[3]= unknown whether the Screech-Owl detected at BEOL in 2012 was a Western or Eastern Screech-Owl

3.1 Bent's Old Fort National Historic Site

3.1.1 2012 sampling

During June of 2012, we sampled five transects/grids at Bent's Old Fort National Historic Site (NHS) (Figure 3.1.1). Four grids were in grassland habitat (shortgrass prairie) with 4 to 16 unique points each (Table 3.1.1). One grid was located in a riparian area (cottonwood bottom) with 23 unique points. Points were surveyed three times for a total of 183 point visits (the number of unique points multiplied by the number of visits) at the park in 2012.

3.1.2 Results and discussion

During 2012, 2,269 birds of 66 species were counted at Bent's Old Fort NHS (Table 3.1.2). This was the second highest bird diversity among SOPN parks surveyed in 2012. Western Meadowlark was the most commonly counted species (23%), followed by Mourning Dove (12%), Red-winged Blackbird (7%), and Northern Mockingbird (6%). As discussed below, several new species were detected for the park in 2012.

The cottonwood transect along the Arkansas River and the adjacent upland transect continued to yield the highest species diversity, including the three most abundant bird species in the park, as well as other common species (in order of abundance)- Northern Mockingbird, Northern Bobwhite, Blue Grosbeak, Western Kingbird, and Yellow-breasted Chat. Burrowing Owl, Bell's Vireo, Lewis's Woodpecker, and White-breasted Nuthatch, detected in 2011, were absent in 2012. New species for the park included at least two singing White-eyed Vireos, one singing Red-eyed Vireo, at least one Brewer's Blackbird, Mississippi Kite, Canada Goose, and a calling Screech-Owl detected prior to beginning the count at the first point on the restoration transect. Though not new species for the park, American Crow, Eastern Bluebird, Cassin's Kingbird, Green Heron, and Western Tanager had not been detected in point count surveys on the park since they were initiated in 2009.

Table 3.1.1. Habitat type, number of points, and sampling dates for each transect or grid at Bent's Old Fort NHS, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
CWOOD	Riparian	Cottonwood bottom	23	3	6/8 - 6/10	6/14 - 6/17	6/16 - 6/18
GRASS	Grassland	Shortgrass prairie	9	3	6/10 - 6/11	6/15	6/16
PDOG	Grassland	Shortgrass prairie	9	3	6/11	6/15	6/16
REST	Grassland	Shortgrass prairie	4	3	6/11	6/15	6/16
UPLAND	Grassland	Shortgrass prairie	16	3	6/8 - 6/11	6/14 - 6/17	6/17 - 6/18

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Brewer's Blackbird (*Euphagus cyanocephalus*) was a newly detected species at Bent's Old Fort NHS in 2012.

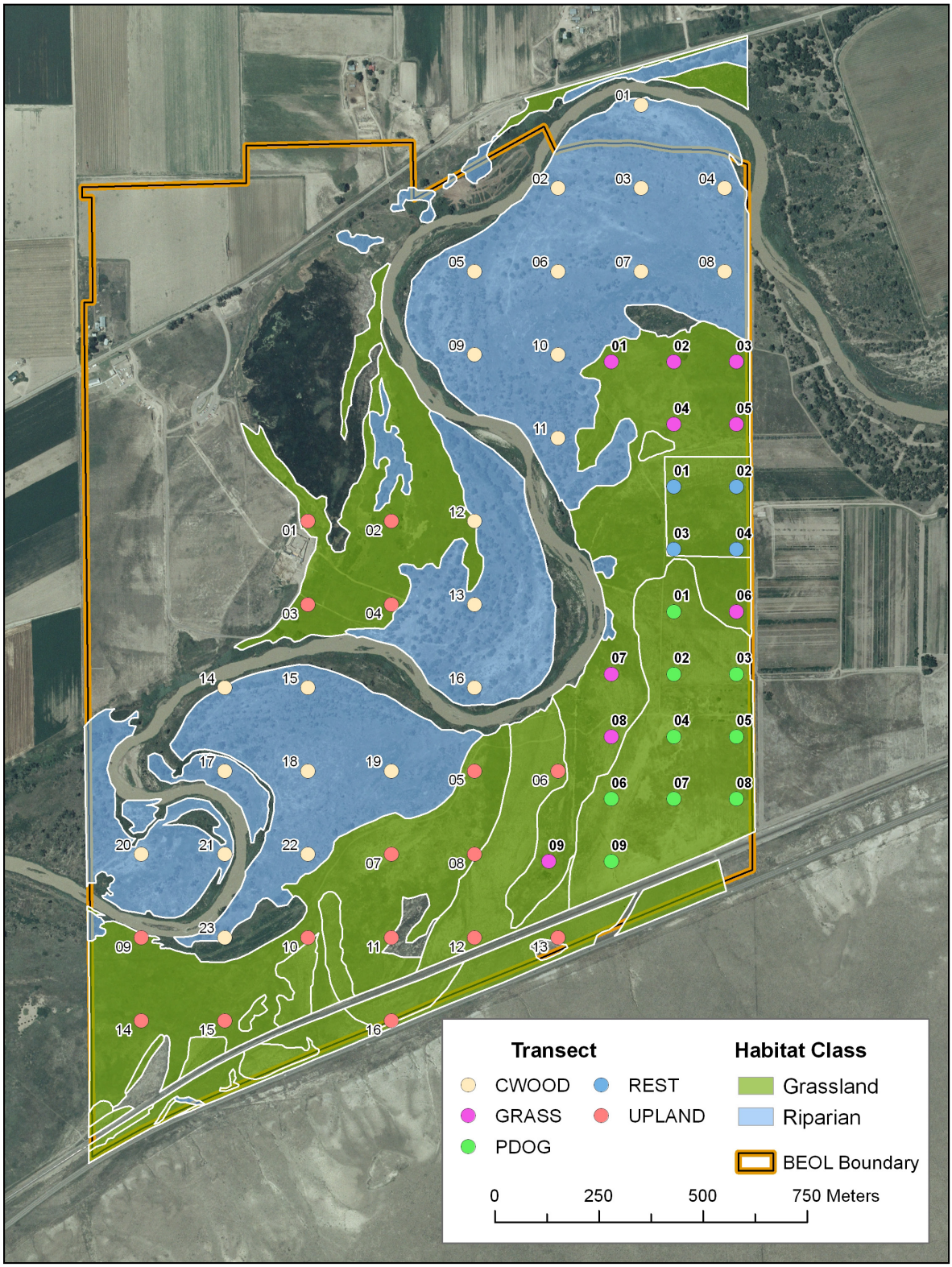

Figure 3.1.1. Point locations targeted for annual sampling at Bent's Old Fort NHS.

Table 3.1.2 Number of birds detected of each species counted in each habitat class, Bent's Old Fort NHS, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Western Meadowlark	367	154	521	23
Mourning Dove	110	157	267	12
Red-winged Blackbird	115	46	161	7
Northern Mockingbird	86	39	125	6
Northern Bobwhite	87	36	123	5
Blue Grosbeak	54	36	90	4
Western Kingbird	64	26	90	4
Yellow-breasted Chat	25	54	79	3
Eastern Kingbird	30	37	67	3
Ring-necked Pheasant	25	23	48	2
Yellow Warbler	10	38	48	2
Cliff Swallow	42	4	46	2
European Starling	21	24	45	2
Barn Swallow	33	6	39	2
Red-headed Woodpecker	11	23	34	1
Killdeer	24	8	32	1
House Wren	5	24	29	1
Bullock's Oriole	12	16	28	1
American Kestrel	9	18	27	1
American Robin	11	15	26	1
Common Nighthawk	15	10	25	1
Common Yellowthroat	10	13	23	1
Yellow-billed Cuckoo	8	14	22	1
Brown-headed Cowbird	9	11	20	1
Brown Thrasher	4	14	18	1
Blue Jay	7	10	17	1
Northern Flicker	7	10	17	1
Warbling Vireo	2	14	16	1
Black-headed Grosbeak	5	9	14	1
Ash-throated Flycatcher	2	11	13	1
House Sparrow	12	--	12	1
Eurasian Collared-Dove	6	6	12	1
Orchard Oriole	2	10	12	1
Mallard	4	7	11	0
Great Horned Owl	2	9	11	0
Downy Woodpecker	2	8	10	0
Common Grackle	6	2	8	0
Brewer's Blackbird	**5**	**3**	**8**	**0**
Great Blue Heron	4	4	8	0
Western Wood-Pewee	--	8	8	0
Indigo Bunting	2	3	5	0

Table 3.1.2. Number of birds detected of each species in each habitat class, Bent's Old Fort NHS, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Chihuahuan Raven	4	--	4	0
Swainson's Hawk	--	4	4	0
Dickcissel	3	--	3	0
Northern Harrier	3	--	3	0
Cassin's Kingbird	2	1	3	0
Lazuli Bunting	2	1	3	0
Mississippi Kite	**2**	**1**	**3**	**0**
Green Heron	1	2	3	0
Rock Pigeon	2	--	2	0
American Goldfinch	1	1	2	0
Canada Goose	**1**	**1**	**2**	**0**
Chipping Sparrow	--	2	2	0
White-eyed Vireo	**--**	**2**	**2**	**0**
American Crow	1	--	1	0
Cassin's Sparrow	1	--	1	0
Great-tailed Grackle	1	--	1	0
Horned Lark	1	--	1	0
Lesser Goldfinch	1	--	1	0
Red-tailed Hawk	1	--	1	0
Say's Phoebe	1	--	1	0
Eastern Bluebird	--	1	1	0
Red-eyed Vireo	**--**	**1**	**1**	**0**
Western Tanager	--	1	1	0
Wild Turkey	--	1	1	0
Willow Flycatcher	--	1	1	0
Screech-Owl (incidental)	**--**	**--**	**--**	**--**
Unidentified Bird	*1*	*2*	*3*	*0*
Unidentified Woodpecker	*1*	*1*	*2*	*0*
Unidentified Sparrow	*1*	--	*1*	*0*
Total	**1,286**	**983**	**2,269**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.2 Capulin Volcano National Monument

3.2.1 2012 sampling

During May of 2012, we sampled two transects/grids at Capulin Volcano NM (Figure 3.2.1). One transect was in the grassland habitat class (shortgrass prairie) and one was in the woodland habitat class (pinyon-juniper). The woodland habitat in which the transect was located was targeted for conversion to grassland prior to the 2010 sampling year, but it is unclear whether the conversion will take place. The pinyon-juniper transect had 17 unique points and the shortgrass prairie transect had 28 unique points (Table 3.2.1). Points were surveyed three times for a total of 135 point visits (the number of unique points multiplied by the number of visits) at the park in 2012.

3.2.2 Results and discussion

During 2012, 1,459 birds of 48 species were counted at Capulin Volcano NM (Table 3.2.2). Spotted Towhee was the most commonly counted species (15%). Also common were Northern Mockingbird (11%), Western Wood-Pewee (8%), Western Meadowlark (7%), Western Kingbird (6%), and Black-headed Grosbeak (6%). Other prominent species included Lark Sparrow (4%), Mourning Dove (4%), Pinyon Jay (4%), and Chipping Sparrow (3%). Two species, Scaled Quail (detected at the steppe transect) and Downy Woodpecker, were previsously reported on 1981 and 1993 checklists for the park; however, they were not officially verified for the park until this year when they were detected during surveys.

Other birds detected during surveys included Hepatic and Western Tanager, Green-tailed and Spotted Towhee, Mountain and Western Bluebird, and two species of wrens– Bewick's and Rock. Common Poorwill was detected for the first time in four years of point count surveys.

Table 3.2.1. Habitat type, number of points, and sampling dates for each transect or grid at Capulin Volcano NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
PJ	Woodland	Pinyon-juniper	17	3	5/16 - 5/20	5/20 - 5/23	5/23 - 5/24
STEPPE	Grassland	Shortgrass prairie	28	3	5/16 - 5/18	5/20 - 5/22	5/22 - 5/24

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Black-headed Grosbeak (*Pheucticus melanocephalus*) was one of the most common birds detected at Capulin Volcano NM in 2012.

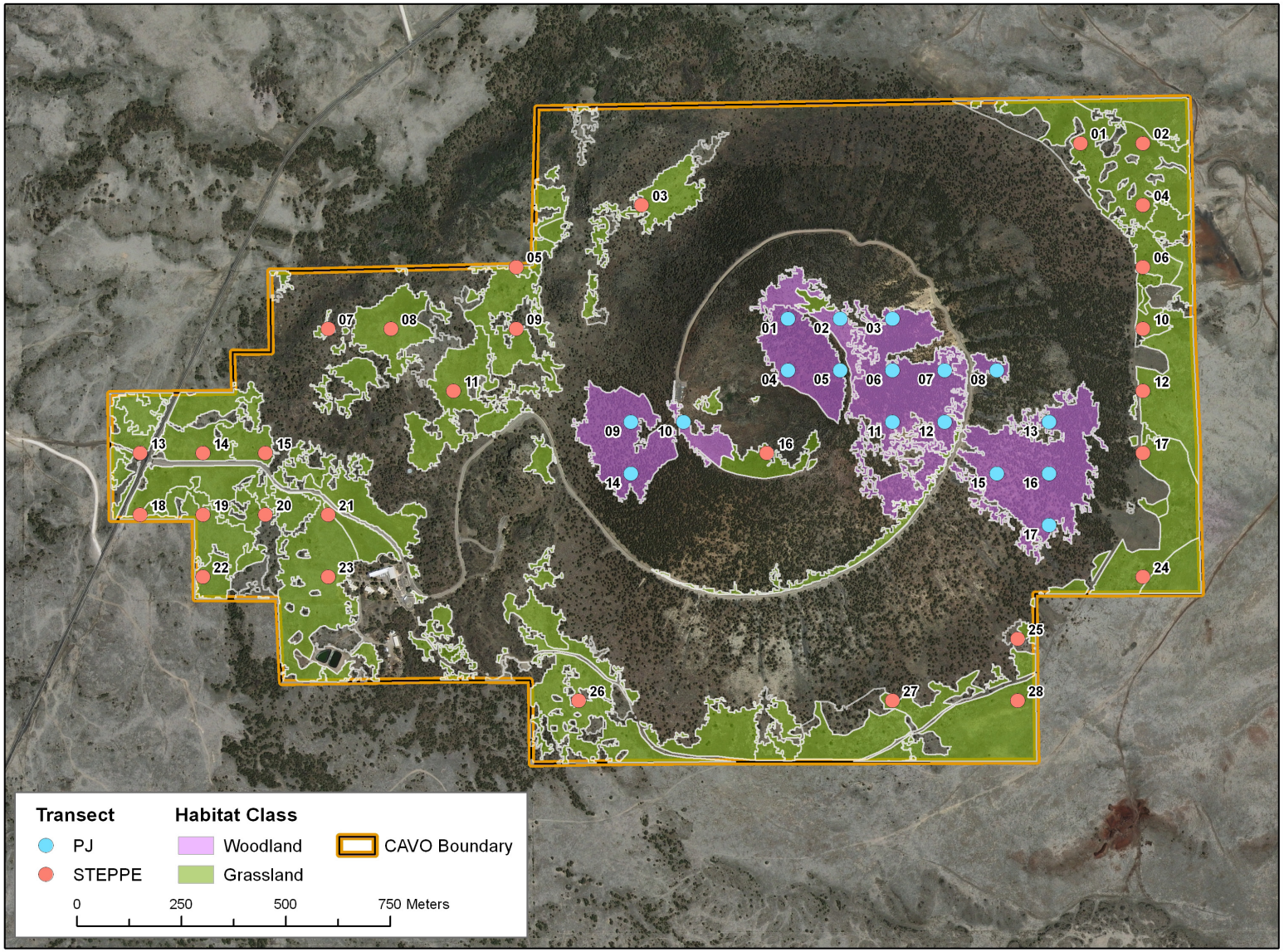

Figure 3.2.1. Point locations targeted for annual sampling at Capulin Volcano NM.

Table 3.2.2. Number of birds detected of each species in each habitat class, Capulin Volcano NM, 2012

Species	Habitat class		# of birds detected	
	Grassland	Woodland	Total	% of total
Spotted Towhee	112	104	216	15
Northern Mockingbird	127	35	162	11
Western Wood-Pewee	63	61	124	8
Western Meadowlark	91	10	101	7
Western Kingbird	62	28	90	6
Black-headed Grosbeak	49	39	88	6
Lark Sparrow	62	2	64	4
Mourning Dove	47	12	59	4
Pinyon Jay	30	22	52	4
Chipping Sparrow	39	12	51	3
Common Raven	31	11	42	3
Brown-headed Cowbird	27	8	35	2
Plumbeous Vireo	16	18	34	2
Western Scrub-Jay	24	9	33	2
Hepatic Tanager	14	18	32	2
Cassin's Kingbird	22	8	30	2
Yellow-rumped Warbler	17	13	30	2
Rock Wren	9	12	21	1
Turkey Vulture	20	--	20	1
Chihuahuan Raven	16	3	19	1
Cassin's Sparrow	18	--	18	1
Bewick's Wren	3	11	14	1
Western Bluebird	9	3	12	1
Bullock's Oriole	7	3	10	1
American Robin	5	5	10	1
Mountain Chickadee	4	6	10	1
Barn Swallow	9	--	9	1
Say's Phoebe	7	--	7	0
Red-tailed Hawk	5	1	6	0
Violet-green Swallow	3	3	6	0
Eurasian Collared-Dove	2	4	6	0
Vesper Sparrow	6	--	6	0
Western Tanager	2	3	5	0
Horned Lark	4	--	4	0
Green-tailed Towhee	1	3	4	0
Ash-throated Flycatcher	--	4	4	0
Common Poorwill	3	--	3	0
Broad-tailed Hummingbird	2	1	3	0
Scaled Quail	**2**	**1**	**3**	**0**
Black-capped Chickadee	1	2	3	0
Blue-gray Gnatcatcher	1	1	2	0

Table 3.2.2. Number of birds detected of each species in each habitat class, Capulin Volcano NM, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Woodland	Total	% of total
Wild Turkey	1	1	2	0
Cooper's Hawk	1	--	1	0
Great Horned Owl	1	--	1	0
Mountain Bluebird	1	--	1	0
Northern Rough-winged Swallow	1	--	1	0
Downy Woodpecker	**--**	**1**	**1**	**0**
Virginia's Warbler	--	1	1	0
Unidentified Corvid	*1*	--	*1*	*0*
Unidentified Accipiter	--	*1*	*1*	*0*
Unidentified Hummingbird	--	*1*	*1*	*0*
Total	**978**	**481**	**1459**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.3 Chickasaw National Recreation Area

3.3.1 2012 sampling

During April and May of 2012, we sampled four transects/grids at Chickasaw NRA (Figures 3.3.1-1, -2, -3). All transects were in the grassland habitat class (upland grassland) with 13 to 19 unique points each (Table 3.3.1). Each point was surveyed three times for a total of 204 point visits (the number of unique points multiplied by the number of visits) at Chickasaw NRA.

3.3.2 Results and discussion

During 2012, 1,967 birds of 65 species were counted at Chickasaw NRA; the park ranked among the top in species richness in the SOPN in 2012 (Table 3-2). Northern Cardinal was the most commonly counted of the breeding birds in the park (18%) (Table 3.3.2). Other common species, in order of relative abundance, were Tufted Titmouse (10%), Field Sparrow (9%), Painted Bunting (8%), American Crow (7%), and Carolina Wren (4%).

Several other species were prominent, most notably Brown-headed Cowbird, Great Crested Flycatcher, Indigo Bunting, and Turkey Vulture. Six species of warblers, five species of woodpeckers, and four species of vireos— White-eyed, Warbling, Red-eyed, and Yellow-throated— were detected during surveys. Two new species were detected at the park in 2012— House Finch and migrant Wilson's Warbler. Though not a new species for the park, Greater Roadrunner had not been detected in point count surveys since they were initiated in 2009.

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A number of Summer Tanagers (*Piranga rubra*) were detected at Chickasaw NRA in 2012.

Table 3.3.1. Habitat type, number of points, and sampling dates for each transect or grid at Chickasaw NRA, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
5LAKES	Grassland	Upland grassland	19	3	4/29	5/3	5/8 - 5/10
NHUNT	Grassland	Upland grassland	13	3	4/30	5/4 - 5/5	5/11
WHUNT_E	Grassland	Upland grassland	18	3	5/2	5/6	5/13
WHUNT_W	Grassland	Upland grassland	18	3	4/30 - 5/2	5/4 - 5/5	5/10 - 5/14

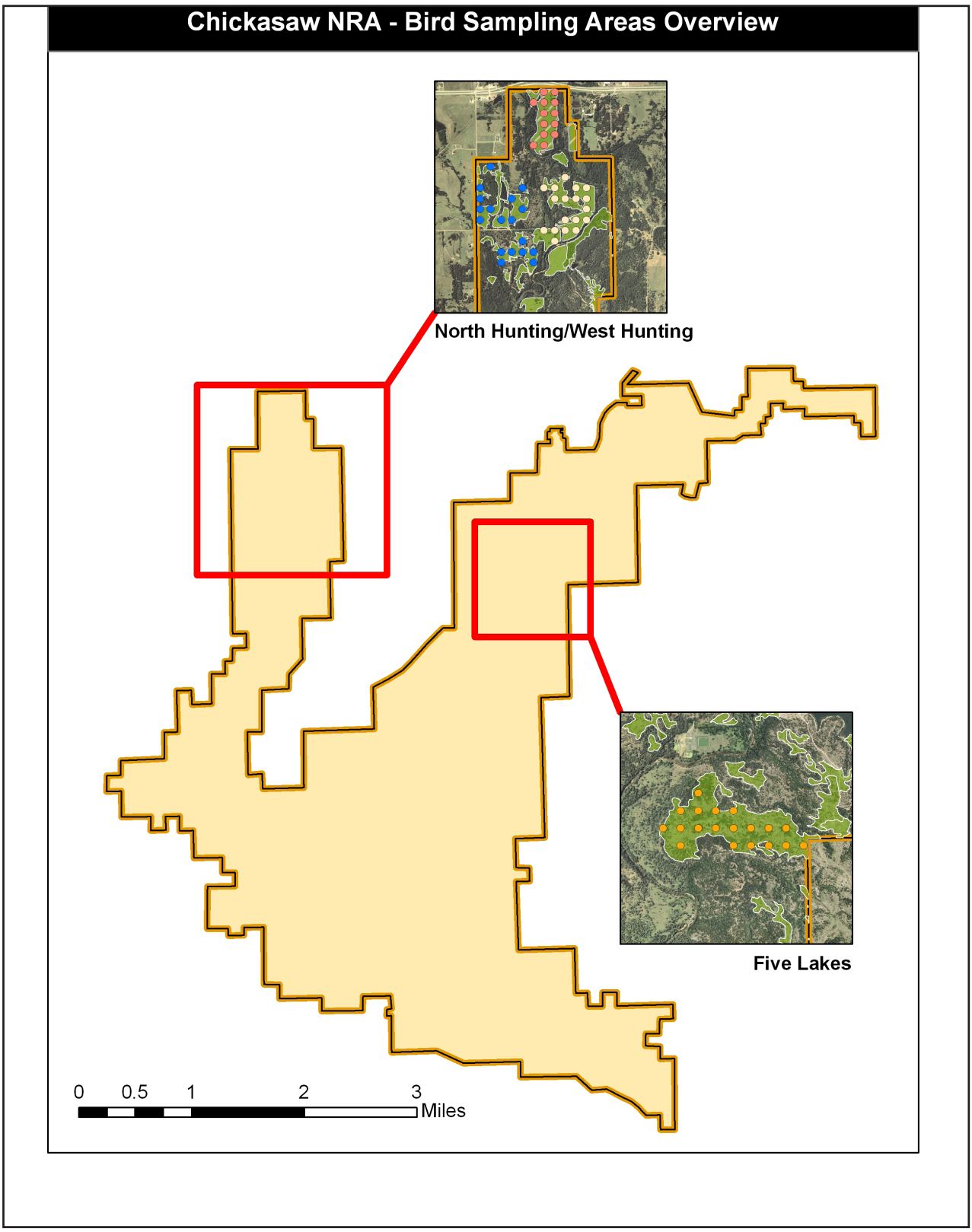

Figure 3.3.1-1. Bird sampling areas at Chickasaw NRA.

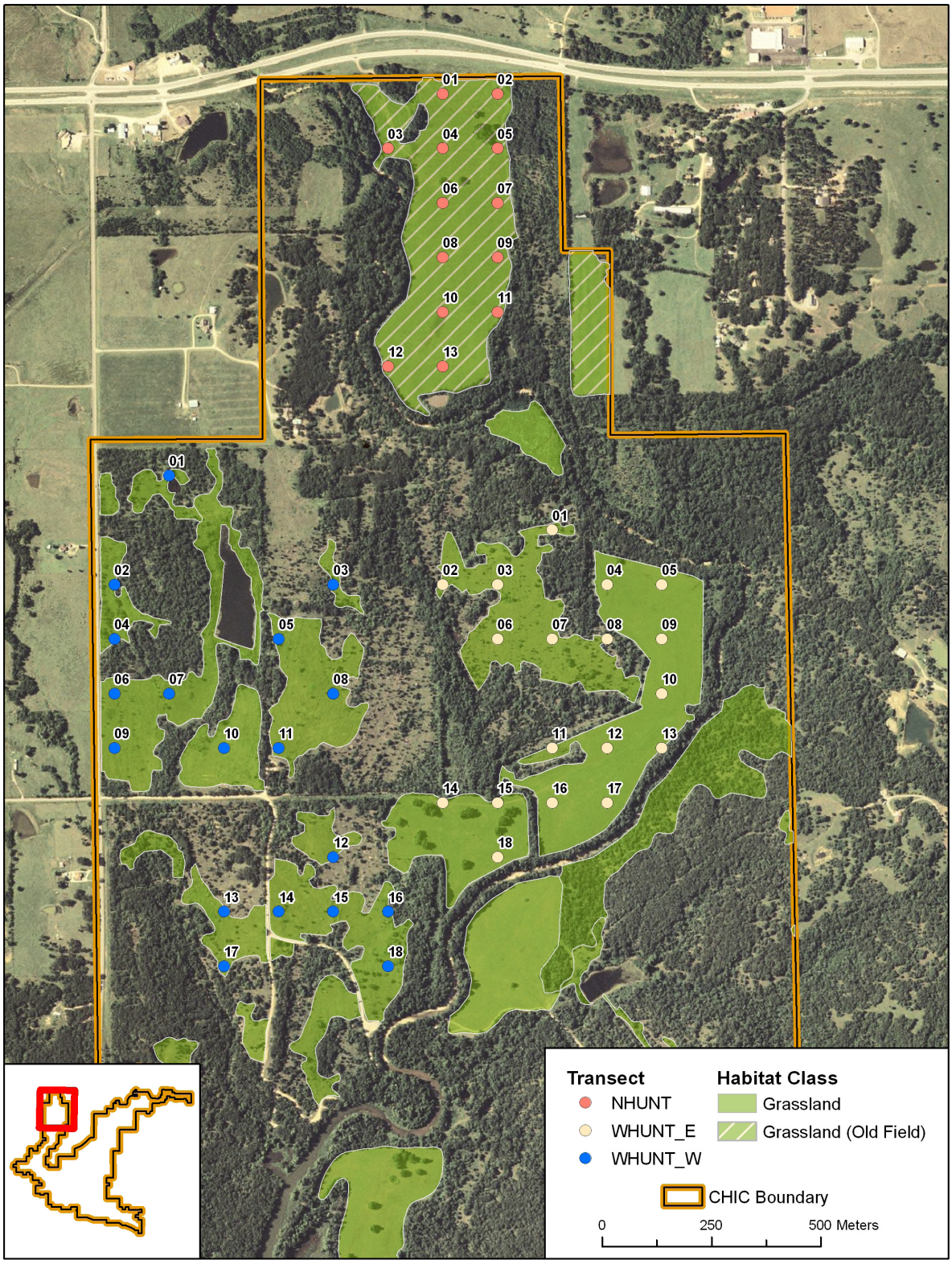

Figure 3.3.1-2. Point locations targeted for annual sampling at Chickasaw NRA, North Hunting/West Hunting.

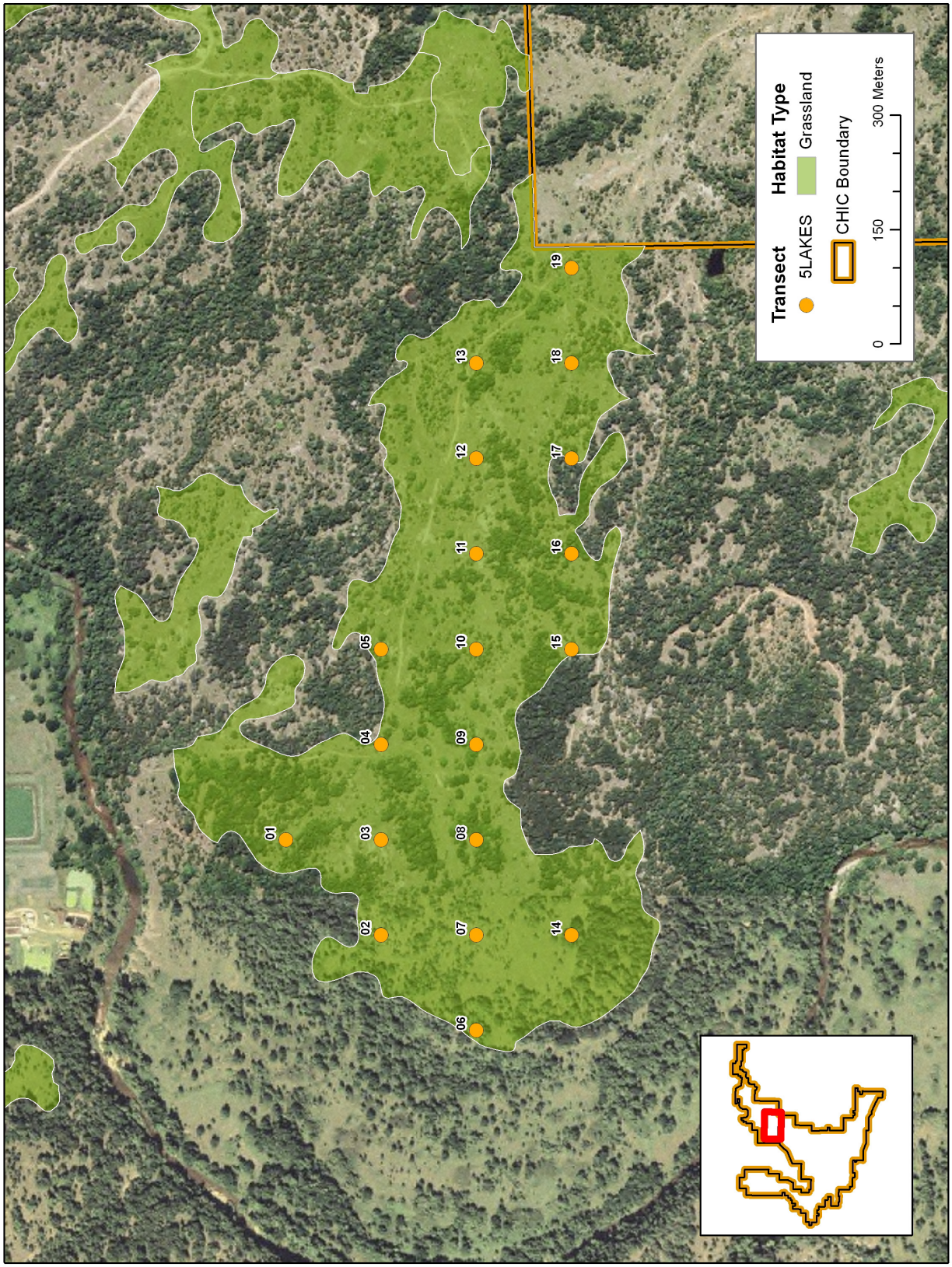

Figure 3.3.1-3. Point locations targeted for annual sampling at Chickasaw NRA, Five Lakes.

Table 3.3.2. Number of birds detected of each species in each habitat class, Chickasaw NRA, 2012

Species	# of birds detected	
	Total (grassland habitat)	% of total
Northern Cardinal	349	18
Tufted Titmouse	199	10
Field Sparrow	179	9
Painted Bunting	154	8
American Crow	139	7
Carolina Wren	75	4
Turkey Vulture	59	3
Indigo Bunting	57	3
Great Crested Flycatcher	55	3
Brown-headed Cowbird	46	2
Red-bellied Woodpecker	42	2
Yellow-throated Vireo	42	2
Blue Jay	41	2
White-eyed Vireo	41	2
Dickcissel	38	2
Carolina Chickadee	36	2
Eastern Bluebird	33	2
Summer Tanager	30	2
Common Grackle	29	1
Yellow-billed Cuckoo	18	1
American Goldfinch	17	1
Blue-gray Gnatcatcher	17	1
Red-eyed Vireo	17	1
Northern Flicker	16	1
Lincoln's Sparrow	11	1
Northern Mockingbird	11	1
Scissor-tailed Flycatcher	11	1
Swainson's Thrush	10	1
Cliff Swallow	9	0
Bewick's Wren	7	0
Canada Goose	7	0
Purple Martin	7	0
Northern Bobwhite	6	0
Eastern Meadowlark	5	0
Red-shouldered Hawk	5	0
Pileated Woodpecker	4	0
Eastern Kingbird	3	0
Eastern Phoebe	3	0
Great Blue Heron	3	0
Great Egret	3	0
House Finch	**3**	**0**
Mississippi Kite	3	0
Wilson's Warbler	**3**	**0**
Yellow Warbler	3	0
Black Vulture	2	0
Black-and-white Warbler	2	0
Black-crowned Night-Heron	2	0
Downy Woodpecker	2	0
Gray Catbird	2	0
Hairy Woodpecker	2	0
Least Flycatcher	2	0
Mourning Dove	2	0
Northern Parula	2	0
Olive-sided Flycatcher	2	0
Rock Pigeon	2	0
Yellow-throated Warbler	2	0
American Robin	1	0
Broad-winged Hawk	1	0
Chipping Sparrow	1	0
Greater Roadrunner	1	0
Red-tailed Hawk	1	0
Ruby-throated Hummingbird	1	0
Rufous-crowned Sparrow	1	0
Warbling Vireo	1	0
Yellow-breasted Chat	1	0
Unidentified Bird	*69*	*4*
Unidentified Woodpecker	*7*	*0*
Unidentified Sparrow	*6*	*0*
Unidentified Hawk	*2*	*0*
Unidentified Swallow	*2*	*0*
Unidentified Flycatcher	*1*	*0*
Unidentified Vireo	*1*	*0*
Total	1967	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.4 Fort Larned National Historic Site

3.4.1 2012 sampling

During June of 2012, we sampled three transects/grids at Fort Larned NHS (Figure 3.4.1). Two transects were in grassland habitat (upland grassland) with 11 and 14 unique points each. One transect was in the riparian habitat class (riparian woodland) with 18 unique points (Table 3.4.1). Each point was surveyed three times for a total of 129 point visits (the number of unique points multiplied by the number of visits) at Fort Larned NHS.

3.4.2 Results and discussion

During 2012, 1,334 birds of 45 species were counted at Fort Larned NHS (Table 3.4.2). Seven of these are national or regional species of concern. The Red-winged Blackbird was the most commonly counted species (11%). House Wren (9%), Eastern Meadowlark (8%), American Robin (7%), Dickcissel (7%), and Baltimore Oriole (7%) were also common. Four new species for the park were detected in 2012— Eastern Phoebe, Hairy Woodpecker, a singing Carolina Wren, and a singing Summer Tanager.

Other prominent species included Mourning Dove, Barn Swallow, Blue Jay, Gray Catbird, Indigo Bunting, Warbling Vireo, Ring-necked Pheasant, and Western Meadowlark. Compared to 2011, the number of detections was notably higher for American Robin, Blue Jay, Dickcissel, Eastern Meadowlark, Indigo Bunting, Red-winged Blackbird, and Warbling Vireo. Although not new species for the park, Common Nighthawk, Common Yellowthroat, and Bell's Vireo were detected for the first time in four years of point count surveys.

DAVE MENKE, USFWS

Common Yellowthroat (*Geothlypis trichas*) was detected during surveys for the first time in 2012, but is not a new species for the NHS.

Table 3.4.1. Habitat type, number of points, and sampling dates for each transect or grid at Fort Larned NHS, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
BU2	Grassland	Upland grassland	11	3	6/8	6/11	6/13 - 6/14
BU8	Grassland	Upland grassland	14	3	6/7	6/9 - 6/10	6/12
RIP	Riparian	Riparian woodland	18	3	6/7 - 6/9	6/10 - 6/11	6/12 - 6/13

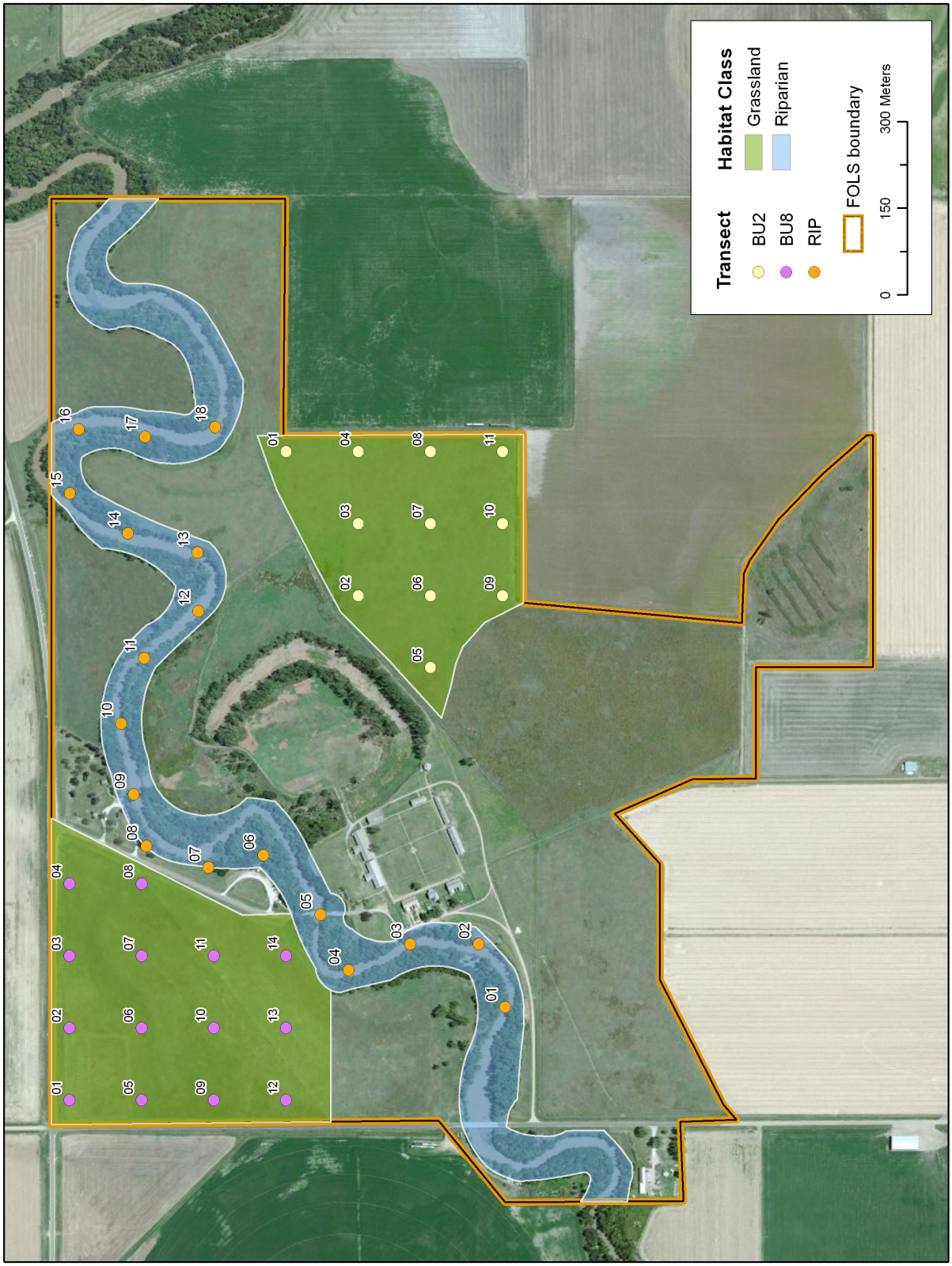

Figure 3.4.1. Point locations targeted for annual sampling at Fort Larned NHS.

Table 3.4.2. Number of birds detected of each species in each habitat class, Fort Larned NHS, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Red-winged Blackbird	123	26	149	11
House Wren	36	90	126	9
Eastern Meadowlark	109	1	110	8
American Robin	56	39	95	7
Dickcissel	88	4	92	7
Baltimore Oriole	21	68	89	7
Mourning Dove	16	53	69	5
Barn Swallow	33	14	47	4
Blue Jay	19	30	49	4
Indigo Bunting	4	39	43	3
Warbling Vireo	16	23	39	3
Gray Catbird	2	33	35	3
Western Meadowlark	35	--	35	3
Ring-necked Pheasant	32	2	34	3
Orchard Oriole	9	24	33	2
Brown-headed Cowbird	12	18	30	2
Western Kingbird	19	5	24	2
Northern Cardinal	9	14	23	2
Brown Thrasher	9	10	19	1
Eastern Kingbird	3	17	20	1
White-breasted Nuthatch	1	15	16	1
Common Grackle	8	4	12	1
Common Nighthawk	9	3	12	1
Yellow Warbler	1	11	12	1
Great Crested Flycatcher	4	6	10	1
Wild Turkey	9	1	10	1
Northern Flicker	7	1	8	1
Downy Woodpecker	1	5	6	0
Hairy Woodpecker	**--**	**6**	**6**	**0**
Horned Lark [1]	6 [1]	--	6 [1]	0
Eastern Phoebe	**--**	**5**	**5**	**0**
Bell's Vireo	--	4	4	0
Grasshopper Sparrow	4	--	4	0
Red-tailed Hawk	2	2	4	0
Killdeer	3	--	3	0
Common Yellowthroat	--	2	2	0
Great Blue Heron	--	2	2	0
Turkey Vulture	1	1	2	0
Yellow-billed Cuckoo	--	2	2	0
American Goldfinch	1	--	1	0
Carolina Wren	**--**	**1**	**1**	**0**

Table 3.4.2. Number of birds detected of each species in each habitat class, Fort Larned NHS, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Eastern Bluebird	1	--	1	0
Red-headed Woodpecker	--	1	1	0
Rose-breasted Grosbeak	1	--	1	0
Summer Tanager	**--**	**1**	**1**	**0**
Unidentified Meadowlark	*11*	--	*11*	*1*
Unidentified Bird	*3*	*5*	*8*	*1*
Unidentified Woodpecker	*4*	*3*	*7*	*1*
Unidentified Sparrow	*5*	--	*5*	*0*
Unidentified Swallow	--	*4*	*4*	*0*
Unidentified Oriole	--	*3*	*3*	*0*
Unidentified Duck	*2*	--	*2*	*0*
Unidentified Hawk	*1*	--	*1*	*0*
Total	**736**	**598**	**1,334**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

[1] Horned Larks were detected during point counts, but they were just outside of park boundaries on private land.

3.5 Fort Union National Monument

3.5.1 2012 sampling

During May of 2012, we sampled three transects or grids at Fort Union NM (Figure 3.5.1). Each transect was in grassland habitat (shortgrass prairie) with 20 unique points each (Table 3.5.1). Each point was surveyed three times for a total of 180 point visits (the number of unique points multiplied by the number of visits) at Fort Union NM.

3.5.2 Results and discussion

During 2012, 1,088 birds of 35 species were counted at Fort Union NM (Table 3.5.2). Western Meadowlark was once again the most abundant species, by far, occurring throughout the park; it accounted for 54% of birds counted. Other prominent species included: Mourning Dove (10%), Vesper Sparrow (5%) primarily in the grassland habitat at the old fort transect, Cassins's Kingbird (4%), Pinyon Jay (3%), Red-winged Blackbird (3%) along Wolf Creek, Common Raven (2%), Barn (2%) and Cliff Swallow (1%) in and around the staff residence area, and Northern Mockingbird (3%) in the pine-juniper immediately adjacent to the first fort boundary, the riparian area along Wolf Creek, and at the visitor's center and staff residence area. Six species, including Ash-throated Flycatcher, Black-headed Grosbeak, Cassin's Kingbird, Pinyon Jay, Spotted Towhee, and Western Scrub Jay were found on or just outside of the first fort park boundary in pine-juniper habitat. There were two detections of Ferruginous Hawk hunting over the adobes west of the visitor's center. Chipping Sparrow and Great-tailed Grackle were detected for the first time in a point count survey on the park. Golden Eagle and a male Lark Bunting (incidentally detected after a count) represent new species for the park. Both were detected northeast of the staff residence area near or on the park boundary fence.

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Vesper Sparrow (*Pooecetes gramineus*) was the third most commonly counted species at Fort Union NM in 2012.

Table 3.5.1. Habitat type, number of points, and sampling dates for each transect or grid at Fort Union NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
OLD FORT	Grassland	Shortgrass prairie	20	3	5/25	5/29	5/30
SHORT_E	Grassland	Shortgrass prairie	20	3	5/18	5/20	5/22
SHORT_W	Grassland	Shortgrass prairie	20	3	5/19	5/21	5/23

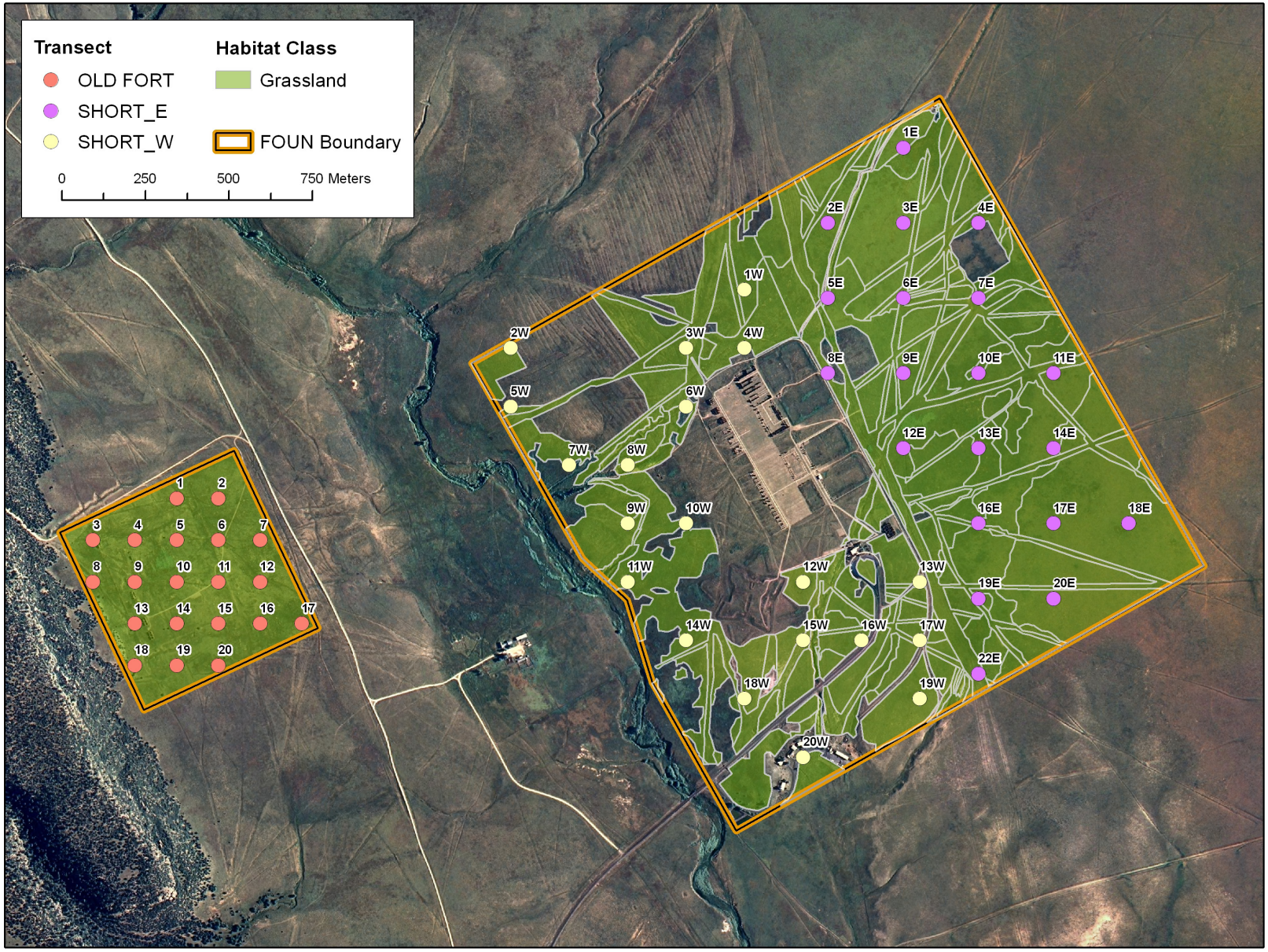

Figure 3.5.1. Point locations targeted for annual sampling at Fort Union NM.

Table 3.5.2. Number of birds detected of each species in each habitat class, Fort Union NM, 2012

Species	# of birds detected	
	Total (grassland habitat)	% of total
Western Meadowlark	585	54
Mourning Dove	110	10
Vesper Sparrow	52	5
Cassin's Kingbird	41	4
Red-winged Blackbird	36	3
Northern Mockingbird	29	3
Pinyon Jay	28	3
Common Raven	25	2
Canada Goose	24	2
Barn Swallow	23	2
Say's Phoebe	20	2
Western Kingbird	12	1
Horned Lark	9	1
Spotted Towhee	9	1
Black-billed Magpie	8	1
Common Nighthawk	8	1
Mountain Bluebird	8	1
American Robin	7	1
Lark Sparrow	7	1
Cliff Swallow	6	1
Rock Wren	5	0
American Kestrel	4	0
Black-headed Grosbeak	3	0
Blue Grosbeak	3	0
Great-tailed Grackle	3	0
Brown-headed Cowbird	2	0
Ferruginous Hawk	2	0
Lesser Goldfinch	2	0
Western Scrub-Jay	2	0
Ash-throated Flycatcher	1	0
Bullock's Oriole	1	0
Chipping Sparrow	1	0
Eurasian Collared-Dove	1	0
Golden Eagle	**1**	**0**
Turkey Vulture	1	0
Lark Bunting (incidental)	**--**	**--**
Unidentified Bird	*5*	*0*
Unidentified Sparrow	*2*	*0*
Unidentified Buteo	*1*	*0*
Unidentified Swallow	*1*	*0*
Total	**1,088**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.6 Lake Meredith National Recreation Area

3.6.1 2012 sampling

During April and May of 2012, we sampled four transects/grids at Lake Meredith NRA (Figures 3.6.1-1, -2, -3, -4). Two transects were located in grassland habitat (upland grassland) with 19 unique points each, and two were located in riparian habitat (bottomland grassland and cottonwood bottom) with 18 or 19 unique points each (Table 3.6.1). Each point was surveyed three times for a total of 225 point visits (the number of unique points multiplied by the number of visits) at Lake Meredith NRA.

3.6.2 Results and discussion

During 2012, 1,558 birds of 65 species were counted at Lake Meredith NRA (Table 3.6.2). The park's diverse habitat, ranging from upland grassland to riparian canyon land and bottomland with a mix of grassland/savannah/wetland, attracts a high diversity of bird species. Of the 65 species detected at the NRA, Red-winged Blackbird was the most commonly counted (10%), with most of the detections at the bottomland transect. Other common birds included Western Meadowlark (9%), Mourning Dove (8%), Cassin's Sparrow (8%), Blue Grosbeak (4%), and Rufous-crowned Sparrow (3%). The count of Western Meadowlark increased from 17 in 2011 to 133 in 2012, possibly due to improved grassland habitat at the upland transect. For the third consecutive year, a pair of Cooper's Hawks and a nest were detected at or near the same site on Turkey Creek.

The upland transect produced two of three new park species detected in 2012– Chihuahuan Raven and migrant Franklin's Gull. Detections of Chihuahuan Ravens included an incidental observation at the upland transect (#s not included in Table 3.6.2) and one raven during a point count survey at the honey-mesquite transect. A large flock of migrant Franklin's Gull was detected on Lake Meredith. The other new species for the park was migrant Ruby-crowned Kinglet (two) at the bottomland transect. Although not new for the park, ten species were detected for the first time during point count surveys. These species included: American Coot on Lake Meredith; Eastern Bluebird, Northern Shoveler and White-faced Ibis at the bottomland transect; Downy Woodpecker, Great-tailed Grackle (just outside of the park boundary), and Wild Turkey at the bottomland and honey mesquite transects; Burrowing Owl (in the black-tailed prairie dog town) and Scaled Quail, both at the upland transect; and Green Heron at the bottomland transect (not included in Table 3.6.2 because it was incidentally observed after a survey).

Table 3.6.1. Habitat type, number of points, and sampling dates for each transect or grid at Lake Meredith NRA, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
BOTTOM	Riparian	Bottomland grassland	18	3	5/12	5/15	5/16
CWOOD	Riparian	Cottonwood bottom	19	3	5/4	5/5	5/9
HONEY	Grassland	Upland grassland	19	3	4/29	5/1	5/7
UPLAND	Grassland	Upland grassland	19	3	4/30	5/2 to 5/8	5/8 - 5/10

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Nesting Cooper's Hawks (*Accipiter cooperii*) were detected during surveys at the NRA for the third consecutive year.

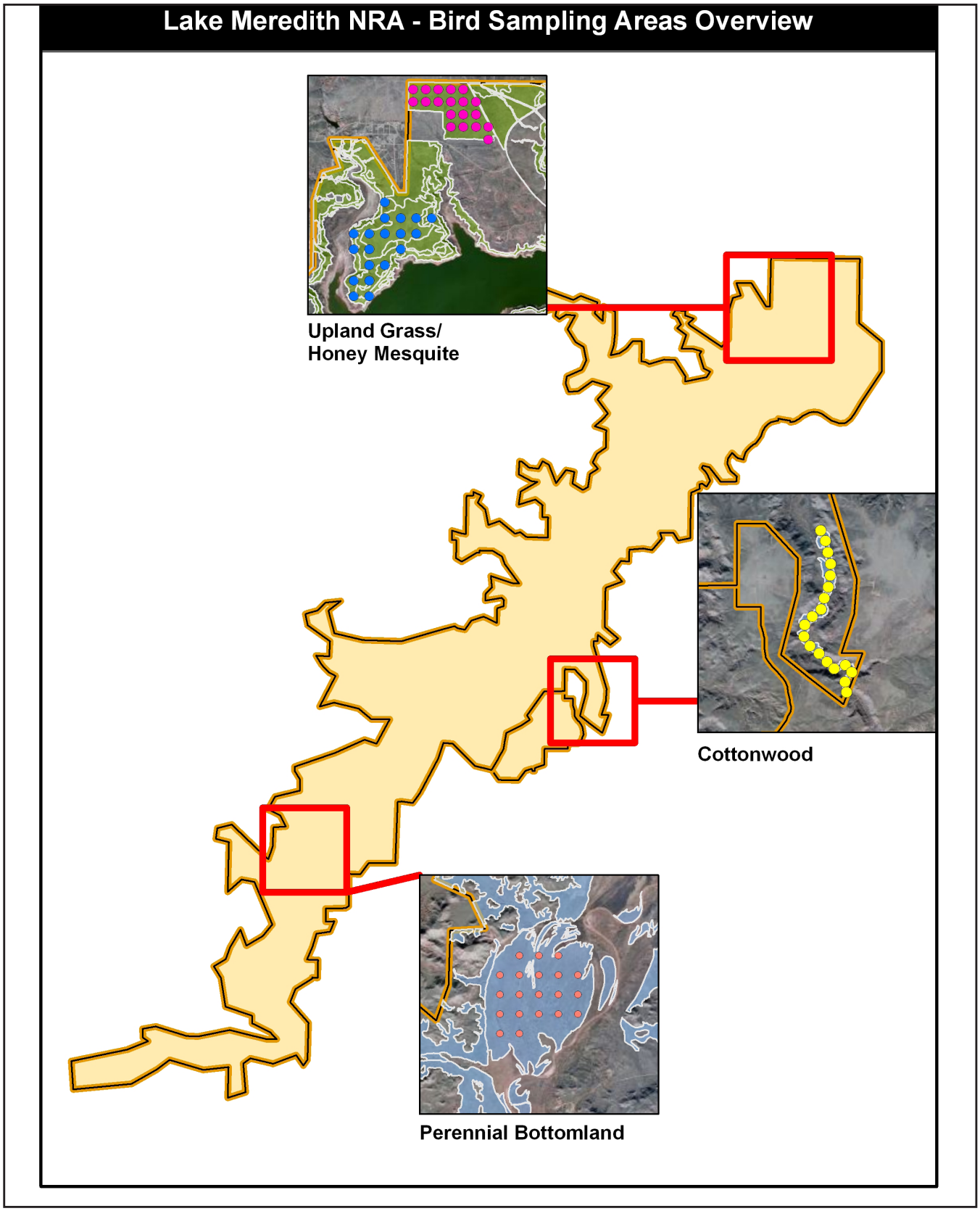

Figure 3.6.1-1. Bird sampling areas at Lake Meredith NRA.

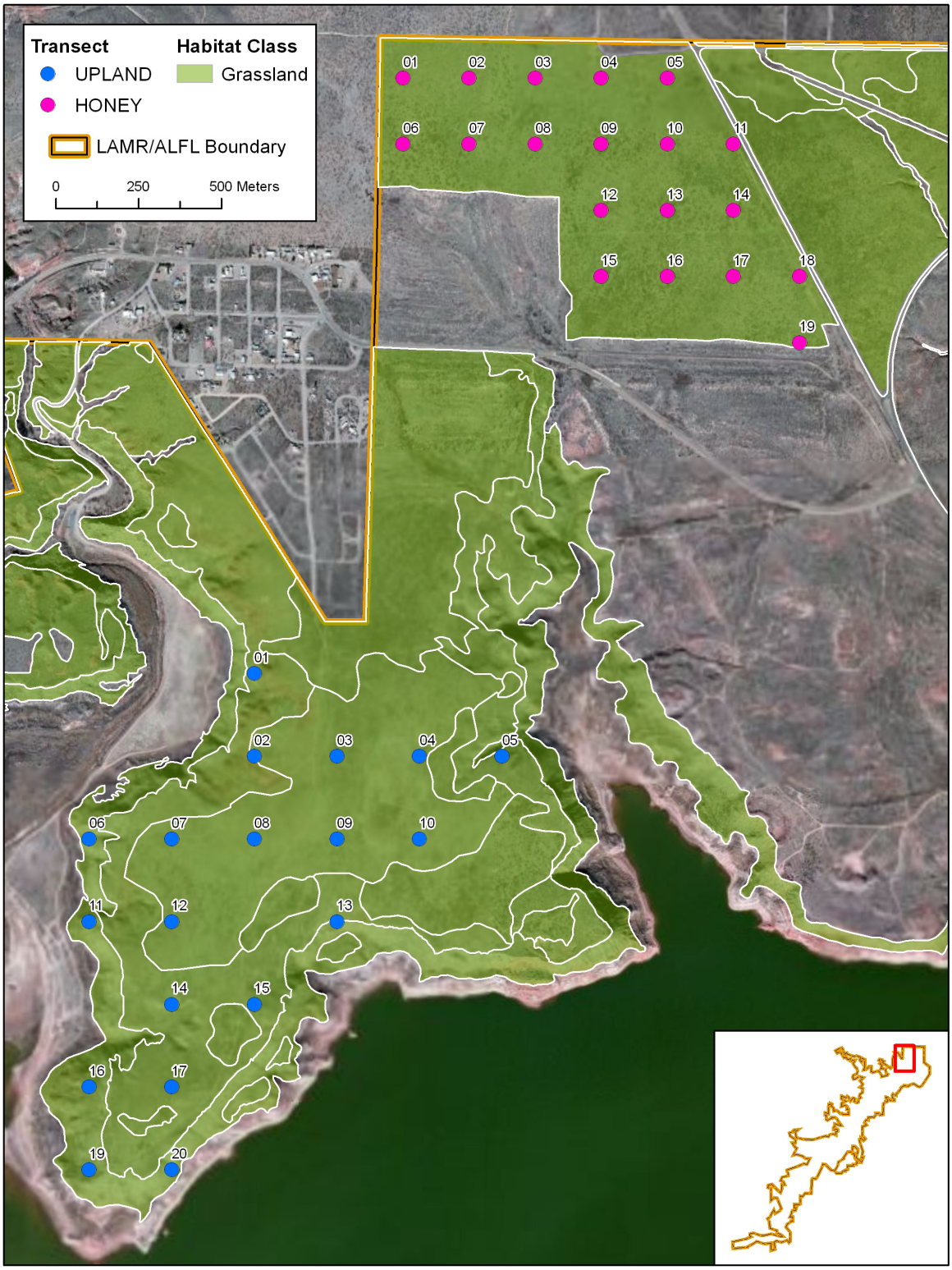

Figure 3.6.1-2. Point locations targeted for annual sampling at Lake Meredith NRA, Upland Grass/Honey Mesquite.

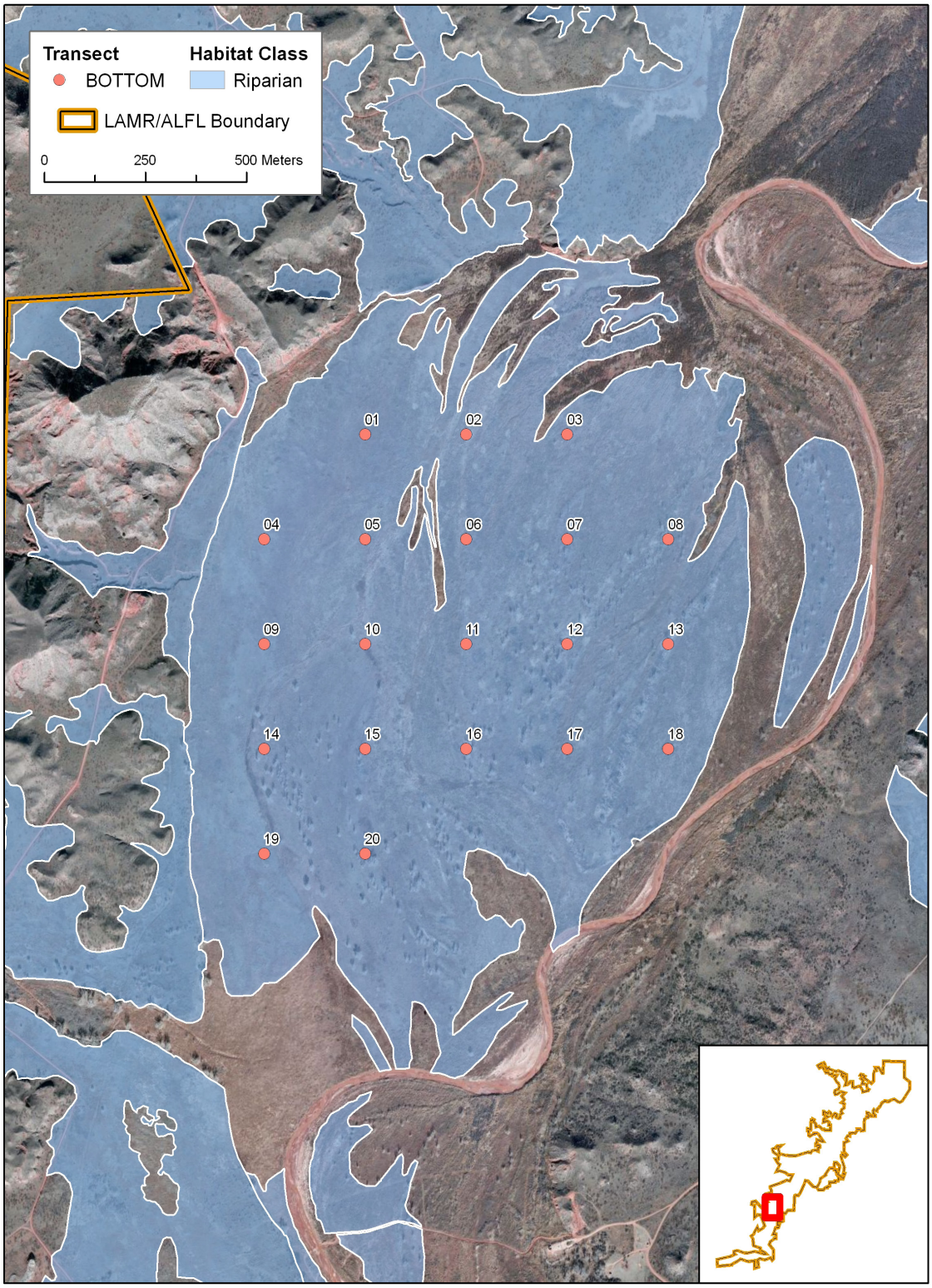

Figure 3.6.1-3. Point locations targeted for annual sampling at Lake Meredith NRA, Pernnial Bottomland.

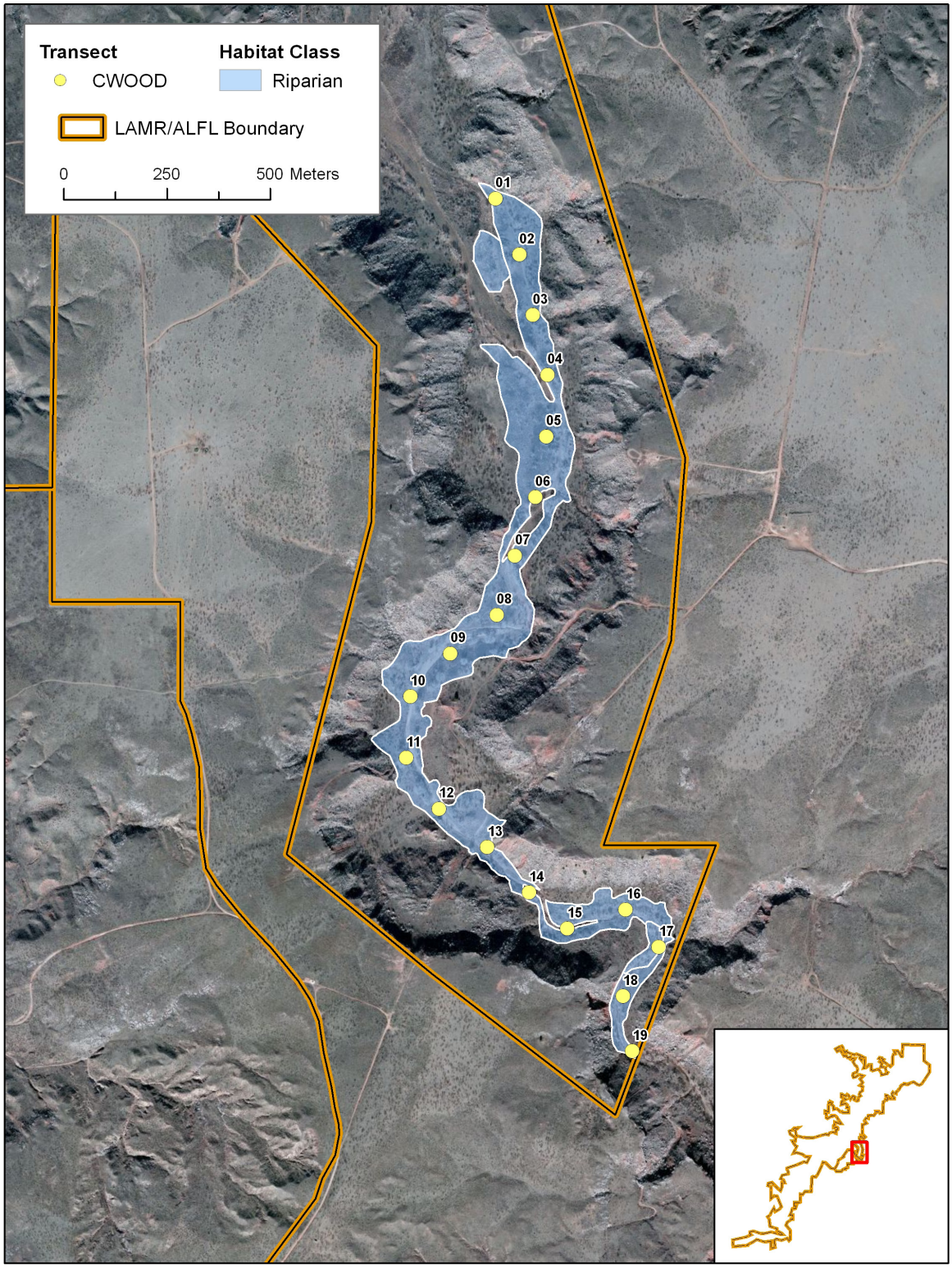

Figure 3.6.1-4. Point locations targeted for annual sampling at Lake Meredith NRA, Cottonwood.

Table 3.6.2. Number of birds detected of each species in each habitat class, Lake Meredith NRA, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Red-winged Blackbird	41	110	151	10
Western Meadowlark	130	3	133	9
Mourning Dove	29	102	131	8
Cassin's Sparrow	119	--	119	8
Franklin's Gull	**56**	**--**	**56**	**4**
Blue Grosbeak	13	42	55	4
Rufous-crowned Sparrow	19	35	54	3
Northern Cardinal	4	46	50	3
Northern Mockingbird	19	30	49	3
Bewick's Wren	2	44	46	3
Lark Bunting	48	--	48	3
Northern Bobwhite	41	2	43	3
Western Kingbird	10	27	37	2
Eastern Meadowlark	--	36	36	2
American Coot	33	--	33	2
Common Grackle	17	16	33	2
Common Yellowthroat	--	32	32	2
Painted Bunting	6	21	27	2
Bullock's Oriole	3	23	26	2
Red-headed Woodpecker	1	22	23	1
Mississippi Kite	--	21	21	1
Rock Wren	10	11	21	1
Scissor-tailed Flycatcher	1	19	20	1
Ash-throated Flycatcher	2	17	19	1
Orchard Oriole	--	19	19	1
Wild Turkey	5	14	19	1
Lark Sparrow	16	1	17	1
Field Sparrow	1	13	14	1
Red-bellied Woodpecker	1	13	14	1
Brown-headed Cowbird	--	11	11	1
Ring-necked Pheasant	--	9	9	1
Turkey Vulture	7	2	9	1
Mallard	2	6	8	1
Great Horned Owl	2	5	7	0
American Crow	1	5	6	0
Dickcissel	--	6	6	0
Northern Flicker	--	6	6	0
American Kestrel	3	2	5	0
Cooper's Hawk	--	5	5	0
Eurasian Collared-Dove	5	--	5	0
Indigo Bunting	--	5	5	0

Table 3.6.2. Number of birds detected of each species in each habitat class, Lake Meredith NRA, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Chipping Sparrow	1	3	4	0
Eastern Kingbird	--	4	4	0
Ladder-backed Woodpecker	--	4	4	0
Red-tailed Hawk	--	4	4	0
Barn Swallow	3	--	3	0
Blue Jay	1	2	3	0
Burrowing Owl	3	--	3	0
Canyon Wren	--	3	3	0
Downy Woodpecker	--	3	3	0
Great-tailed Grackle [1]	3 [1]	--	3 [1]	0
White-faced Ibis	--	3	3	0
Northern Shoveler	--	2	2	0
Ruby-crowned Kinglet	**--**	**2**	**2**	**0**
Black-throated Sparrow	--	1	1	0
Chihuahuan Raven	**1**	**--**	**1**	**0**
Cliff Swallow	1	--	1	0
Common Nighthawk	--	1	1	0
Eastern Bluebird	--	1	1	0
Great Blue Heron	1	--	1	0
Killdeer	--	1	1	0
Loggerhead Shrike	1	--	1	0
Scaled Quail	1	--	1	0
Summer Tanager	--	1	1	0
Western Wood-Pewee	--	1	1	0
Unidentified Bird	*59*	*4*	*63*	*4*
Unidentified Woodpecker	*--*	*8*	*8*	*1*
Unidentified Sparrow	*4*	*--*	*4*	*0*
Unidentified Duck	*--*	*1*	*1*	*0*
Unidentified Buteo	*1*	*1*	*2*	*0*
Total	**727**	**831**	**1,558**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

[1] Great-tailed Grackles were detected during point counts, but they were just outside of park boundaries on private land.

3.7 Lyndon B. Johnson National Historical Park

3.7.1 2012 sampling

During April of 2012, we sampled two transects or grids at Lyndon B. Johnson NHP (Figure 3.7.1-1, -2, -3). One transect was in riparian habitat (bottomland grassland) with 17 unique points. The other transect was in grassland (upland grassland) habitat with six unique points (Table 3.7.1). Each point was surveyed three times for a total of 69 point visits (the number of unique points multiplied by the number of visits) at the park.

3.7.2 Results and discussion

During 2012, 632 birds of 38 species were counted at Lyndon B. Johnson NHP (Table 3.7.2). Northern Cardinal was the most commonly counted species (17%), with Black-crested Titmouse (8%) and Cliff Swallow (7%) the next most common. There was one new species recorded at the park in 2012, Chihuahuan Raven.

Other prominent species include Summer Tanager, Scissor-tailed Flycatcher, Ladder-backed Woodpecker, and Orchard Oriole at the riparian ranch transect, Northern Mockingbird at the grassland restoration transect, and Carolina Wren and Mourning Dove at both transects. Field Sparrow was detected at the grassland restoration transect for the second consecutive year. The grassland restoration transect produced five species not detected in point counts since they were initiated in 2009, including Grasshopper Sparrow, Eastern Kingbird, a migrant Vesper Sparrow, Blue Grosbeak, and one migrant White-crowned Sparrow. One Osprey was detected for the first time in point count surveys during each of the three visits to the ranch transect.

Table 3.7.1. Habitat type, number of points, and sampling dates for each transect or grid at Lyndon B. Johnson NHP, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
RANCH	Riparian	Bottomland grassland	17	3	4/16	4/17	4/18
RESTORATION	Grassland	Upland grassland	6	3	4/16	4/17	4/18

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Chihuahuan Raven (*Corvus cryptoleucus*) was observed at the park for the first time in 2012.

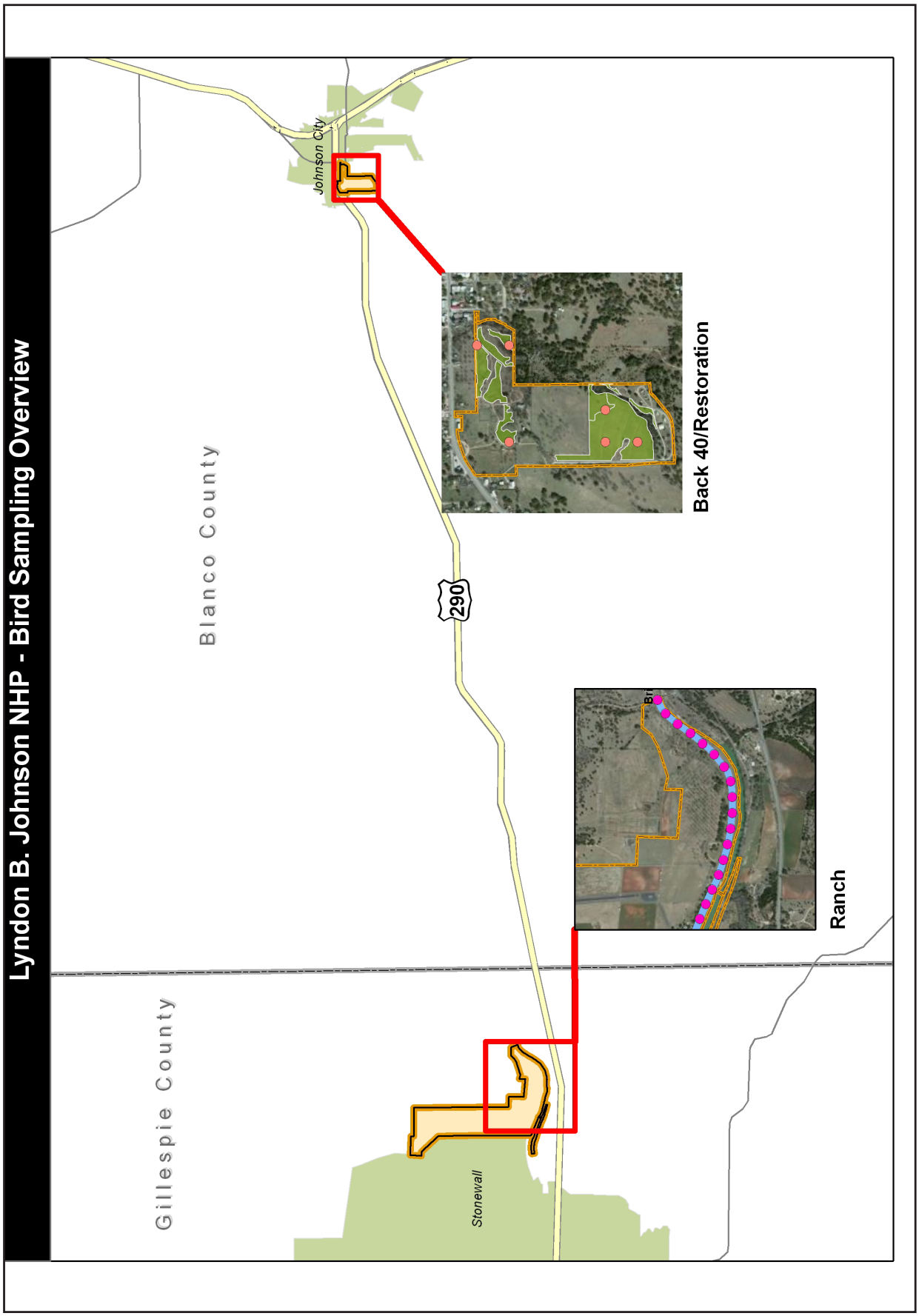

Figure 3.7.1-1. Bird sampling areas at Lyndon B. Johnson NHP.

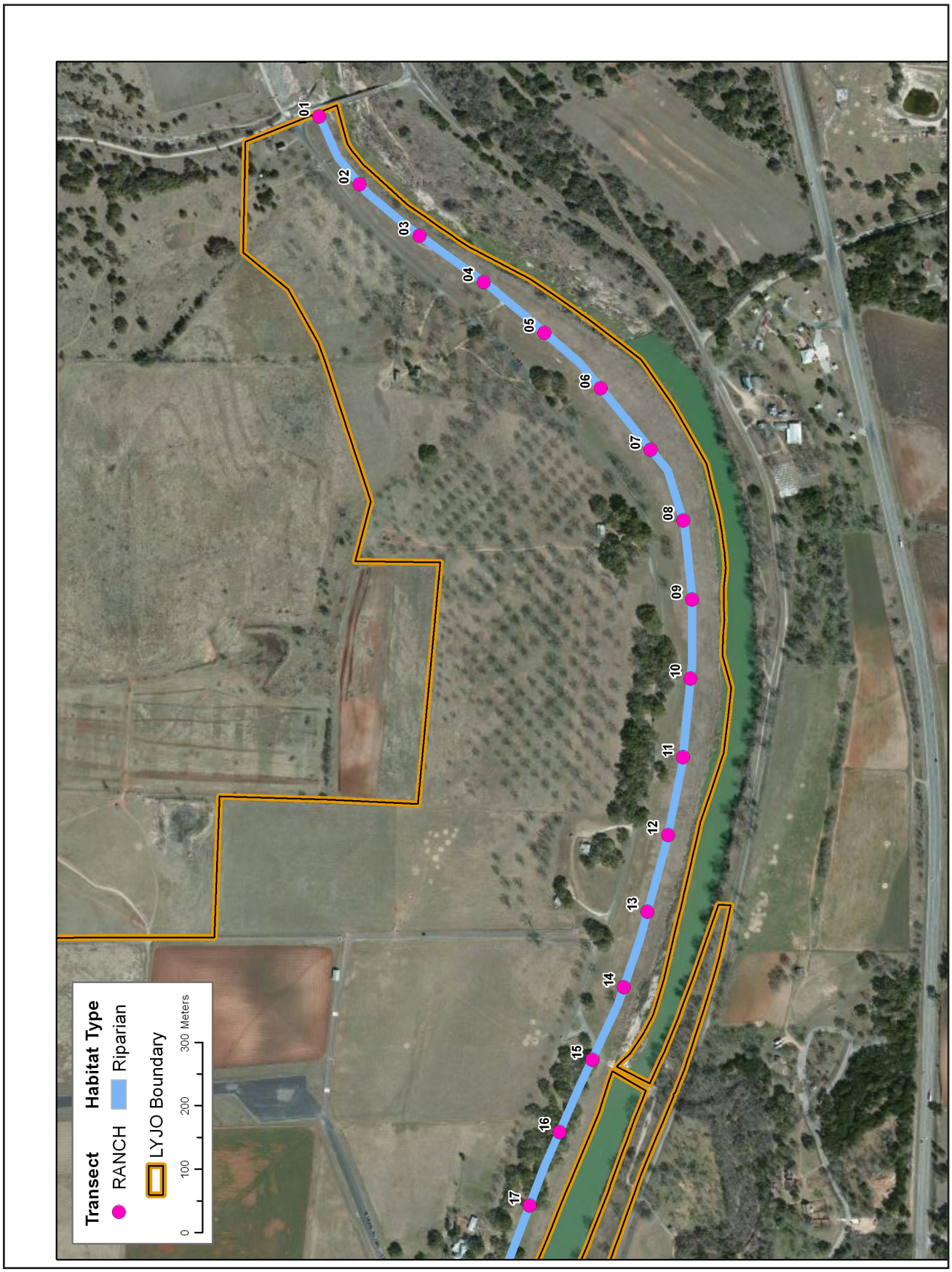

Figure 3.7.1-2. Point locations targeted for annual sampling at Lyndon B. Johnson NHP, Ranch,

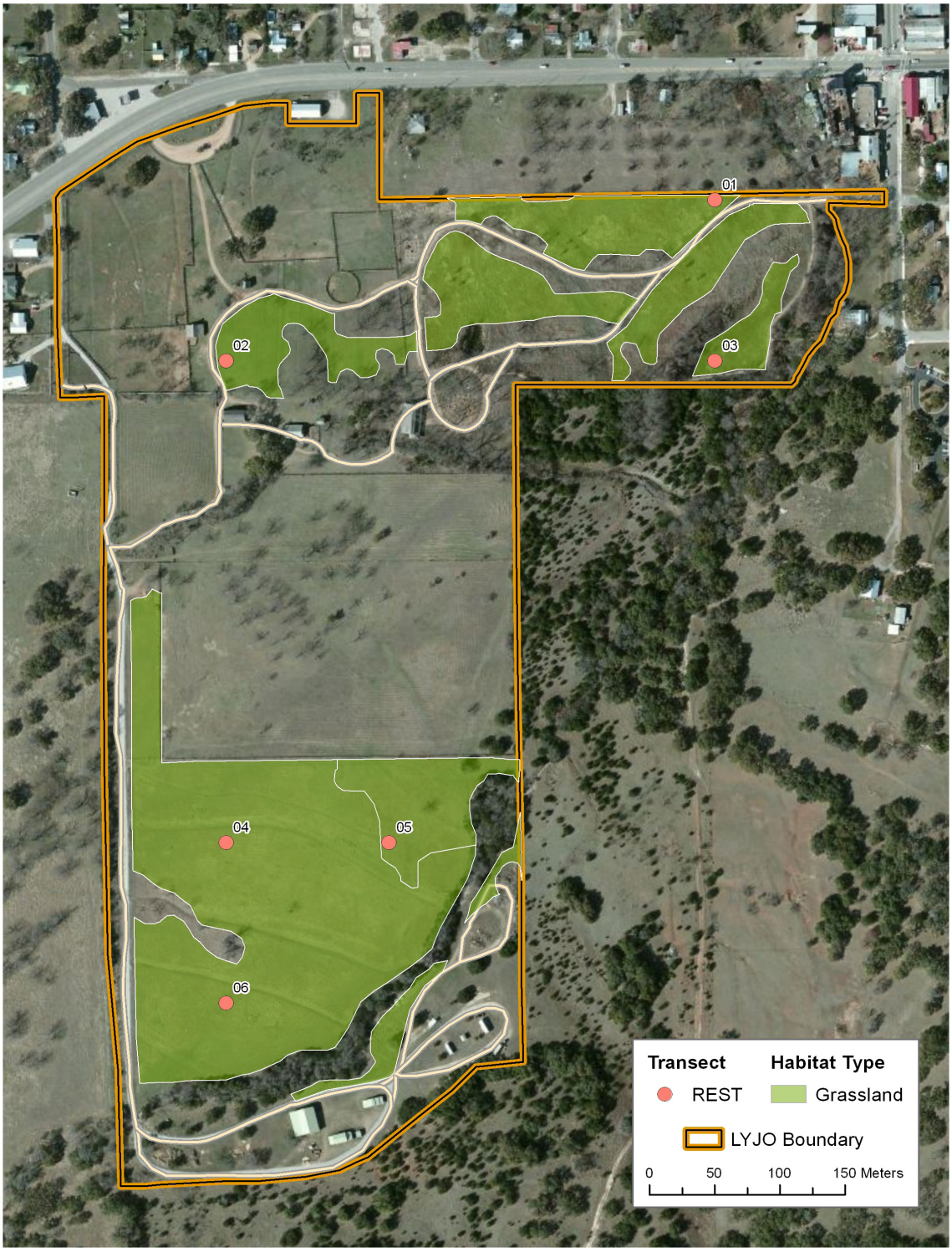

Figure 3.7.1-3. Point locations targeted for annual sampling at Lyndon B. Johnson NHP, Back 40/Restoration.

Table 3.7.2. Number of birds detected of each species in each habitat class, Lyndon B. Johnson NHP, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Northern Cardinal	34	73	107	17
Black-crested Titmouse	9	39	48	8
Cliff Swallow	--	44	44	7
Summer Tanager	--	33	33	5
Northern Mockingbird	19	8	27	4
Orchard Oriole	1	25	26	4
Red-winged Blackbird	--	26	26	4
American Crow	--	23	23	4
Mourning Dove	4	17	21	3
Carolina Wren	7	12	19	3
Ladder-backed Woodpecker	1	16	17	3
Scissor-tailed Flycatcher	4	13	17	3
Common Grackle	14	2	16	3
Turkey Vulture	1	15	16	3
Brown-headed Cowbird	--	12	12	2
Great-tailed Grackle	12	--	12	2
Bewick's Wren	3	8	11	2
Eastern Phoebe	--	8	8	1
Black Vulture	4	3	7	1
White-winged Dove	3	3	6	1
Blue Grosbeak	2	3	5	1
Carolina Chickadee	2	3	5	1
House Sparrow	--	5	5	1
Great Blue Heron	--	4	4	1
Barn Swallow	3	--	3	0
Eurasian Collared-Dove	--	3	3	0
Field Sparrow	3	--	3	0
Grasshopper Sparrow	3	--	3	0
Lark Sparrow	--	3	3	0
Osprey	--	3	3	0
Chihuahuan Raven	**--**	**2**	**2**	**0**
Double-crested Cormorant	--	2	2	0
Red-tailed Hawk	--	2	2	0
Blue Jay	1	--	1	0
Eastern Kingbird	1	--	1	0
White-crowned Sparrow	--	1	1	0

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Vesper Sparrow	1	--	1	0
Wild Turkey	1	--	1	0
Unidentified Bird	*2*	*66*	*68*	*11*
Unidentified Sparrow	*1*	*18*	*19*	*3*
Unidentified Swallow	*1*	--	*1*	*0*
Total	**137**	**495**	**632**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.8 Pecos National Historical Park

3.8.1 2012 sampling

During May and June of 2012, we sampled six transects or grids at Pecos NHP (Figure 3.8.1). Four transects were in the grassland habitat class (shortgrass prairie), with 6 to 18 unique points each. Two transects were in the riparian habitat class (cottonwood bottom), with 17 and 18 unique points each (Table 3.8.1). Most points were surveyed three times for a total of 272 point visits (the number of unique points multiplied by the number of visits) at Pecos NHP in 2012.

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Lark Sparrow (*Chondestes grammacus*) was one of the most commonly counted species at Pecos NHP in 2012.

3.8.2 Results and discussion

During 2012, 2,321 birds of 70 species were counted at Pecos NHP (Table 3.8.2). This was the highest species diversity in the SOPN in 2012. Species counted in the highest numbers were Cassin's Kingbird (8%), Western Wood-Pewee (8%), Spotted Towhee (6%), Black-headed Grosbeak (6%), Common Raven (6%), and Lark Sparrow (6%).

Other prominent species were Northern Mockingbird, Pinyon Jay, Chipping Sparrow, Mourning Dove, Violet-Green Swallow, and Western Scrub-Jay. Unusually high numbers of Western Tanagers were detected at Unit 3 and Unit 17 transects. A singing male Summer Tanager at the Unit 17 transect and an Eastern Kingbird at the river transect are new species for the park. American Goldfinch and Blue-gray Gnatcatcher, both at the river transect, were detected for the first time in a point count since surveys were initiated in 2009.

Table 3.8.1. Habitat type, number of points, and sampling dates for each transect or grid at Pecos NHP, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
GLORIETA	Riparian	Cottonwood bottom	18	3	5/31	6/3	6/4
PECOS	Riparian	Cottonwood bottom	17	3	5/29	5/30	5/31 - 6/5
UNIT 3	Grassland	Shortgrass prairie	18	2	5/30	6/3	6/4
UNIT 6	Grassland	Shortgrass prairie	18	3	6/1	6/2	6/3
UNIT 17	Grassland	Shortgrass prairie	14	3	5/28 - 5/29	5/29 - 6/5	6/5
UNIT 19	Grassland	Shortgrass prairie	6	3	5/28	5/29	6/5

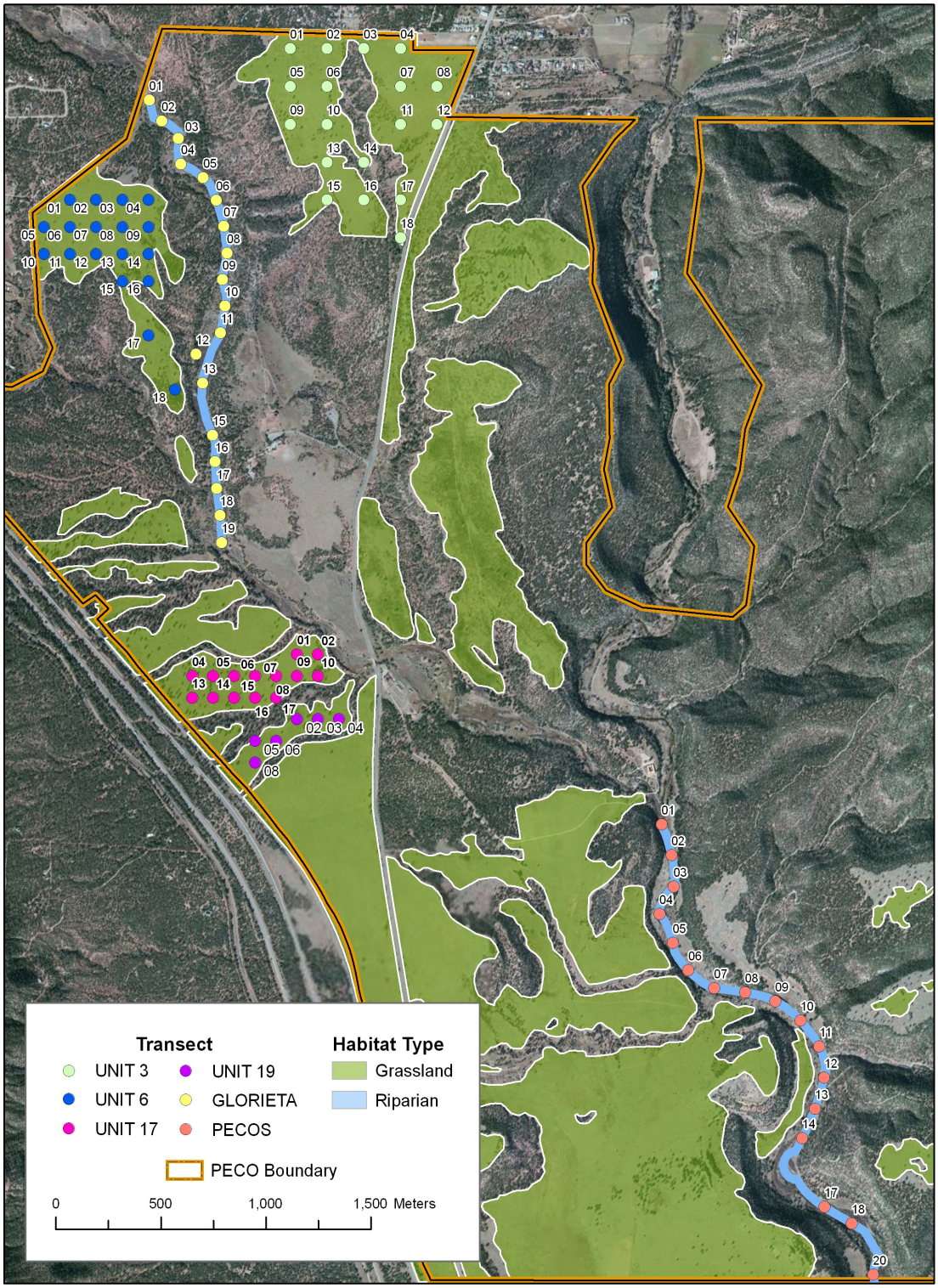

Figure 3.8.1. Point locations targeted for annual sampling at Pecos NHP.

Table 3.8.2. Number of birds detected of each species in each habitat class, Pecos NHP, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Cassin's Kingbird	159	38	197	8
Western Wood-Pewee	124	67	191	8
Spotted Towhee	19	125	144	6
Black-headed Grosbeak	51	87	138	6
Common Raven	96	40	136	6
Lark Sparrow	134	--	134	6
Northern Mockingbird	102	20	122	5
Pinyon Jay	83	8	91	4
Violet-green Swallow	2	76	78	3
Western Scrub-Jay	29	46	75	3
Chipping Sparrow	55	8	63	3
Yellow-breasted Chat	--	61	61	3
Mourning Dove	26	27	53	2
Plumbeous Vireo	32	17	49	2
American Crow	37	11	48	2
Brewer's Blackbird	5	42	47	2
Yellow Warbler	1	42	43	2
House Finch	26	16	42	2
Ash-throated Flycatcher	20	21	41	2
Juniper Titmouse	16	25	41	2
Yellow-rumped Warbler	25	9	34	1
Song Sparrow	1	32	33	1
Cliff Swallow	16	15	31	1
Western Kingbird	28	3	31	1
Western Meadowlark	25	2	27	1
Hepatic Tanager	13	7	20	1
Lesser Goldfinch	10	10	20	1
Bullock's Oriole	6	13	19	1
Barn Swallow	13	5	18	1
Northern Flicker	7	11	18	1
Vesper Sparrow	16	--	16	1
Mallard	--	14	14	1
American Robin	2	11	13	1
Black Phoebe	--	13	13	1
Spotted Sandpiper	--	13	13	1
Brown-headed Cowbird	1	11	12	1
Mountain Bluebird	12	--	12	1
Western Bluebird	8	4	12	1
Bewick's Wren	3	8	11	0
Red-winged Blackbird	1	10	11	0
Say's Phoebe	9	2	11	0

Table 3.8.2. Number of birds detected of each species in each habitat class, Pecos NHP, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Western Tanager	8	2	10	0
Eurasian Collared-Dove	7	2	9	0
Mountain Chickadee	--	9	9	0
Blue Grosbeak	3	5	8	0
Cassin's Sparrow	8	--	8	0
Common Nighthawk	5	2	7	0
Northern Rough-winged Swallow	2	5	7	0
Black-throated Gray Warbler	--	4	4	0
Gray Flycatcher	3	1	4	0
White-breasted Nuthatch	4	--	4	0
Black-chinned Hummingbird	--	3	3	0
Broad-tailed Hummingbird	--	3	3	0
Bushtit	--	3	3	0
Canyon Towhee	1	2	3	0
Warbling Vireo	--	3	3	0
American Goldfinch	2	--	2	0
Blue-gray Gnatcatcher	--	2	2	0
Cordilleran Flycatcher	--	2	2	0
Great Blue Heron	1	1	2	0
Red-tailed Hawk	--	2	2	0
Summer Tanager	**2**	**--**	**2**	**0**
Turkey Vulture	2	--	2	0
Common Yellowthroat	--	1	1	0
Cooper's Hawk	1	--	1	0
Eastern Kingbird	**--**	**1**	**1**	**0**
Gray Catbird	--	1	1	0
Great Horned Owl	--	1	1	0
House Sparrow	1	--	1	0
House Wren	--	1	1	0
Unidentified Bird	*10*	*8*	*18*	*1*
Unidentified Sparrow	*3*	*1*	*4*	*0*
Unidentified Swallow	*3*	*4*	*7*	*0*
Unidentified Hummingbird	*2*	*1*	*3*	*0*
Unidentified Empidonax	*1*	--	*1*	*0*
Unidentified Warbler	*1*	--	*1*	*0*
Total	**1,281**	**1,040**	**2,321**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.9 Sand Creek Massacre National Historic Site

3.9.1 2012 sampling

During June of 2012, we sampled three transects or grids at Sand Creek Massacre NHS (Figure 3.9.1). Two transects were in grassland habitat (shortgrass prairie) with 20 unique points each, and one transect was in riparian habitat (cottonwood bottom) with 16 unique points (Table 3.9.1). Each point was surveyed three times for a total of 168 point visits (the number of unique points multiplied by the number of visits) at Sand Creek Massacre NHS.

3.9.2 Results and discussion

During 2012, 1,646 birds of 39 species were counted at Sand Creek Massacre NHS (Table 3.9.2). Western Meadowlark, the most commonly detected species in the park (27%), was noted throughout the park, with the highest numbers in the sand sage and upland grassland. Other common species, in order of abundance, included Mourning Dove (15%), Cassin's Sparrow (11%), Western Kingbird (9%), House Wren (4%), Bullock's Oriole (3%), and Horned Lark (3%).

Compared to 2011, the number of detections was notably higher for Baltimore Oriole, Dickcissel, House Wren, Red-winged Blackbird, and Western Meadowlark. Decreases in the number of detections from 2011 were noted for Bullocks's Oriole, Grasshopper Sparrow, Horned Lark, Northern Mockingbird, and Red-headed Woodpecker. Sand Creek is the only park in the SOPN with three species of orioles— Baltimore, Bullock's, and Orchard.

Other birds detected include several Lark Bunting (absent in 2011), and an incidental detection of Scaled Quail. Burrowing Owl and Mountain Plover, detected in the prairie dog colony at the upland grassland transect in 2009, were absent for the third consecutive year. The prairie dog population was decimated by plague in the spring of 2010. House Finch was a new species for the park.

Table 3.9.1. Habitat type, number of points, and sampling dates for each transect or grid at Sand Creek Massacre NHS, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
COTTONWOOD	Riparian	Cottonwood bottom	16	3	6/11	6/12	6/13
UPLAND GRASS	Grassland	Shortgrass prairie	20	3	6/17 - 6/11	6/8- 6/12	6/9 - 6/13
UPLAND SAGE	Grassland	Shortgrass prairie	20	3	6/19	6/21	6/22 - 6/23

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Bullock's Oriole (*Icterus bullockii*) was a common species at Sand Creek Massacre NHS in 2012.

Figure 3.9.1. Point locations targeted for annual sampling at Sand Creek Massacre NHS.

Table 3.9.2. Number of birds detected of each species in each habitat class, Sand Creek Massacre NHS, 2012

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Western Meadowlark	456	52	508	31
Mourning Dove	62	193	255	15
Cassin's Sparrow	180	9	189	11
Western Kingbird	30	114	144	9
House Wren	1	64	65	4
Bullock's Oriole	9	46	55	3
Horned Lark	53	--	53	3
Red-winged Blackbird	44	8	52	3
Lark Sparrow	18	21	39	2
Orchard Oriole	--	31	31	2
Grasshopper Sparrow	29	--	29	2
Ring-necked Pheasant	24	3	27	2
Northern Mockingbird	9	16	25	2
Dickcissel	15	2	17	1
Yellow Warbler	1	13	14	1
Baltimore Oriole	--	13	13	1
Common Nighthawk	9	2	11	1
Brown-headed Cowbird	7	2	9	1
Killdeer	8	1	9	1
Northern Flicker	3	6	9	1
Common Grackle	1	7	8	0
Blue Grosbeak	1	6	7	0
Barn Swallow	6	--	6	0
Downy Woodpecker	--	5	5	0
Eastern Kingbird	1	4	5	0
European Starling	--	5	5	0
Lark Bunting	5	--	5	0
Warbling Vireo	--	5	5	0
Western Wood-Pewee	--	5	5	0
Swainson's Hawk	4	--	4	0
Eurasian Collared-Dove	2	1	3	0
House Finch	**1**	**2**	**3**	**0**
Red-headed Woodpecker	--	3	3	0
Blue Jay	--	2	2	0
Brown Thrasher	--	2	2	0
Yellow-billed Cuckoo	2	--	2	0
Great Horned Owl	--	1	1	0

Table 3.9.2. Number of birds detected of each species in each habitat class, Sand Creek Massacre NHS, 2012, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Red-tailed Hawk	--	1	1	0
Say's Phoebe	1	--	1	0
Unidentified Bird	*4*	*5*	*9*	*1*
Unidentified Woodpecker	*2*	*6*	*8*	*0*
Unidentified Sparrow	*1*	*1*	*2*	*0*
Total	**989**	**657**	**1,646**	**100%**

Note: Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

3.10 Washita Battlefield National Historic Site

3.10.1 2012 sampling

During May of 2012, we sampled two transects/grids at Washita Battlefield NHS (Figure 3.10.1). Both transects were in grassland habitat, bottomland grassland and upland grassland, with 18 and 19 unique points, respectively (Table 3.10.1). Points were surveyed three times for a total of 110 point visits (the number of unique points multiplied by the number of visits) at Washita Battlefield NHS.

3.10.2 Results and discussion

During 2012, 1,161 birds of 45 species were counted at Washita Battlefield NHS (Table 3.10.2). The occurrence of a nice mix of grassland and savannah/woodland bird species on the NHS is a reflection of the diverse habitat. Dickcissel was the most abundant species (18%). Other common species, in order of relative abundance, were Northern Bobwhite (14%), Northern Cardinal (8%), Eastern Meadowlark (8%), Painted Bunting (6%), and Field Sparrow (5%). Two species of wrens were detected— Bewick's and Carolina, and five species of sparrows (including Cassin's, Field, and Grasshopper) were detected; the other two species of sparrow, Clay-colored and Savannah, were passing through on migration.

Ring-necked Pheasant, a male detected by call, is a new species for the park. Eastern Phoebe, Indigo Bunting, and Northern Flicker were detected for the first time in four years of point count surveys.

Table 3.10.1. Habitat type, number of points, and sampling dates for each transect or grid at Washita Battlefield NHS, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2	Visit 3
RESTORATION	Grassland	Bottomland grassland	18	3	5/16 - 5/18	5/18 - 5/22	5/22
UPLAND	Grassland	Upland grassland	19	3	5/15	5/17	5/20

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Northern Cardinal (*Cardinalis cardinalis*) was the third most common species detected at Washita Battlefield NHS in 2012.

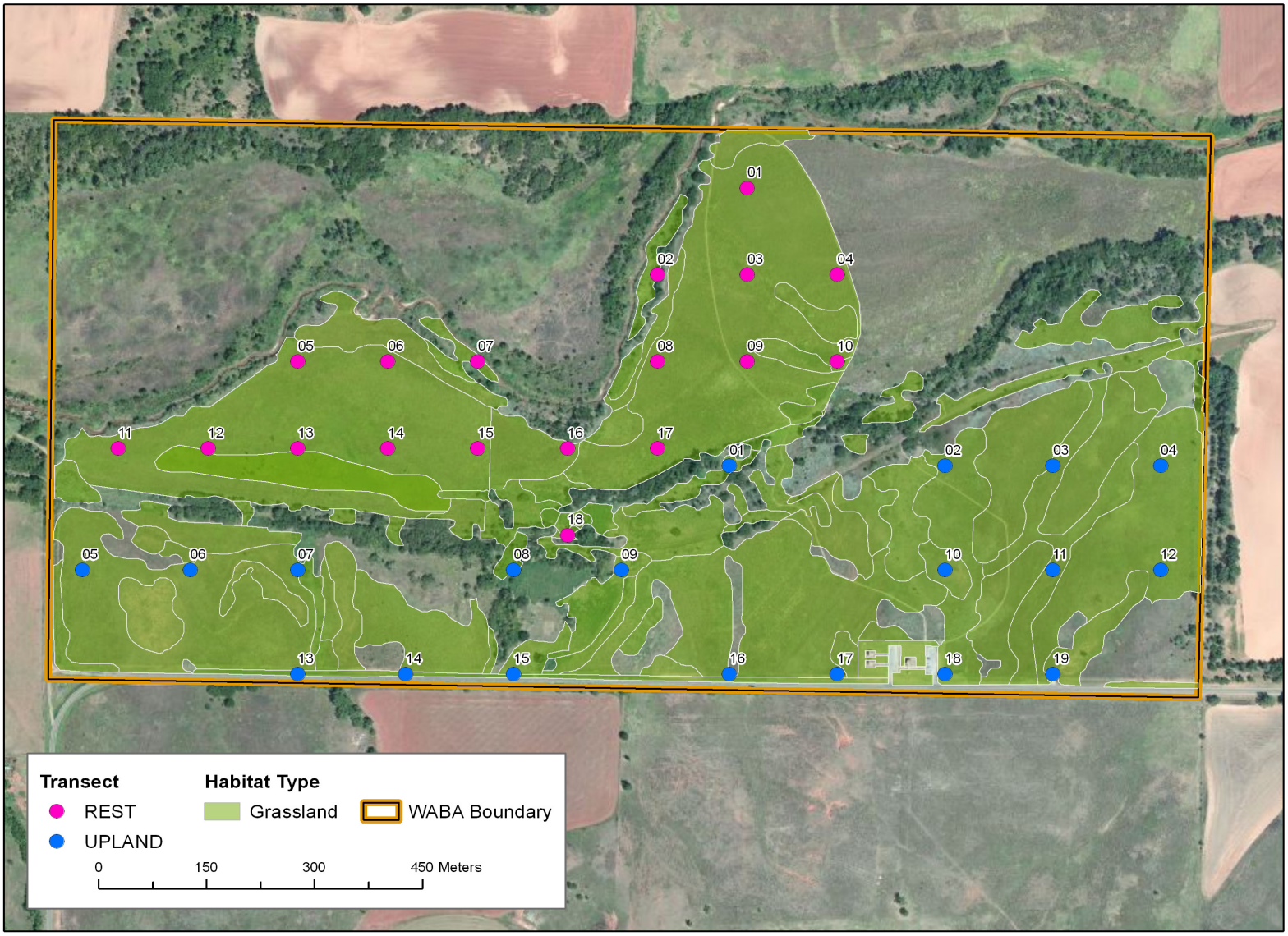

Figure 3.10.1. Point locations targeted for annual sampling at Washita Battlefield NHS.

Table 3.10.2. Number of birds detected of each species in each habitat class, Washita Battlefield NHS, 2012

Species	# of birds detected	
	Total (grassland habitat)	% of total
Dickcissel	211	18
Northern Bobwhite	158	14
Northern Cardinal	98	8
Eastern Meadowlark	97	8
Painted Bunting	70	6
Field Sparrow	63	5
Tufted Titmouse	48	4
Red-bellied Woodpecker	45	4
American Crow	42	4
Northern Mockingbird	38	3
Yellow-billed Cuckoo	28	2
Barn Swallow	24	2
Western Meadowlark	21	2
Mourning Dove	20	2
Carolina Chickadee	19	2
Great Crested Flycatcher	17	1
Eastern Bluebird	15	1
American Goldfinch	13	1
Brown-headed Cowbird	12	1
Wild Turkey	9	1
Red-winged Blackbird	8	1
Carolina Wren	7	1
Turkey Vulture	6	1
Common Nighthawk	6	1
Mississippi Kite	6	1
Cassin's Sparrow	4	0
Indigo Bunting	4	0
Common Grackle	4	0
Brown Thrasher	4	0
Scissor-tailed Flycatcher	3	0
Eastern Phoebe	3	0
Green Heron	3	0
Blue Grosbeak	2	0
Grasshopper Sparrow	2	0
Downy Woodpecker	2	0
Red-tailed Hawk	2	0
Clay-colored Sparrow	2	0
Ring-necked Pheasant	**1**	**0**
Blue Jay	1	0
Bewick's Wren	1	0
Northern Flicker	1	0
Killdeer	1	0
Blue-gray Gnatcatcher	1	0
Belted Kingfisher	1	0
Savannah Sparrow	1	0
Unidentified Bird	*24*	*2*
Unidentified Meadowlark	*6*	*1*
Unidentified Woodpecker	*4*	*0*
Unidentified Sparrow	*2*	*0*
Unidentified Hawk	*1*	*0*
Total	**1,161**	**100%**

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.

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