National Park Service
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Natural Resource Stewardship and Science

Landbird Monitoring in the Chihuahuan Desert Network

2011 Annual Report

Natural Resource Technical Report NPS/CHDN/NRTR—2012/559

ON THE COVER

Scaled Quail (*Callipepla squamata*). Photo © Robert Shantz.

Landbird Monitoring in the Chihuahuan Desert Network

2011 Annual Report

Natural Resource Technical Report NPS/CHDN/NRTR—2012/559

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Acronyms

AMIS	Amistad National Recreation Area
BIBE	Big Bend National Park
CAVE	Carlsbad Caverns National Park
CHDN	Chihuahuan Desert Inventory & Monitoring Network
FODA	Fort Davis National Historic Site
GUMO	Guadalupe Mountains National Park
NHS	national historic site
NM	national monument
NP	national park
NPS	National Park Service
NRA	national recreation area
RMBO	Rocky Mountain Bird Observatory
WHSA	White Sands National Monument

Executive Summary

In 2011, landbirds were surveyed within six of seven Chihuahuan Desert Inventory & Monitoring Network (CHDN) parks. Sample points were located along a transect for linear features (e.g., most riparian habitats) or a grid for areal features. A total of 73 transects or grids was surveyed in 2011. 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 March through May, 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 generally conducted once for each transect or grid when there was ample area to survey. For Guadalupe Mountains and Carlsbad Caverns National Parks (NP), there was only enough habitat to establish one riparian transect in each park, so we surveyed each transect two times on different days to increase sample size. We also surveyed the transect in Fort Davis National Historic Site (NHS) twice, due to the small size of the Site.

We had a total of 760 point counts on 73 transects or grids. Of these, 630 were point counts in grassland habitat and 130 were point counts in riparian habitat. We recorded a total of 7,789 individual birds of 140 species during on our point counts. Big Bend NP had the highest number of individual birds counted (n = 2,607). Fort Davis NHS had the lowest number of birds detected (n = 593). We observed the greatest number of species at Guadalupe Mountains NP (n = 89) and Big Bend NP (n = 88) and the fewest at White Sands National Monument (n = 51). Species richness and community composition varied widely among the parks surveyed. 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. Black-throated Sparrow was the most commonly detected species within the CHDN (n= 592). Seventeen species were detected only once during surveys. Twenty species (such as Ash-throated Flycatcher, Black-throated Sparrow, Brown-headed Cowbird, Cactus Wren, and Green-tailed Towhee) were detected at all six parks, whereas numerous species were detected at one or very few parks. New species, previously unverified in a given park, were recorded for three parks.

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 CHDN 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 2001, the Chihuahuan Desert Inventory & Monitoring Network (CHDN) includes seven parks in the northern Chihuahuan Desert in southern New Mexico and west Texas (Table 1.1-1). Six of the seven parks are representative of the Northern Chihuahuan Subregion of the Chihuahuan Desert Ecoregion. The exception is Amistad National Recreation Area (NRA), which is situated primarily within the Tamaulipan Thornscrub (Mezquital) Ecoregion of southern Texas and northeastern Mexico, but it is also influenced by both the Chihuahuan Desert and Edwards Plateau Ecoregions (NPS, CHDN 2010).

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 CHDN parks. Landbirds are a conspicuous component of many ecosystems, and they 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 (e.g., climate, vegetation; 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 CHDN (NPS, CHDN 2010) 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 inherently valuable. The high aesthetic and spiritual values that humans place on native wildlife is 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, longstanding

Table 1.1-1. Parks in the Chihuahuan Desert Inventory & Monitoring Network (CHDN)

Park	Park Acronymn	Area (Acres)	Acres (Hectares)
Amistad National Recreation Area	AMIS	57,292	23,195
Big Bend National Park	BIBE	801,863	324,641
Carlsbad Caverns National Park	CAVE	46,766	18,934
Fort Davis National Historic Site	FODA	474	192
Guadalupe Mountains National Park	GUMO	86,416	34,986
White Sands National Monument	WHSA	143,733	58,191
Rio Grande Wild and Scenic River	RIGR	5,164	2,091

recreational pastime in the U.S., and it forms the basis of a large and sustainable industry (Sekercioglu 2002).

The CHDN began monitoring birds in spring 2010, following a pilot season 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 CHDN 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. However, 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 subsequent analyses using the Distance program (Thomas et al. 2005). Provided that assumptions are reasonably met, distance-sampling methods allow researchers to model a detection function that adjusts for imperfect detectability and is a robust, widely accepted method 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.

In 2011, we surveyed landbirds within six of the seven CHDN parks; sampling was not conducted in the Rio Grande Wild and Scenic River. With the exception of Fort Davis National Historic Site (NHS), all parks were stratified by grassland and riparian habitat classes. In Guadalupe Mountains and Carlsbad Caverns NP, riparian area was limited to McKittrick Canyon and Rattlesnake Springs, respectively. Sample locations were selected randomly within habitat classes using a design that creates a spatially-balanced distribution of points. Fort Davis NHS contains only grassland habitat, thus no riparian transects were located there. Because of the small area encompassed by Fort Davis NHS, sample points were placed in a grid to provide coverage of the entire Site. Sample points were located along a transect for linear features (e.g., most riparian habitats) or a grid for areal features. Note that in Chapters 2 and 3 we may use the terms "transect" and "grid" interchangeably.

Table 2.1.1-1. Number of transects or grids of each habitat class surveyed in each CHDN park unit, 2011

Park unit	Grassland	Riparian
Amistad NRA	9	4
Big Bend NP	20	10
Carlsbad Caverns NP	8	1
Fort Davis NHS	1	--
Guadalupe Mountians NP	9	1
White Sands NM	10	--

A total of 73 unique transects or grids were surveyed in 2011 (Table 2.1.1-1). Most transects/grids in the CHDN parks were sampled one time, using the sampling methods described in Pavlacky et al. (in prep.). In these relatively large parks of the CHDN, a hierarchical multi-scale occupancy approach was used (Pavlacky et al. [in prep.]; Nichols et al. 2008; Kendall and White 2009). Multiple sampling visits were conducted at Fort Davis NHS and riparian transects at Carlsbad Caverns NP and Guadalupe Mountains NP, following methodology by Powell et al. (2007).

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Scott's Oriole (*Icterus parisorum*) was among the most commonly counted species in the CHDN in 2011.

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 CHDN 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 March through May, 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). A point-transect is a line transect of zero length (i.e., a point) (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 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 previously unconfirmed in a particular park.

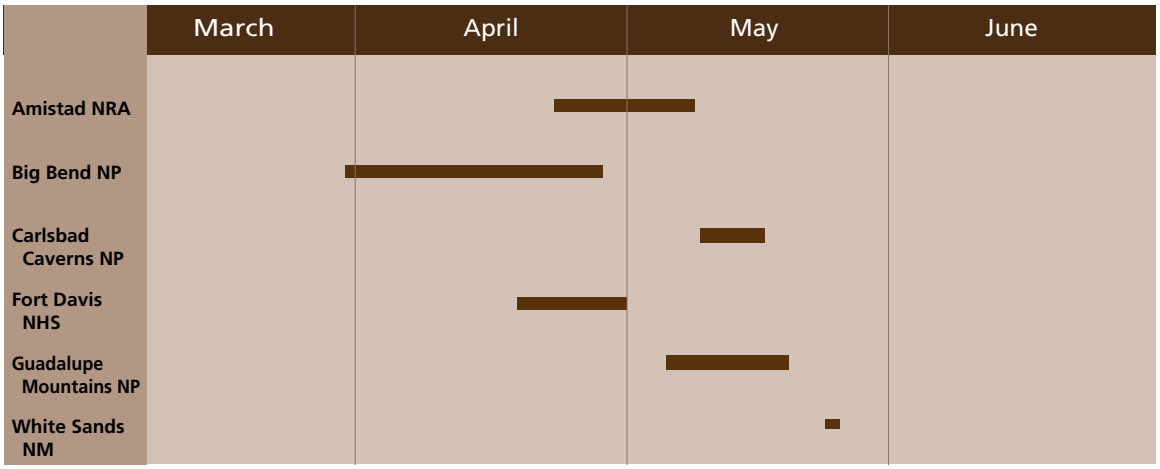

Figure 2.1.2. Dates when sampling was conducted in CHDN parks, 2011.

Most CHDN transects were surveyed once, with the exception of the grassland grid at Fort Davis National Historic Site (NHS) and the riparian transects at Carlsbad Caverns and Guadalupe Mountains national parks, which were visited twice.

We conducted six-minute point-counts 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 CHDN and other organizations as covariates when as-

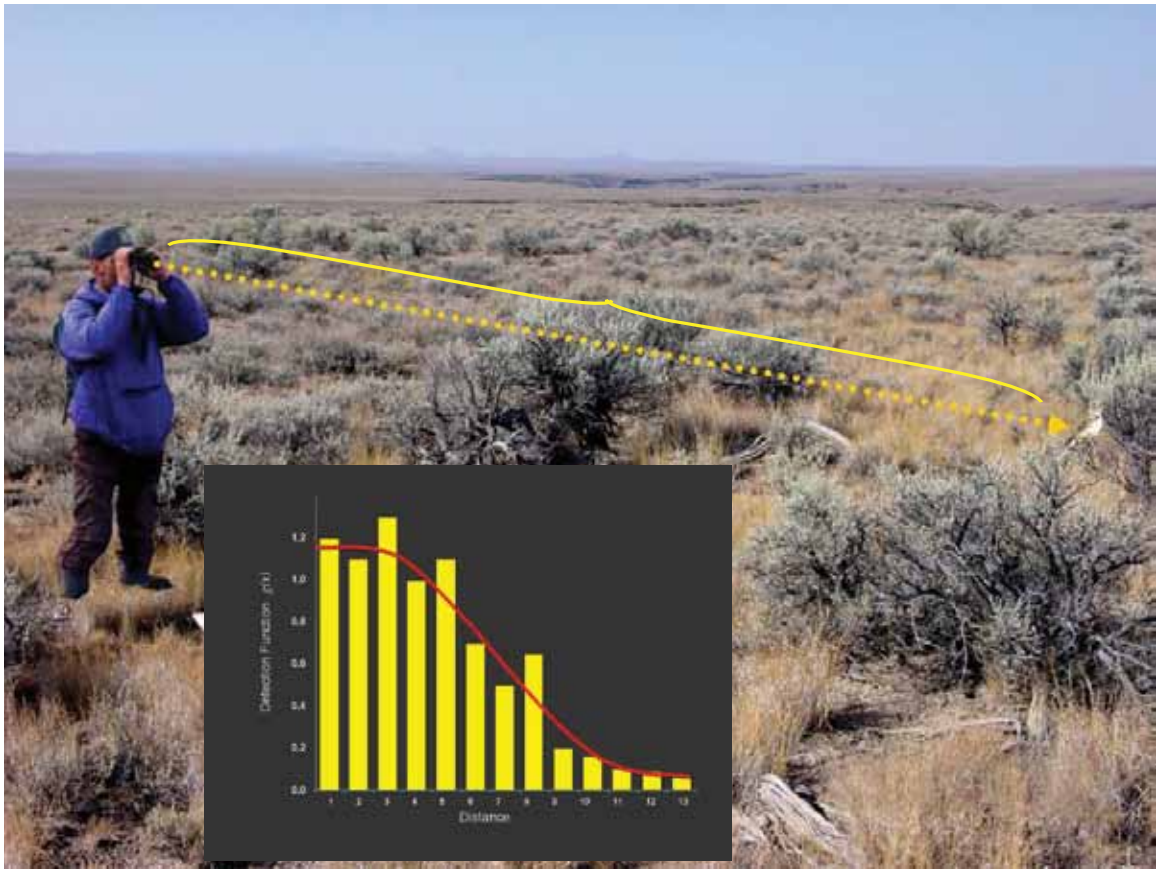

Figure 2.2. Distance sampling works by estimating a detection profile (graph) as a function of distance from which either individual or groups of birds are observed from the transect.

sessing population trends for birds. Finally, landbird 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 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 CHDN 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. CHDN and its parks will have easy access to the data upon completion of the new Avian Data Center, expected in February, 2012.

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 broader ecological context.

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Common Poorwill (*Phalaenoptilus nuttallii*) was detected once in the CHDN in 2011.

3 Results and Discussion

We had a total of 760 point counts (the number of counts from a given point during a given sampling occasion) on 73 transects or grids (Table 3-1). Of these, 630 were point counts in grassland habitats and 130 were point counts in riparian habitats. We recorded a total of 7,789 individual birds of 140 species during our point counts.

Big Bend National Park (NP) had the highest number of individual birds counted (n = 2,607). Fort Davis National Historic Site (NHS) had the lowest number of birds counted (n = 593). We observed the greatest number of species at Guadalupe Mountains NP (n = 89) and Big Bend NP (n = 88) and the fewest at White Sands National Monument (NM) (n = 51) (Table 3-2). Species richness and community composition varied widely among the parks surveyed. 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.

Table 3-2. Number of species observed in each habitat class at each park, 2011

Park	Species detected		
	Grassland	Riparian	Total[1]
Amistad NRA	53	36	61
Big Bend NP	57	70	88
Carlsbad Caverns NP	49	52	71
Fort Davis NHS	55	--	55
Guadalupe Mountains NP	68	57	89
White Sands NM	51	--	51
Total[1]	**113**	**112**	**140**

[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.

Black-throated Sparrow was the most commonly detected species within the CHDN (n = 592) (see Table 3-3). Seventeen species were detected only once during surveys. Twenty species (such as Ash-throated Flycatcher, Black-throated Sparrow, Brown-headed Cowbird, Cactus Wren, Green-tailed Towhee, Ladder-backed Woodpecker, Rock Wren, Scott's Oriole, White-winged Dove, and Yellow-rumped Warbler) were detected at all six parks, whereas numerous species were detected at one or very few parks.

Table 3-1. The number of point counts (# of counts from a given point during a given sampling occasion) and individual birds counted in each habitat class at each CHDN park, 2011

Park	Grassland		Riparian		Total birds detected
	# Point counts	Birds counted	# Point counts	Birds counted	
Amistad NRA	85	1,157	23	589	1,746
Big Bend NP	219	1,512	64	1,095	2,607
Carlsbad Caverns NP	75	754	16	386	1,140
Fort Davis NHS	42	593	--	--	593
Guadalupe Mountains NP	98	717	27	356	1,073
White Sands NM	111	630	--	--	630
Total	**630**	**5,363**	**130**	**2,426**	**7,789**

Note: The riparian habitats in Carlsbad Caverns NP and Guadalupe Mountains NP, and the grassland habitat at Fort Davis NHS, were sampled twice; all other transects or grids were sampled once.

Table 3-3. Total number of individual birds observed of each species during surveys in all CHDN parks, 2011

Common name	# of birds
Black-throated Sparrow	592
Turkey Vulture	481
Cliff Swallow	450
Cactus Wren	328
White-winged Dove	286
Northern Mockingbird	277
House Finch	228
Bell's Vireo	216
Ash-throated Flycatcher	213
Pyrrhuloxia	210
Chipping Sparrow	209
Mourning Dove	188
Cassin's Sparrow	159
Scott's Oriole	139
Western Kingbird	136
Brewer's Sparrow	125
Bewick's Wren	111
Scaled Quail	109
Canyon Wren	99
Great-tailed Grackle	87
Chihuahuan Raven	83
Curve-billed Thrasher	81
Barn Swallow	78
Verdin	78
Wilson's Warbler	76
Cassin's Kingbird	75
Brown-headed Cowbird	74
Lark Sparrow	74
Rock Wren	69
Rufous-crowned Sparrow	68
Canyon Towhee	61
Yellow-rumped Warbler	60
Lark Bunting	57
Common Yellowthroat	56
Northern Cardinal	55
Say's Phoebe	54
Violet-green Swallow	51
Green-tailed Towhee	47
Northern Rough-winged Swallow	46
Blue-gray Gnatcatcher	41
Horned Lark	41

Common name	# of birds
Summer Tanager	41
Bank Swallow	40
Black-tailed Gnatcatcher	39
Red-winged Blackbird	38
Yellow-breasted Chat	38
Lesser Nighthawk	35
White-crowned Sparrow	35
Blue Grosbeak	32
Lesser Goldfinch	32
House Sparrow	31
Wild Turkey	31
Brewer's Blackbird	30
Eastern Meadowlark	30
Vermilion Flycatcher	29
Black-headed Grosbeak	27
Greater Roadrunner	27
Common Ground-Dove	26
White-throated Swift	24
Vesper Sparrow	23
Ladder-backed Woodpecker	21
Swainson's Hawk	21
Great Blue Heron	19
Black Vulture	18
Black-chinned Hummingbird	18
Phainopepla	18
Loggerhead Shrike	17
Western Wood-Pewee	16
Cave Swallow	15
Killdeer	15
Lazuli Bunting	15
Western Tanager	15
American Coot	14
Mallard	14
Western Meadowlark	14
Black-chinned Sparrow	13
Crissal Thrasher	11
Gray Vireo	11
Hermit Thrush	11
Savannah Sparrow	10
Spotted Sandpiper	9
Townsend's Warbler	9

Table 3-3. Total number of individual birds observed of each species during surveys in all CHDN parks, 2011, cont.

Common name	# of birds
Eurasian Collared-Dove	8
Hammond's Flycatcher	8
Painted Bunting	8
Broad-tailed Hummingbird	7
Great Horned Owl	7
Red-tailed Hawk	7
Western Scrub-Jay	7
Golden-fronted Woodpecker	6
Marsh Wren	6
Plumbeous Vireo	6
Yellow Warbler	6
Bullock's Oriole	5
Hooded Oriole	5
Ruby-crowned Kinglet	5
American Avocet	4
American Kestrel	4
Double-crested Cormorant	4
Gray Flycatcher	4
Green Heron	4
Indigo Bunting	4
Northern Harrier	4
Orchard Oriole	4
Virginia's Warbler	4
Black-crested Titmouse	3
Burrowing Owl	3
Common Nighthawk	3
Common Raven	3
Cordilleran Flycatcher	3
Crested Caracara	3
Black Phoebe	2
Black-throated Gray Warbler	2
Cassin's Vireo	2
Dusky Flycatcher	2
Gray Hawk	2
Juniper Titmouse	2
MacGillivray's Warbler	2
Montezuma Quail	2
Northern Flicker	2
Northern Shoveler	2
Swainson's Thrush	2
Yellow-billed Cuckoo	2
American Pipit	1
Carolina Wren	1
Common Poorwill	1
Cooper's Hawk	1
Eastern Phoebe	1
Gambel's Quail	1
Golden Eagle	1
Great Egret	1
Hermit Warbler	1
House Wren	1
Northern Waterthrush	1
Pied-billed Grebe	1
Pine Siskin	1
Sage Thrasher	1
Spotted Towhee	1
Western Screech-Owl	1
Winter Wren	1
Unidentified birds	*703*
Total	**7,789**

Note: Species are listed in rank order from most to least commonly detected. Number of birds is the total number of individuals counted. Unidentified birds were included in the total number of birds recorded during surveys, but these birds were not included in counts of the number of species detected per park. Incidental sightings (i.e., species identified by our birding team, but not as part of our regular survey) are not included in this table, but are included in individual park species tables.

Table 3-4. Parks where each species was detected, March through May 2011

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Acorn Woodpecker	*Melanerpes formicivorus*		o	o	o	o	o
American Avocet	*Recurvirostra americana*	o	●	o			o
American Bittern	*Botaurus lentiginosus*	o	o	o		o	
American Coot	*Fulica americana*	●	●	o		o	o
American Crow	*Corvus brachyrhynchos*			o			o
American Dipper	*Cinclus mexicanus*		o	o		o	
American Goldfinch	*Spinus tristis*	o	o	o	o	o	o
American Kestrel	*Falco sparverius*	o	●	o	o	●	o
American Pipit	*Anthus rubescens*	o	●	o		o	o
American Redstart	*Setophaga ruticilla*	o	o	o		o	o
American Robin	*Turdus migratorius*	o	o	o	o	o	o
American Tree Sparrow	*Spizella arborea*			o		o	o
American White Pelican	*Pelecanus erythrorhynchos*	o	o	o			o
American Wigeon	*Anas americana*	o	o	o		o	o
American Woodcock	*Scolopax minor*		o	o			
Anhinga	*Anhinga anhinga*	o	o				
Anna's Hummingbird	*Calypte anna*		o	o		o	
Aplomado Falcon	*Falco femoralis*		o			o	
Ash-throated Flycatcher	*Myiarchus cinerascens*	●	●	●	●	●	●
Aztec Thrush	*Ridgwayia pinicola*		o				
Baird's Sandpiper	*Calidris bairdii*	o	o	o			o
Baird's Sparrow	*Ammodramus bairdii*		o	o			o
Bald Eagle	*Haliaeetus leucocephalus*	o	o	o		o	
Baltimore Oriole	*Icterus galbula*	o	o	o		o	
Band-tailed Pigeon	*Patagioenas fasciata*		o	o		o	
Bank Swallow	*Riparia riparia*	o	●	o			o
Barn Owl	*Tyto alba*	o	o	o			o
Barn Swallow	*Hirundo rustica*	●	o	●	●	●	●
Bay-breasted Warbler	*Dendroica castanea*		o	o			
Bell's Vireo	*Vireo bellii*	●	●	●		●	●
Belted Kingfisher	*Megaceryle alcyon*	o	o	o		o	o
Berylline Hummingbird	*Amazilia beryllina*		o				
Bewick's Wren	*Thryomanes bewickii*	●	●	●	●	●	●
Black Phoebe	*Sayornis nigricans*	●	●	o	o	o	o

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Black Tern	*Chlidonias niger*	o	o	o			o
Black Vulture	*Coragyps atratus*	●	●			o	
Black-and-white Warbler	*Mniotilta varia*	o	o	o		o	o
Black-bellied Plover	*Pluvialis squatarola*	o					o
Black-bellied Whistling-Duck	*Dendrocygna autumnalis*	o	o	o			
Black-billed Cuckoo	*Coccyzus erythropthalmus*		o	o			
Black-billed Magpie	*Pica hudsonia*			o		o	
Blackburnian Warbler	*Dendroica fusca*		o	o			
Black-capped Vireo	*Vireo atricapilla*		o	o			
Black-chinned Hummingbird	*Archilochus alexandri*	o	o	●	●	●	●
Black-chinned Sparrow	*Spizella atrogularis*		●	o	o	●	o
Black-crested Titmouse	*Baeolophus atricristatus*	o	o		●	o	
Black-crowned Night-Heron	*Nycticorax nycticorax*	o	o	o			o
Black-headed Grosbeak	*Pheucticus melanocephalus*		●	●	o	●	o
Black-legged Kittiwake	*Rissa tridactyla*		o				
Black-necked Stilt	*Himantopus mexicanus*	o	o	o			o
Blackpoll Warbler	*Dendroica striata*		o	o			
Black-tailed Gnatcatcher	*Polioptila melanura*	o	●	o	●	●	●
Black-throated Blue Warbler	*Dendroica caerulescens*	o	o	o		o	o
Black-throated Gray Warbler	*Dendroica nigrescens*		o	o		●	o
Black-throated Green Warbler	*Dendroica virens*		o	o			
Black-throated Sparrow	*Amphispiza bilineata*	●	●	●	●	●	●
Black-vented Oriole	*Icterus wagleri*		o				
Blue Grosbeak	*Passerina caerulea*	o	o	●	●	o	●
Blue Jay	*Cyanocitta cristata*		o	o		o	
Blue-gray Gnatcatcher	*Polioptila caerulea*	●	●	●	●	●	o
Blue-headed Vireo	*Vireo solitarius*		o	o		o	
Blue-throated Hummingbird	*Lampornis clemenciae*		o	o		o	
Blue-winged Teal	*Anas discors*	o	o	o			o
Blue-winged Warbler	*Vermivora cyanoptera*		o	o			

● = species detected in 2011 survey

o = species not detected in 2011 survey but previously documented in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Bobolink	*Dolichonyx oryzivorus*			o			
Bonaparte's Gull	*Chroicocephalus philadelphia*	o	o				o
Brewer's Blackbird	*Euphagus cyanocephalus*	o	●	o	●	o	o
Brewer's Sparrow	*Spizella breweri*	o	●	●	●	●	●
Broad-billed Hummingbird	*Cynanthus latirostris*		o	o		o	
Broad-tailed Hummingbird	*Selasphorus platycercus*		o	●	o	●	o
Broad-winged Hawk	*Buteo platypterus*		o	o			
Bronzed Cowbird	*Molothrus aeneus*	o	o	o	o	o	o
Brown Creeper	*Certhia americana*		o	o		o	o
Brown Pelican	*Pelecanus occidentalis*	o	o				o
Brown Thrasher	*Toxostoma rufum*		o	o		o	o
Brown-crested Flycatcher	*Myiarchus tyrannulus*	o	o		o	o	
Brown-headed Cowbird	*Molothrus ater*	●	●	●	●	●	●
Bufflehead	*Bucephala albeola*	o	o	o		o	o
Bullock's Oriole	*Icterus bullockii*	o	o	●	o	●	o
Burrowing Owl	*Athene cunicularia*	o	●	o		●	o
Bushtit	*Psaltriparus minimus*	o	o	o	o	o	
Cactus Wren	*Campylorhynchus brunneicapillus*	●	●	●	●	●	●
Calliope Hummingbird	*Stellula calliope*		o	o	o	o	
Canada Goose	*Branta canadensis*		o	o			o
Canada Warbler	*Wilsonia canadensis*		o	o			
Canvasback	*Aythya valisineria*	o	o	o			o
Canyon Towhee	*Melozone fusca*	●	●	●	●	●	o
Canyon Wren	*Catherpes mexicanus*	●	●	●	●	●	
Cape May Warbler	*Dendroica tigrina*		o	o			
Carolina Wren	*Thryothorus ludovicianus*	●	o	o		o	
Caspian Tern	*Hydroprogne caspia*	o					
Cassin's Finch	*Carpodacus cassinii*		o	o	o	o	o
Cassin's Kingbird	*Tyrannus vociferans*		●	●	●	●	●
Cassin's Sparrow	*Peucaea cassinii*	●	●	●	●	●	●
Cassin's Vireo	*Vireo cassinii*		o	o		●	
Cattle Egret	*Bubulcus ibis*	o	o	o		o	o
Cave Swallow	*Petrochelidon fulva*		o	o	●	●	
Cedar Waxwing	*Bombycilla cedrorum*	o	o	o	o	o	o

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Cerulean Warbler	*Dendroica cerulea*		o	o			
Chestnut-collared Longspur	*Calcarius ornatus*	o	o	o		o	o
Chestnut-sided Warbler	*Dendroica pensylvanica*		o	o		o	o
Chihuahuan Raven	*Corvus cryptoleucus*	o	●	o	●	●	●
Chimney Swift	*Chaetura pelagica*	o	o	o			
Chipping Sparrow	*Spizella passerina*	●	●	●	●	●	●
Cinnamon Teal	*Anas cyanoptera*	o	o	o			o
Clark's Grebe	*Aechmophorus clarkii*	o					
Clark's Nutcracker	*Nucifraga columbiana*		o	o	o	o	
Clay-colored Sparrow	*Spizella pallida*	o	o	o	o	o	o
Clay-colored Thrush	*Turdus grayi*		o				
Cliff Swallow	*Petrochelidon pyrrhonota*	●	o	●	o	●	●
Colima Warbler	*Oreothlypis crissalis*		o			o	
Common Black-Hawk	*Buteogallus anthracinus*		o	o	o	o	
Common Goldeneye	*Bucephala clangula*		o	o			
Common Grackle	*Quiscalus quiscula*		o	o		o	o
Common Ground-Dove	*Columbina passerina*	●	●	o			o
Common Loon	*Gavia immer*	o	o				o
Common Merganser	*Mergus merganser*		o	o			o
Common Moorhen	*Gallinula chloropus*		o	o			
Common Nighthawk	*Chordeiles minor*	o	o	●	o	o	o
Common Poorwill	*Phalaenoptilus nuttallii*	o	o	o		●	o
Common Raven	*Corvus corax*	o	●	o	o	●	o
Common Yellowthroat	*Geothlypis trichas*	●	●	●		o	o
Connecticut Warbler	*Oporornis agilis*			o			
Cooper's Hawk	*Accipiter cooperii*	o	o	o	o	●	o
Cordilleran Flycatcher	*Empidonax occidentalis*		o	●	o	o	o
Costa's Hummingbird	*Calypte costae*		o				
Couch's Kingbird	*Tyrannus couchii*	o	o				
Crescent-chested Warbler	*Oreothlypis superciliosa*		o				

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Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Crested Caracara	*Caracara cheriway*	●	o				
Crissal Thrasher	*Toxostoma crissale*		●	o		●	●
Curve-billed Thrasher	*Toxostoma curvirostre*	o	o	o	o	o	o
Dark-eyed Junco	*Junco hyemalis*		o	o	o	o	o
Dickcissel	*Spiza americana*	o	o	o		o	o
Double-crested Cormorant	*Phalacrocorax auritus*	●	o	o			
Downy Woodpecker	*Picoides pubescens*			o		o	
Dunlin	*Calidris alpina*		o				
Dusky Flycatcher	*Empidonax oberholseri*		o	o	o	o	●
Dusky-capped Flycatcher	*Myiarchus tuberculifer*		o	o			
Eared Grebe	*Podiceps nigricollis*	o	o	o			o
Eastern Bluebird	*Sialia sialis*		o	o		o	
Eastern Kingbird	*Tyrannus tyrannus*		o	o			
Eastern Meadowlark	*Sturnella magna*	o	o	●	●	●	●
Eastern Phoebe	*Sayornis phoebe*	o	●	o		o	
Eastern Screech-Owl	Megascops asio	o	o				
Eastern Towhee	*Pipilo erythrophthalmus*			o		o	
Eastern Wood-Pewee	*Contopus virens*	o	o	o			
Elegant Trogon	*Trogon elegans*		o				
Elf Owl	*Micrathene whitneyi*	o	o	o		o	
Eurasian Collared-Dove	*Streptopelia decaocto*	o	o	o	●	o	o
Eurasian Wigeon	*Anas penelope*	o					
European Starling	*Sturnus vulgaris*		o	o	o	o	o
Evening Grosbeak	*Coccothraustes vespertinus*		o	o		o	o
Fan-tailed Warbler	*Euthlypis lachrymosa*		o				
Ferruginous Hawk	*Buteo regalis*	o	o	o		o	o
Ferruginous Pygmy-Owl	*Glaucidium brasilianum*		o				
Field Sparrow	*Spizella pusilla*	o	o	o		o	
Flame-colored Tanager	*Piranga bidentata*		o				
Flammulated Owl	*Otus flammeolus*		o	o		o	
Forster's Tern	*Sterna forsteri*	o	o				o
Fox Sparrow	*Passerella iliaca*	o	o	o			
Franklin's Gull	*Leucophaeus pipixcan*	o	o				o
Gadwall	*Anas strepera*	o	o	o			o

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Gambel's Quail	*Callipepla gambelii*		o			o	●
Golden Eagle	*Aquila chrysaetos*	o	o	o	o	●	o
Golden-cheeked Warbler	*Dendroica chrysoparia*		o				
Golden-crowned Kinglet	*Regulus satrapa*	o	o	o		o	
Golden-crowned Sparrow	*Zonotrichia atricapilla*		o	o		o	
Golden-fronted Woodpecker	*Melanerpes aurifrons*	●	●				
Golden-winged Warbler	*Vermivora chrysoptera*		o	o			
Grace's Warbler	*Dendroica graciae*		o	o		o	
Grasshopper Sparrow	*Ammodramus savannarum*	o	o	o	o	o	
Gray Catbird	*Dumetella carolinensis*		o	o		o	o
Gray Flycatcher	*Empidonax wrightii*		o	o	●	●	o
Gray Hawk	*Buteo nitidus*		●	●	o		
Gray Vireo	*Vireo vicinior*		●	o		●	o
Gray-cheeked Thrush	*Catharus minimus*		o	o			o
Great Blue Heron	*Ardea herodias*	●	o	o	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
Great Kiskadee	*Pitangus sulphuratus*	o	o	o			
Greater Pewee	*Contopus pertinax*		o	o	o	o	
Greater Roadrunner	*Geococcyx californianus*	●	●	o	o	●	●
Greater White-fronted Goose	*Anser albifrons*	o	o				
Greater Yellowlegs	*Tringa melanoleuca*	o	o	o			o
Great-tailed Grackle	*Quiscalus mexicanus*	●	●	●		●	o
Green Heron	*Butorides virescens*	●	o	o			o
Green Kingfisher	*Chloroceryle americana*	o	o				
Green-tailed Towhee	*Pipilo chlorurus*	●	●	●	●	●	●
Green-winged Teal	*Anas crecca*	o	o	o		o	o
Groove-billed Ani	*Crotophaga sulcirostris*	o	o	o			
Gull-billed Tern	*Gelochelidon nilotica*	o					

● = species detected in 2011 survey

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Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Hairy Woodpecker	*Picoides villosus*			o		o	
Hammond's Flycatcher	*Empidonax hammondii*		o	o		●	
Harris's Hawk	*Parabuteo unicinctus*	o	o	o		o	
Harris's Sparrow	*Zonotrichia querula*		o	o			o
Hepatic Tanager	*Piranga flava*		o	o	o	o	o
Hermit Thrush	*Catharus guttatus*	o	o	●	o	●	o
Hermit Warbler	*Dendroica occidentalis*		o	o		●	
Herring Gull	*Larus argentatus*	o				o	
Hooded Merganser	*Lophodytes cucullatus*	o	o	o			
Hooded Oriole	*Icterus cucullatus*	●	o	●		o	●
Hooded Warbler	*Wilsonia citrina*		o	o		o	o
Horned Grebe	*Podiceps auritus*	o					o
Horned Lark	*Eremophila alpestris*	o	●	o	o	●	●
House Finch	*Carpodacus mexicanus*	●	●	●	●	●	●
House Sparrow	*Passer domesticus*	o	o	o	●	o	o
House Wren	*Troglodytes aedon*	o	o	●	o	o	o
Hutton's Vireo	*Vireo huttoni*		o	o		o	
Inca Dove	*Columbina inca*	o	o	o			o
Indigo Bunting	*Passerina cyanea*	●	o	o	o	o	o
Interior Least Tern	*Sterna antillarum athalassos*	o					
Juniper Titmouse	*Baeolophus ridgwayi*			o	o	●	
Kentucky Warbler	*Oporornis formosus*		o	o		o	o
Killdeer	*Charadrius vociferus*	●	●	●	o	o	o
King Rail	*Rallus elegans*		o				
Ladder-backed Woodpecker	*Picoides scalaris*	●	●	●	●	●	●
Lark Bunting	*Calamospiza melanocorys*	o	●	o	o	●	o
Lark Sparrow	*Chondestes grammacus*	●	o	●	●	●	●
Laughing Gull	*Leucophaeus atricilla*	o	o				
Lawrence's Goldfinch	*Spinus lawrencei*					o	
Lazuli Bunting	*Passerina amoena*		o	o		●	o
Le Conte's Sparrow	*Ammodramus leconteii*	o	o	o			
Least Bittern	*Ixobrychus exilis*		o	o			
Least Flycatcher	*Empidonax minimus*	o	o	o			
Least Grebe	*Tachybaptus dominicus*		o				

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Least Sandpiper	*Calidris minutilla*	o	o	o			o
Least Tern	*Sterna antillarum*		o				o
Lesser Goldfinch	*Spinus psaltria*	●	●	●	●	●	●
Lesser Nighthawk	*Chordeiles acutipennis*	●	●	o	●	●	●
Lesser Prairie-Chicken	*Tympanuchus pallidicinctus*			o			
Lesser Scaup	*Aythya affinis*	o	o	o			o
Lesser Yellowlegs	*Tringa flavipes*	o	o	o			o
Lewis's Woodpecker	*Melanerpes lewis*		o	o		o	
Lincoln's Sparrow	*Melospiza lincolnii*	o	o	o	o	o	o
Little Blue Heron	*Egretta caerulea*	o	o				
Loggerhead Shrike	*Lanius ludovicianus*	o	●	●	o	●	o
Long-billed Curlew	*Numenius americanus*	o	o	o			o
Long-billed Dowitcher	*Limnodromus scolopaceus*	o	o	o			o
Long-billed Thrasher	*Toxostoma longirostre*	o	o	o			
Long-eared Owl	*Asio otus*		o	o			
Louisiana Waterthrush	*Parkesia motacilla*		o	o			
Lucifer Hummingbird	*Calothorax lucifer*		o	o			
Lucy's Warbler	*Oreothlypis luciae*		o	o			o
MacGillivray's Warbler	*Oporornis tolmiei*	o	o	o	o	o	●
Magnificent Hummingbird	*Eugenes fulgens*		o	o		o	
Magnolia Warbler	*Dendroica magnolia*		o	o		o	
Mallard	*Anas platyrhynchos*	●	●	o		o	o
Marbled Godwit	*Limosa fedoa*						o
Marsh Wren	*Cistothorus palustris*	o	●	●		o	o
McCown's Longspur	*Rhynchophanes mccownii*	o		o		o	
Merlin	*Falco columbarius*	o	o	o		o	o
Mexican Jay	*Aphelocoma ultramarina*		o				
Mississippi Kite	*Ictinia mississippiensis*		o	o			
Montezuma Quail	*Cyrtonyx montezumae*		o	o	●	o	

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Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Mountain Bluebird	*Sialia currucoides*	o	o	o	o	o	o
Mountain Chickadee	*Poecile gambeli*		o	o		o	o
Mourning Dove	*Zenaida macroura*	o	o	o	●	o	o
Mourning Warbler	*Oporornis philadelphia*		o				
Nashville Warbler	*Oreothlypis ruficapilla*	o	o	o		o	o
Neotropic Cormorant	*Phalacrocorax brasilianus*	o	o	o			
Northern Beardless-Tyrannulet	*Camptostoma imberbe*			o			
Northern Bobwhite	*Colinus virginianus*	o		o		o	
Northern Cardinal	*Cardinalis cardinalis*	●	●	o	●	o	
Northern Flicker	*Colaptes auratus*	o	●	o	●	o	o
Northern Goshawk	*Accipiter gentilis*		o	o		o	
Northern Harrier	*Circus cyaneus*	o	●	●	o	●	o
Northern Mockingbird	*Mimus polyglottos*	●	●	●	●	●	●
Northern Parula	*Parula americana*		o	o		o	o
Northern Pintail	*Anas acuta*	o	o	o		o	o
Northern Pygmy-Owl	*Glaucidium gnoma*		o			o	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	o	●	●		●	●
Northern Saw-whet Owl	*Aegolius acadicus*		o			o	
Northern Shoveler	*Anas clypeata*	o	●	o			o
Northern Shrike	Lanius excubitor					o	
Northern Waterthrush	*Parkesia noveboracensis*		o	o		●	o
Olive Sparrow	*Arremonops rufivirgatus*	o					
Olive Warbler	*Peucedramus taeniatus*		o				
Olive-sided Flycatcher	*Contopus cooperi*		o	o	o	o	o
Orange-crowned Warbler	*Oreothlypis celata*	o	o	o	o	o	o
Orchard Oriole	*Icterus spurius*	o	o	●	o		o
Osprey	*Pandion haliaetus*	o	o	o		o	
Ovenbird	*Seiurus aurocapilla*		o	o			o
Pacific Loon	*Gavia pacifica*	o					
Pacific-slope Flycatcher	*Empidonax difficilis*					o	
Painted Bunting	*Passerina ciris*	●	o	●	o	o	o
Painted Redstart	*Myioborus pictus*		o	o		o	
Palm Warbler	*Dendroica palmarum*		o	o			o
Pectoral Sandpiper	*Calidris melanotos*		o				

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Peregrine Falcon	*Falco peregrinus*	o	o	o		o	o
Phainopepla	*Phainopepla nitens*		o	●	●	●	●
Philadelphia Vireo	*Vireo philadelphicus*		o	o			
Pied-billed Grebe	*Podilymbus podiceps*	●	o	o			o
Pine Grosbeak	*Pinicola enucleator*					o	
Pine Siskin	*Spinus pinus*		o	o	o	●	o
Pine Warbler	*Dendroica pinus*		o	o			
Pinyon Jay	*Gymnorhinus cyanocephalus*		o	o		o	o
Piratic Flycatcher	*Legatus leucophaius*		o	o			
Plumbeous Vireo	Vireo plumbeus		o	o		●	o
Prairie Falcon	*Falco mexicanus*		o	o		o	o
Prairie Warbler	*Dendroica discolor*		o	o			
Prothonotary Warbler	*Protonotaria citrea*		o	o	o		
Purple Finch	*Carpodacus purpureus*		o	o		o	
Purple Gallinule	*Porphyrio martinica*		o				
Purple Martin	*Progne subis*	o	o	o		o	o
Pygmy Nuthatch	*Sitta pygmaea*		o	o		o	
Pyrrhuloxia	*Cardinalis sinuatus*	●	●	●	●	●	●
Red Crossbill	*Loxia curvirostra*		o	o		o	
Red-bellied Woodpecker	*Melanerpes carolinus*			o			
Red-breasted Merganser	*Mergus serrator*	o	o				
Red-breasted Nuthatch	*Sitta canadensis*		o	o	o	o	o
Reddish Egret	*Egretta rufescens*	o	o				
Red-eyed Vireo	*Vireo olivaceus*		o	o		o	o
Red-faced Warbler	*Cardellina rubrifrons*		o	o		o	
Redhead	*Aythya americana*	o	o	o			o
Red-headed Woodpecker	*Melanerpes erythrocephalus*		o	o			o
Red-naped Sapsucker	*Sphyrapicus nuchalis*		o	o		o	o
Red-necked Phalarope	*Phalaropus lobatus*			o			o
Red-shouldered Hawk	*Buteo lineatus*	o	o	o			

● = species detected in 2011 survey

o = species not detected in 2011 survey but previously documented in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Red-tailed Hawk	*Buteo jamaicensis*	●	●	o	o	●	o
Red-winged Blackbird	*Agelaius phoeniceus*	●	●	o		o	o
Ring-billed Gull	*Larus delawarensis*	o	o	o		o	o
Ringed Kingfisher	*Megaceryle torquata*	o					
Ring-necked Duck	*Aythya collaris*	o	o	o		o	o
Ring-necked Pheasant	*Phasianus colchicus*			o		o	
Rock Pigeon	*Columba livia*	o	o	o		o	o
Rock Wren	*Salpinctes obsoletus*	●	●	●	●	●	●
Roseate Spoonbill	*Platalea ajaja*	o	o				
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		o	o		o	o
Rose-throated Becard	*Pachyramphus aglaiae*		o				
Ross's Goose	*Chen rossii*		o				
Rough-legged Hawk	*Buteo lagopus*		o	o		o	o
Royal Tern	*Thalasseus maximus*	o					
Ruby-crowned Kinglet	*Regulus calendula*	●	●	o	●	o	o
Ruby-throated Hummingbird	*Archilochus colubris*	o	o			o	
Ruddy Duck	*Oxyura jamaicensis*	o	o	o			o
Ruddy Ground-Dove	*Columbina talpacoti*		o	o			
Rufous Hummingbird	*Selasphorus rufus*		o	o	o	o	o
Rufous-backed Robin	*Turdus rufopalliatus*		o				
Rufous-capped Warbler	*Basileuterus rufifrons*	o	o				
Rufous-crowned Sparrow	*Aimophila ruficeps*	●	●	●	●	●	o
Rusty Blackbird	*Euphagus carolinus*		o	o		o	
Sage Sparrow	*Amphispiza belli*		o	o		o	o
Sage Thrasher	*Oreoscoptes montanus*	o	●	o		o	o
Sanderling	*Calidris alba*						o
Sandhill Crane	*Grus canadensis*	o	o	o		o	o
Savannah Sparrow	*Passerculus sandwichensis*	o	●	●	●	o	o
Say's Phoebe	*Sayornis saya*	●	●	●	●	●	●
Scaled Quail	*Callipepla squamata*	●	●	●	●	●	o
Scarlet Tanager	*Piranga olivacea*		o	o		o	o
Scissor-tailed Flycatcher	*Tyrannus forficatus*	o	o	o			o
Scott's Oriole	*Icterus parisorum*	●	●	●	●	●	●

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Sedge Wren	*Cistothorus platensis*	o	o	o			
Semipalmated Plover	*Charadrius semipalmatus*	o					o
Semipalmated Sandpiper	*Calidris pusilla*	o		o			o
Sharp-shinned Hawk	*Accipiter striatus*	o	o	o	o	o	o
Short-eared Owl	*Asio flammeus*		o	o			o
Short-tailed Hawk	*Buteo brachyurus*		o	o			
Slate-throated Redstart	*Myioborus miniatus*		o				
Smith's Longspur	*Calcarius pictus*		o				
Snow Bunting	*Plectrophenax nivalis*		o				
Snow Goose	*Chen caerulescens*	o	o	o			o
Snowy Egret	*Egretta thula*	o	o	o		o	o
Snowy Plover	*Charadrius alexandrinus*	o					o
Solitary Sandpiper	*Tringa solitaria*	o	o	o			o
Song Sparrow	*Melospiza melodia*	o	o	o	o	o	o
Sora	*Porzana carolina*	o	o	o			o
Spotted Owl[1]	*Strix occidentalis*			o[1]		o[1]	
Spotted Sandpiper	*Actitis macularius*	o	●	●		o	o
Spotted Towhee	*Pipilo maculatus*	o	o	o	o	●	o
Sprague's Pipit	*Anthus spragueii*	o	o	o			
Steller's Jay	*Cyanocitta stelleri*		o	o	o	o	
Stilt Sandpiper	*Calidris himantopus*						o
Sulphur-bellied Flycatcher	*Myiodynastes luteiventris*		o				
Summer Tanager	*Piranga rubra*	o	●	●	●	●	●
Swainson's Hawk	*Buteo swainsoni*	●	●	●	o	●	●
Swainson's Thrush	*Catharus ustulatus*	o	o	o		●	o
Swainson's Warbler	*Limnothlypis swainsonii*		o	o			
Swallow-tailed Kite	*Elanoides forficatus*		o				
Swamp Sparrow	*Melospiza georgiana*	o	o	o		o	
Tennessee Warbler	*Oreothlypis peregrina*		o	o			
Thick-billed Kingbird	*Tyrannus crassirostris*		o	o			

● = species detected in 2011 survey

o = species not detected in 2011 survey but previously documented in the park, including species that migrate through or winter in the park

[1] = the Spotted Owls in these CHDN parks belong to the Mexican subspecies (*Strix occidentalis lucida*)

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Townsend's Solitaire	*Myadestes townsendi*		o	o	o	o	o
Townsend's Warbler	*Dendroica townsendi*		o	●	o	●	●
Tree Swallow	*Tachycineta bicolor*	o	o	o			o
Tricolored Heron	*Egretta tricolor*	o	o	o			
Tropical Kingbird	*Tyrannus melancholicus*		o				
Tropical Parula	*Parula pitiayumi*		o	o			
Tufted Flycatcher	*Mitrephanes phaeocercus*		o				
Tundra Swan	*Cygnus columbianus*		o	o			
Turkey Vulture	*Cathartes aura*	●	●	●	●	●	o
Upland Sandpiper	*Bartramia longicauda*	o	o	o			
Varied Bunting	*Passerina versicolor*	o	●	o		o	
Varied Thrush	*Ixoreus naevius*		o	o		o	
Veery	*Catharus fuscescens*		o				
Verdin	*Auriparus flaviceps*	●	●	●	●	●	●
Vermilion Flycatcher	*Pyrocephalus rubinus*	●	●	●	o	●	o
Vesper Sparrow	*Pooecetes gramineus*	o	●	o	●	o	o
Violet-crowned Hummingbird	*Amazilia violiceps*	o	o				
Violet-green Swallow	*Tachycineta thalassina*		●	●	o	●	●
Virginia Rail	*Rallus limicola*	o	o	o			o
Virginia's Warbler	*Oreothlypis virginiae*		●	o	●	●	o
Warbling Vireo	*Vireo gilvus*		o	o		o	o
Western Bluebird	*Sialia mexicana*		o	o	o	o	o
Western Grebe	*Aechmophorus occidentalis*	o		o			o
Western Kingbird	*Tyrannus verticalis*	●	●	●	o	●	●
Western Meadowlark	*Sturnella neglecta*	o	●	o	o	●	●
Western Sandpiper	*Calidris mauri*	o	o	o			o
Western Screech-Owl	*Megascops kennicottii*	o	●	o		o	o
Western Scrub-Jay	*Aphelocoma californica*		o	o	o	●	o
Western Tanager	*Piranga ludoviciana*	o	●	●	o	●	o
Western Wood-Pewee	*Contopus sordidulus*		o	●	●	o	●
Whimbrel	*Numenius phaeopus*		o				
Whip-poor-will	*Caprimulgus vociferus*		o	o		o	
White Ibis	*Eudocimus albus*		o	o			
White-breasted Nuthatch	*Sitta carolinensis*		o	o		o	

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
White-crowned Sparrow	*Zonotrichia leucophrys*	o	●	●	●	●	●
White-eared Hummingbird	*Hylocharis leucotis*		o			o	
White-eyed Vireo	*Vireo griseus*	o	o	o			
White-faced Ibis	*Plegadis chihi*	o	o	o			o
White-rumped Sandpiper	*Calidris fuscicollis*						o
White-tailed Hawk	*Buteo albicaudatus*		o				
White-tailed Kite	*Elanus leucurus*		o	o			
White-throated Sparrow	*Zonotrichia albicollis*		o	o	o	o	o
White-throated Swift	*Aeronautes saxatalis*	o	o	o	o	●	o
White-tipped Dove	*Leptotila verreauxi*		o				
White-winged Dove	*Zenaida asiatica*	●	●	●	●	●	●
Wild Turkey	*Meleagris gallopavo*	o	o	●		●	
Willet	*Tringa semipalmata*	o	o	o			o
Williamson's Sapsucker	*Sphyrapicus thyroideus*		o	o		o	o
Willow Flycatcher	*Empidonax traillii*		o	o[2]		o	o
Wilson's Phalarope	*Phalaropus tricolor*	o	o	o			o
Wilson's Snipe	*Gallinago delicata*	o	o	o		o	o
Wilson's Warbler	*Wilsonia pusilla*	●	●	●	●	●	●
Winter Wren	*Troglodytes hiemalis*	o	●	o		o	
Wood Duck	*Aix sponsa*	o	o	o		o	
Wood Thrush	*Hylocichla mustelina*		o				o
Worm-eating Warbler	*Helmitheros vermivorum*	o	o	o			o
Yellow Grosbeak	*Pheucticus chrysopeplus*					o	
Yellow Rail	*Coturnicops noveboracensis*		o				
Yellow Warbler	*Dendroica petechia*	●	●	●	o	●	o
Yellow-bellied Flycatcher	*Empidonax flaviventris*		o				
Yellow-bellied Sapsucker	*Sphyrapicus varius*		o	o		o	
Yellow-billed Cuckoo	*Coccyzus americanus*	●	o	●	o	o	
Yellow-breasted Chat	*Icteria virens*	o	●	●		o	o
Yellow-crowned Night-Heron	*Nyctanassa violacea*	o	o	o			

● = species detected in 2011 survey

o = species not detected in 2011 survey but previously documented in the park, including species that migrate through or winter in the park

[2] = Willow Flycatchers at CAVE belong to the Southwestern subspecies (*Empidonax traillii extimus*)

Table 3-4. Parks where each species was detected, March through May 2011, cont.

Common name	Scientific name	AMIS	BIBE	CAVE	FODA	GUMO	WHSA
Yellow-eyed Junco	*Junco phaeonotus*		o			o	
Yellow-green Vireo	*Vireo flavoviridis*		o	o			
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	o	o	o	o	o	o
Yellow-rumped Warbler	*Dendroica coronata*	●	●	●	●	●	●
Yellow-throated Vireo	*Vireo flavifrons*	o	o	o		o	
Yellow-throated Warbler	*Dendroica dominica*		o	o			o
Zone-tailed Hawk	*Buteo albonotatus*	o	o	o	o	o	

● = species detected in 2011 survey

o = species not detected in 2011 survey but previously documented in the park, including species that migrate through or winter in the park

3.1 Amistad National Recreation Area

3.1.1 2011 sampling

During April and May of 2011, we sampled 13 transects/grids at Amistad NRA (Figure 3.1.1-1, -2). We conducted 85 point counts on nine grids in grassland habitat and 23 point counts on four transects in riparian habitat (Table 3.1.1), for a total of 108 point counts at the park. Each point was surveyed once in 2011.

3.1.2 Results and discussion

During 2011, 1,746 birds of 61 species were counted at Amistad NRA (Table 3.1.2). Cliff Swallow was the most commonly counted species (25%), followed by Pyrrhuloxia (6%), Cactus Wren (5%), Cassin's Sparrow (4%), and Bell's Vireo (4%). No new species were detected for the park during the survey.

Amistad encompasses three different rivers but very little dry land. Many of the rivers are cut through steep bedrock canyons with adjacent private property composed of upland mesas. Because of this unique geography, many of the upland surveys were conducted very close to water and the riparian surveys were close to upland habitat. Therefore, there was some overlap in the bird communities. Birds detected in upland habitats included Bell's Vireo, Cassin's Sparrow, Black-throated Sparrow, Cactus Wren, Ash-throated Flycatcher, Vermillion Flycatcher, Lesser Nighthawk, Northern Mockingbird, Pyrrhuloxia, Northern Cardinal, and Bewick's Wren. Birds frequently detected in riparian areas included Canyon Wren, Turkey Vulture, Black Vulture, Great Blue Heron, Cliff Swallow, Red-winged Blackbird, Hooded Oriole, and Painted Bunting. Rare birds observed included a Varied Bunting at one of the riparian sites and Scissor-tailed Flycatchers at the 'bone yard' campground.

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Pyrrhuloxia (*Cardinalis sinuatus*) was the second-most counted species at Amistad NRA in 2011.

Table 3.1.1. Habitat class, number of points, and sampling dates for each transect or grid at Amistad NRA, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-AM2	Grassland	12	1	5/2/2011	--
CH-AM3	Grassland	6	1	4/30/2011	--
CH-AM4	Grassland	8	1	4/29/2011	--
CH-AM5	Grassland	9	1	4/24/2011	--
CH-AM6	Grassland	11	1	4/25/2011	--
CH-AM7	Grassland	10	1	4/24/2011	--
CH-AM8	Grassland	11	1	5/9/2011	--
CH-AM9	Grassland	10	1	5/4/2011	--
CH-AM10	Grassland	8	1	5/7/2011	--
CH-AMRI1	Riparian	5	1	4/22/2011	--
CH-AMRI9	Riparian	5	1	5/1/2011	--
CH-AMRI23	Riparian	7	1	4/21/2011	--
CH-AMRI31	Riparian	6	1	5/8/2011	--

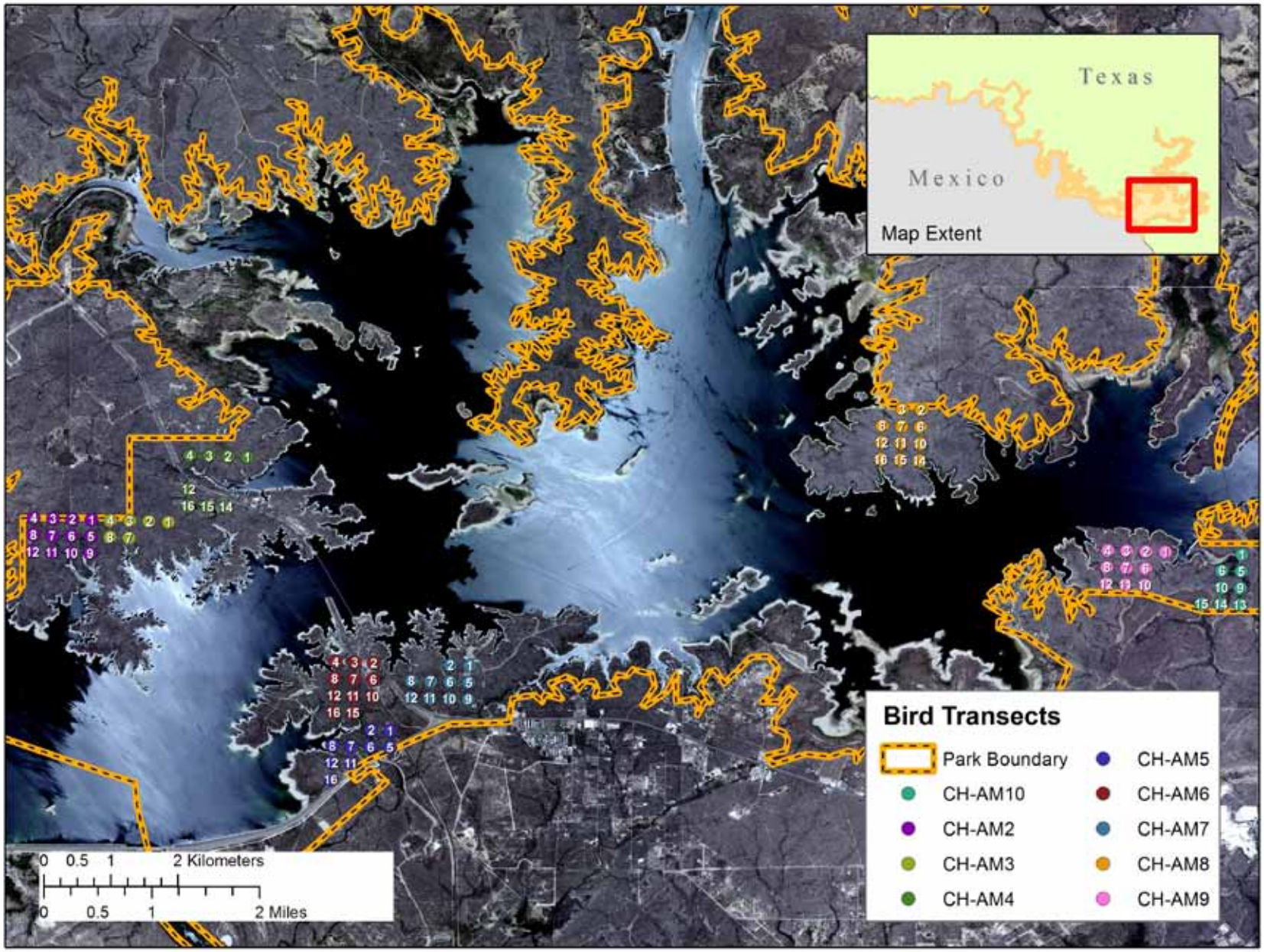

Figure 3.1.1-1. Point locations targeted for annual sampling at Amistad NRA, East.

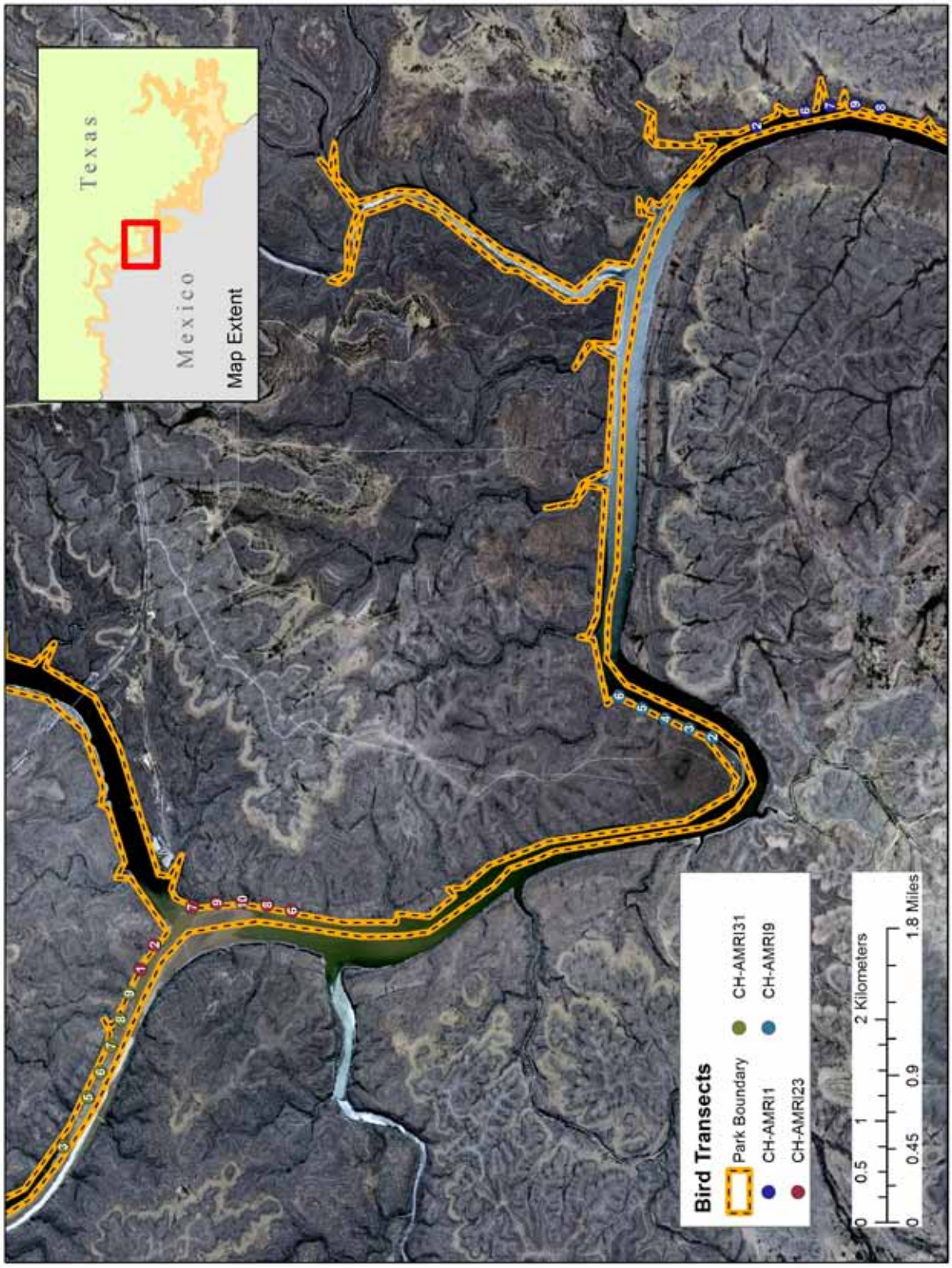

Figure 3.1.1-2. Point locations targeted for annual sampling at Amistad NRA, West.

Table 3.1.2 Number of birds detected of each species in each habitat class, Amistad NRA, 2011

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Cliff Swallow	88	342	430	25
Pyrrhuloxia	108	4	112	6
Cactus Wren	76	4	80	5
Cassin's Sparrow	68	8	76	4
Bell's Vireo	71	4	75	4
Black-throated Sparrow	64	7	71	4
Turkey Vulture	40	30	70	4
White-winged Dove	59	3	62	4
Great-tailed Grackle	52	5	57	3
House Finch	35	21	56	3
Chipping Sparrow	28	14	42	2
Northern Mockingbird	40	1	41	2
Bewick's Wren	38	--	38	2
Ash-throated Flycatcher	28	8	36	2
Canyon Wren	--	33	33	2
Red-winged Blackbird	30	3	33	2
Brown-headed Cowbird	29	--	29	2
Scaled Quail	29	--	29	2
Northern Cardinal	22	1	23	1
Great Blue Heron	--	19	19	1
Lesser Nighthawk	17	--	17	1
Black Vulture	3	13	16	1
Common Ground-Dove	15	1	16	1
Curve-billed Thrasher	14	2	16	1
Lark Sparrow	13	1	14	1
American Coot	13	--	13	1
Barn Swallow	9	--	9	1
Blue-gray Gnatcatcher	9	--	9	1
Verdin	4	4	8	0
Scott's Oriole	1	5	6	0
Painted Bunting	3	2	5	0
Say's Phoebe	--	5	5	0
Wilson's Warbler	--	5	5	0
Canyon Towhee	4	--	4	0
Double-crested Cormorant	4	--	4	0
Green Heron	4	--	4	0
Indigo Bunting	4	--	4	0
Killdeer	4	--	4	0
Ladder-backed Woodpecker	2	2	4	0
Rufous-crowned Sparrow	2	2	4	0
Vermilion Flycatcher	4	--	4	0

Table 3.1.2. Number of birds detected of each species in each habitat class, Amistad NRA, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Crested Caracara	3	--	3	0
Golden-fronted Woodpecker	3	--	3	0
Hooded Oriole	2	1	3	0
Mourning Dove	3	--	3	0
Rock Wren	3	--	3	0
Swainson's Hawk	1	2	3	0
Yellow Warbler	3	--	3	0
Common Yellowthroat	2	--	2	0
Mallard	1	1	2	0
Western Kingbird	1	1	2	0
Black Phoebe	--	1	1	0
Carolina Wren	--	1	1	0
Greater Roadrunner	--	1	1	0
Green-tailed Towhee	1	--	1	0
Lesser Goldfinch	1	--	1	0
Pied-billed Grebe	1	--	1	0
Red-tailed Hawk	--	1	1	0
Ruby-crowned Kinglet	1	--	1	0
Yellow-billed Cuckoo	1	--	1	0
Yellow-rumped Warbler	1	--	1	0
Unidentified Bird	*65*	*14*	*79*	*5*
Unidentified Blackbird	*21*	*--*	*21*	*1*
Unidentified Cardinal	*1*	*5*	*6*	*0*
Unidentified Hummingbird	*--*	*2*	*2*	*0*
Unidentified Oriole	*1*	*2*	*3*	*0*
Unidentified Sparrow	*4*	*6*	*10*	*1*
Unidentified Swallow	*3*	*1*	*4*	*0*
Unidentified Warbler	*--*	*1*	*1*	*0*
Total	**1,157**	**589**	**1,746**	**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 Big Bend National Park

3.2.1 2011 sampling

During March and April of 2011, we sampled 30 transects/grids at Big Bend NP (Figures 3.2.1-1 to 3.2.1-6). We conducted 219 point counts on twenty grids in grassland habitat and 64 point counts on ten transects in riparian habitat (Table 3.2.1), for a total of 283 point counts at the park. Each point was surveyed one time in 2011.

3.2.2 Results and discussion

During 2011, 2,607 birds of 88 species were counted at Big Bend NP (Table 3.2.2). Cactus Wren was the most commonly counted species (8%). Other common species were Turkey Vulture (8%), Black-throated Sparrow (7%), Mourning Dove (5%), White-winged Dove (5%), Bell's Vireo (4%), House Finch (3%), and Ash-throated Flycatcher (3%). No new species were detected for the park during the survey.

Big Bend NP was the first park we surveyed in 2011. We conducted the upland surveys first due to the difficulty accessing several of the riparian sites. Common species observed in the upland areas included Cactus Wren, Ash-throated Flycatcher, Pyrrhuloxia, Black-throated Sparrow, Verdin, and Gray Vireo. Common species detected in the riparian areas included several of the above species, with the addition of Bell's Vireo, Golden-fronted Woodpecker, and Common Yellowthroat. Rare birds observed outside of survey efforts included a nesting pair of Gray Hawks at the Cottonwood Campground, several Elf Owls at the Rio Grande Village, and a Golden Eagle and Peregrine Falcon on the Terlingua Ranch Golf Course adjacent to the park along the Rio Grande.

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Verdin (*Auriparus flaviceps*) was observed mostly in grassland habitat at Big Bend NP.

Table 3.2.1. Habitat class, number of points, and sampling dates for each transect or grid at Big Bend NP, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-BB1	Grassland	10	1	4/19/2011	--
CH-BB2	Grassland	8	1	4/5/2011	--
CH-BB3	Grassland	11	1	3/30/2011	--
CH-BB4	Grassland	11	1	3/31/2011	--
CH-BB5	Grassland	10	1	4/27/2011	--
CH-BB6	Grassland	9	1	4/8/2011	--
CH-BB7	Grassland	9	1	4/7/2011	--
CH-BB8	Grassland	14	1	4/6/2011	--
CH-BB9	Grassland	10	1	4/23/2011	--
CH-BB10	Grassland	13	1	4/1/2011	--
CH-BB11	Grassland	11	1	4/4/2011	--
CH-BB12	Grassland	11	1	4/11/2011	--
CH-BB13	Grassland	12	1	4/4/2011	--
CH-BB14	Grassland	15	1	3/30/2011	--
CH-BB15	Grassland	8	1	4/1/2011	--
CH-BB16	Grassland	10	1	4/7/2011	--
CH-BB17	Grassland	14	1	4/15/2011	--
CH-BB18	Grassland	8	1	4/8/2011	--
CH-BB19	Grassland	13	1	4/6/2011	--
CH-BB20	Grassland	12	1	4/9/2011	--
CH-BIRI1	Riparian	9	1	4/20/2011	--
CH-BIRI2	Riparian	8	1	4/14/2011	--
CH-BIRI3	Riparian	6	1	4/12/2011	--
CH-BIRI5	Riparian	6	1	4/13/2011	--
CH-BIRI6	Riparian	5	1	4/25/2011	--
CH-BIRI8	Riparian	5	1	4/15/2011	--
CH-BIRI9	Riparian	5	1	4/18/2011	--
CH-BIRI14	Riparian	8	1	4/21/2011	--
CH-BIRI16	Riparian	5	1	4/24/2011	--
CH-BIRI17	Riparian	7	1	4/17/2011	--

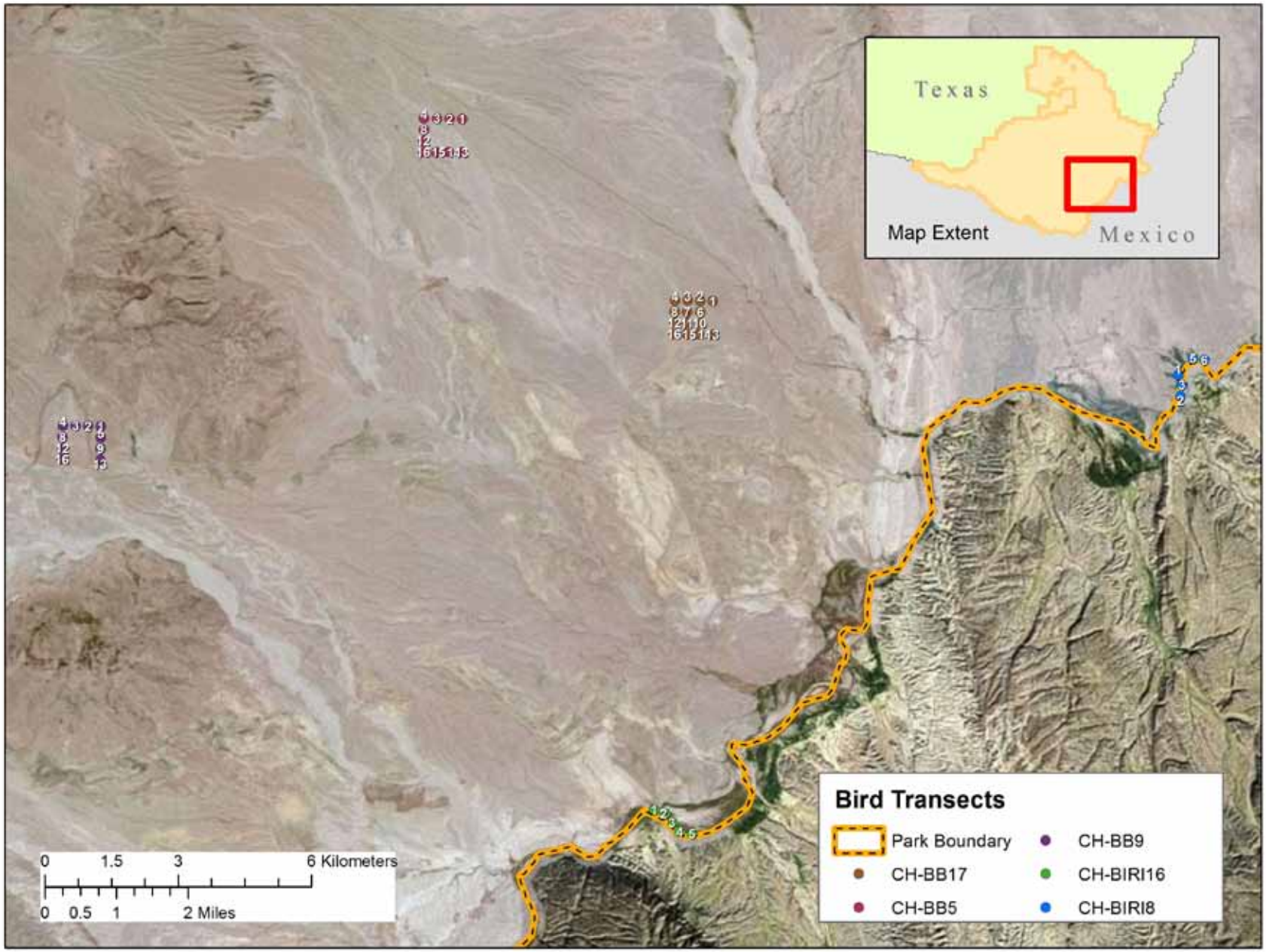

Figure 3.2.1-1. Point locations targeted for annual sampling at Big Bend NP, East.

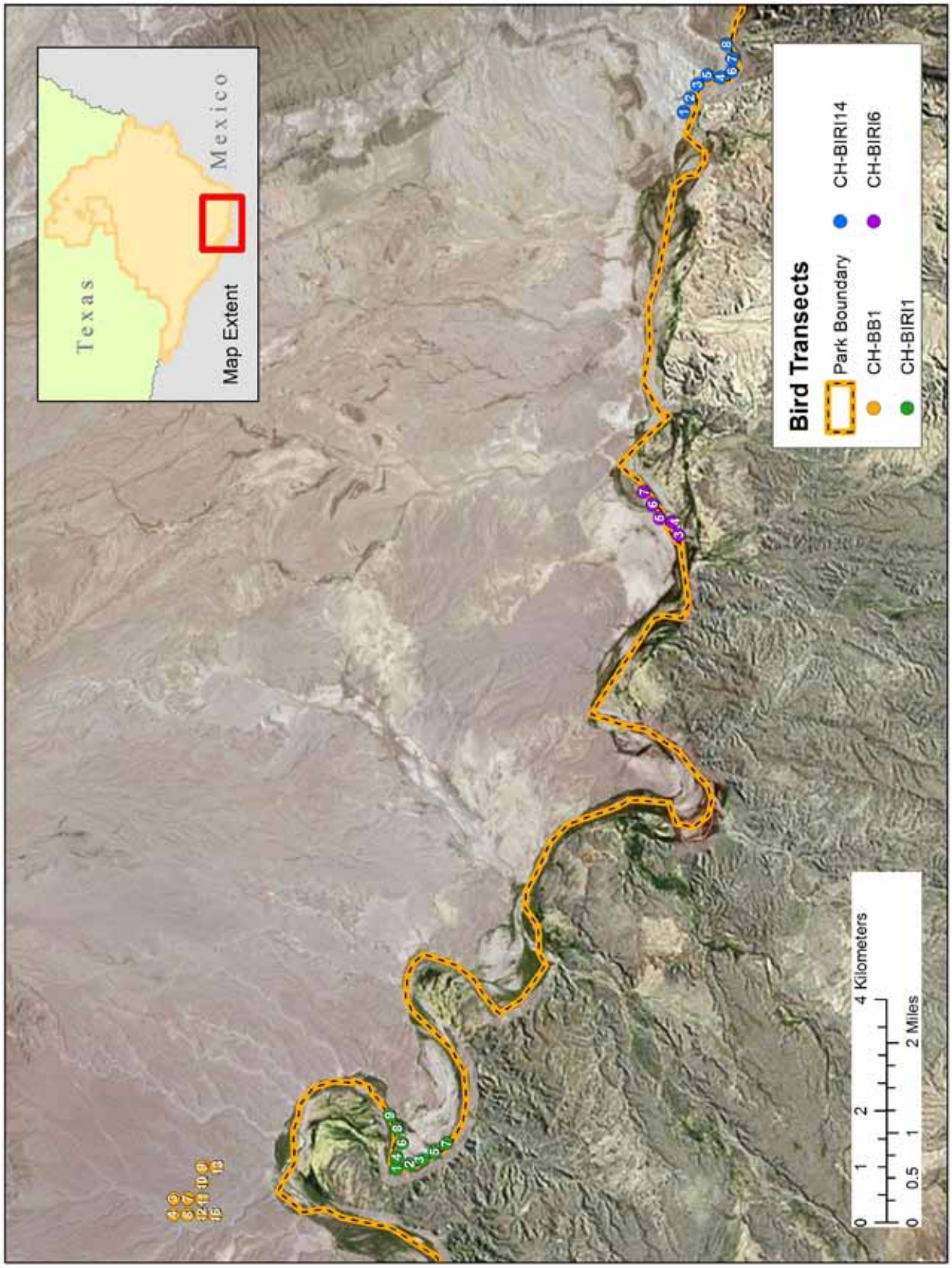

Figure 3.2.1-2. Point locations targeted for annual sampling at Big Bend NP, South.

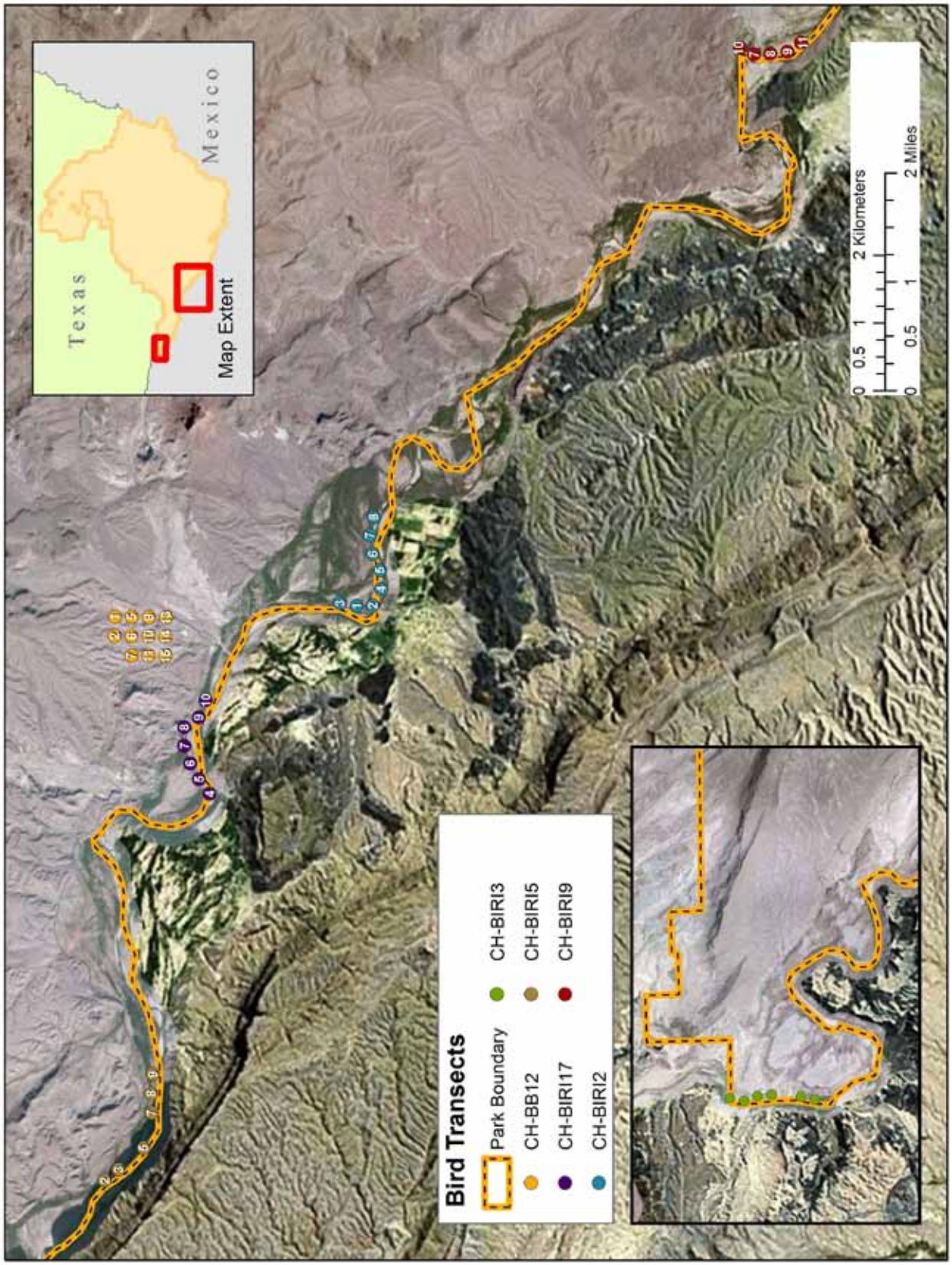

Figure 3.2.1-3. Point locations targeted for annual sampling at Big Bend NP, West.

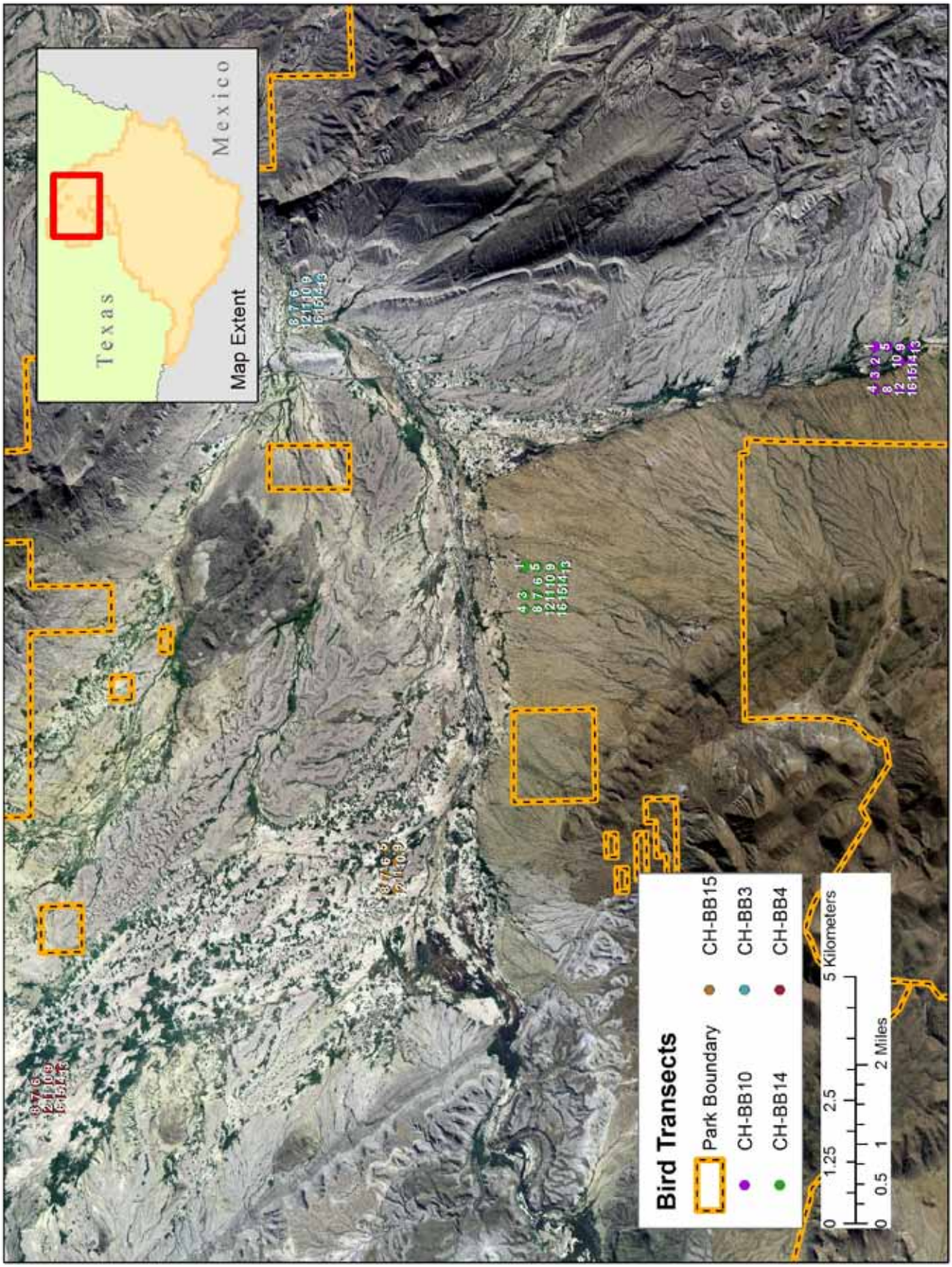

Figure 3.2.1-4. Point locations targeted for annual sampling at Big Bend NP, North.

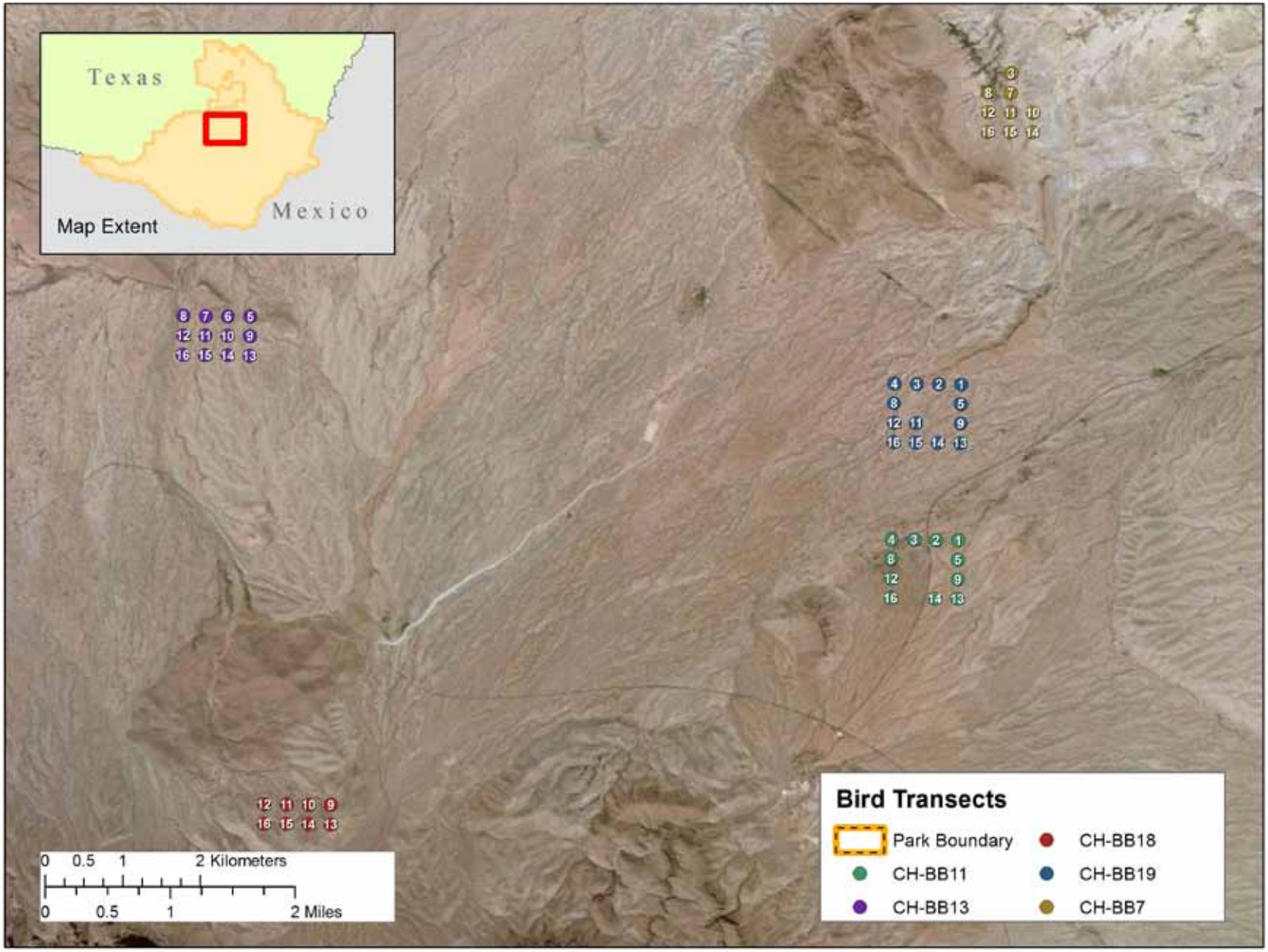

Figure 3.2.1-5. Point locations targeted for annual sampling at Big Bend NP, North-central.

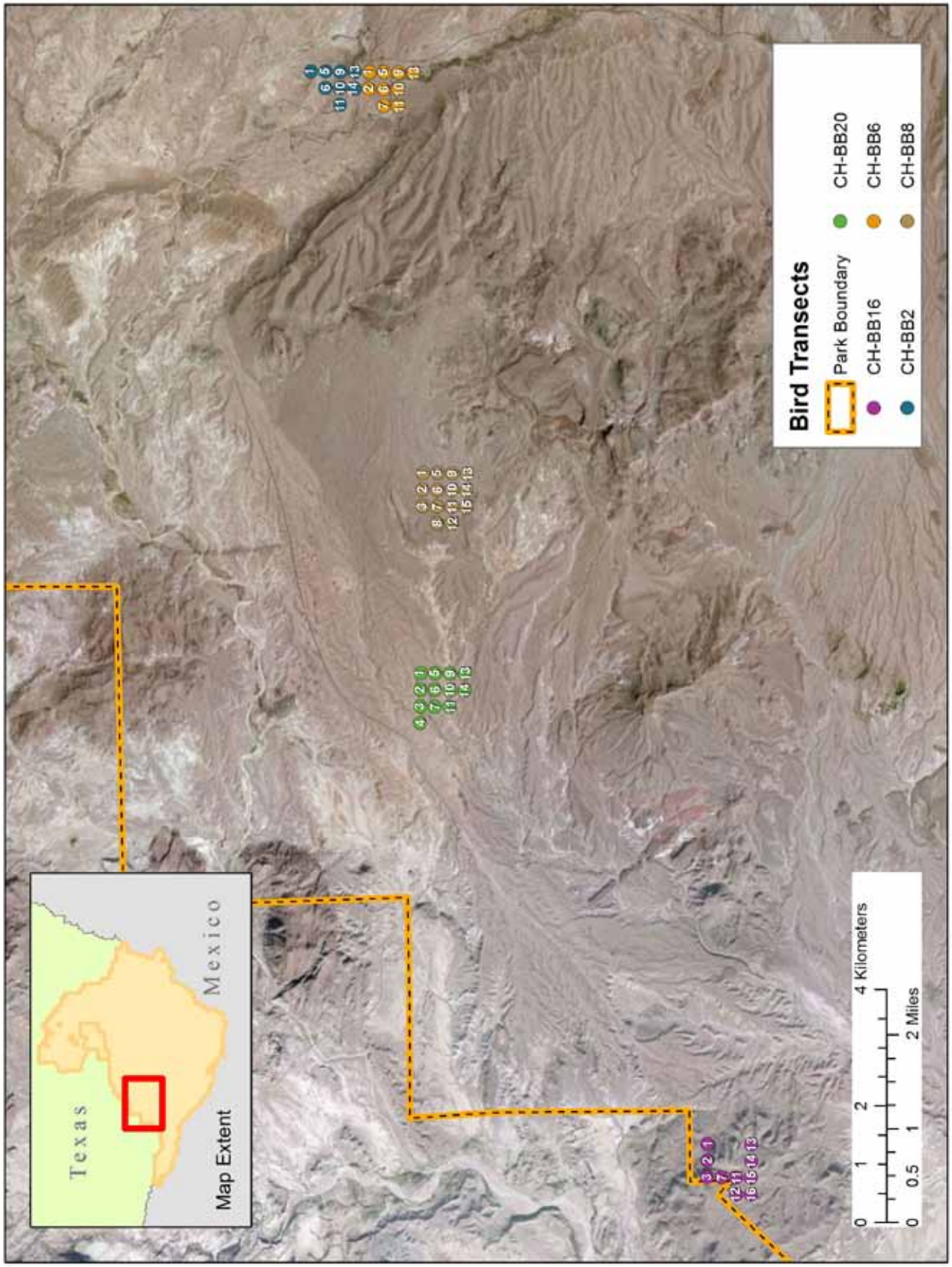

Figure 3.2.1-6. Point locations targeted for annual sampling at Big Bend NP, Northwest.

Table 3.2.2. Number of birds detected of each species in each habitat class, Big Bend NP, 2011

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Cactus Wren	220	--	220	8
Turkey Vulture	165	38	203	8
Black-throated Sparrow	174	15	189	7
Mourning Dove	66	70	136	5
White-winged Dove	18	103	121	5
Bell's Vireo	4	107	111	4
House Finch	73	16	89	3
Ash-throated Flycatcher	72	16	88	3
Verdin	54	9	63	2
Chihuahuan Raven	54	6	60	2
Chipping Sparrow	18	42	60	2
Pyrrhuloxia	59	1	60	2
Northern Mockingbird	33	23	56	2
Northern Rough-winged Swallow	3	39	42	2
Common Yellowthroat	1	40	41	2
Bank Swallow	--	40	40	2
Scott's Oriole	36	1	37	1
Curve-billed Thrasher	35	--	35	1
Rock Wren	33	2	35	1
Black-tailed Gnatcatcher	23	11	34	1
Northern Cardinal	7	23	30	1
Say's Phoebe	8	21	29	1
Yellow-breasted Chat	--	29	29	1
Brewer's Blackbird	--	27	27	1
Wilson's Warbler	2	24	26	1
Bewick's Wren	23	2	25	1
Great-tailed Grackle	5	20	25	1
Blue-gray Gnatcatcher	14	9	23	1
Summer Tanager	--	22	22	1
Rufous-crowned Sparrow	12	7	19	1
Greater Roadrunner	13	5	18	1
Scaled Quail	14	2	16	1
Yellow-rumped Warbler	3	12	15	1
Vesper Sparrow	8	6	14	1
Lesser Nighthawk	5	8	13	0
Mallard	--	12	12	0
Canyon Wren	5	6	11	0
Canyon Towhee	10	--	10	0
Common Ground-Dove	--	10	10	0
Violet-green Swallow	--	10	10	0
Vermilion Flycatcher	--	8	8	0

Table 3.2.2. Number of birds detected of each species in each habitat class, Big Bend NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Black-chinned Sparrow	4	3	7	0
Gray Vireo	7	--	7	0
Crissal Thrasher	4	2	6	0
Green-tailed Towhee	3	3	6	0
Loggerhead Shrike	6	--	6	0
Savannah Sparrow	5	1	6	0
Spotted Sandpiper	--	6	6	0
Cassin's Kingbird	--	5	5	0
Ladder-backed Woodpecker	2	3	5	0
Lark Bunting	5	--	5	0
Marsh Wren	--	5	5	0
Red-winged Blackbird	--	5	5	0
Western Kingbird	--	5	5	0
American Avocet	--	4	4	0
Brewer's Sparrow	3	1	4	0
Killdeer	--	4	4	0
Golden-fronted Woodpecker	1	2	3	0
Great Horned Owl	1	2	3	0
Red-tailed Hawk	2	1	3	0
Ruby-crowned Kinglet	--	3	3	0
Swainson's Hawk	3	--	3	0
White-crowned Sparrow	3	--	3	0
American Kestrel	2	--	2	0
Black Vulture	--	2	2	0
Black-headed Grosbeak	--	2	2	0
Common Raven	2	--	2	0
Horned Lark	2	--	2	0
Northern Shoveler	--	2	2	0
Western Meadowlark	2	--	2	0
American Coot	--	1	1	0
American Pipit	--	1	1	0
Black Phoebe	--	1	1	0
Brown-headed Cowbird	1	--	1	0
Burrowing Owl	1	--	1	0
Cassin's Sparrow	--	1	1	0
Eastern Phoebe	--	1	1	0
Gray Hawk	--	1	1	0
Great Egret	--	1	1	0
Lesser Goldfinch	--	1	1	0
Northern Flicker	1	--	1	0
Northern Harrier	1	--	1	0
Sage Thrasher	1	--	1	0

Table 3.2.2. Number of birds detected of each species in each habitat class, Big Bend NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Virginia's Warbler	--	1	1	0
Western Screech-Owl	--	1	1	0
Western Tanager	1	--	1	0
Winter Wren	--	1	1	0
Yellow Warbler	--	1	1	0
Unidentified Bird	*98*	*47*	*145*	*6*
Unidentified Cardinal	*46*	*50*	*96*	*4*
Unidentified Swallow	*--*	*35*	*35*	*1*
Unidentified Sparrow	*18*	*8*	*26*	*1*
Unidentified Myiarchus	*--*	*12*	*12*	*0*
Unidentified Blackbird	*--*	*10*	*10*	*0*
Unidentified Thrasher	*8*	*--*	*8*	*0*
Unidentified Corvid	*3*	*4*	*7*	*0*
Unidentified Duck	*--*	*4*	*4*	*0*
Unidentified Hummingbird	*2*	*2*	*4*	*0*
Unidentified Warbler	*--*	*4*	*4*	*0*
Unidentified Hawk	*2*	*--*	*2*	*0*
Unidentified Woodpecker	*--*	*2*	*2*	*0*
Unidentified Empidonax	*--*	*1*	*1*	*0*
Unidentified Flycatcher	*1*	*--*	*1*	*0*
Unidentified Oriole	*--*	*1*	*1*	*0*
Unidentified Tanager	*1*	*--*	*1*	*0*
Total	**1,512**	**1,095**	**2,607**	**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 Carlsbad Caverns National Park

3.3.1 2011 sampling

During May of 2011, we sampled nine transects/grids at Carlsbad Caverns NP (Figure 3.3.1-1, -2). We conducted 75 point counts on eight grids in grassland habitat and 16 point counts on one transect in riparian habitat (Table 3.3.1). The grassland grids were visited once in 2011, but the riparian transect was visited twice. There was a total of 91 point counts at the park.

3.3.2 Results and discussion

During 2011, 1,140 birds of 71 species were counted at Carlsbad Caverns NP (Table 3.3.2). Black-throated Sparrow was the most commonly counted species (8%). Turkey Vulture (7%), Northern Mockingbird (7%), Western Kingbird (5%), and Chipping Sparrow (5%) were also common. No new species were detected for the park during the survey.

Bird activity at the park was low overall, except at Rattlesnake Springs which served as the only riparian habitat within the park. Rattlesnake Springs had the highest bird abundance and diversity of any site surveyed in the CHDN in 2011. Birds observed in the riparian area include Yellow-breasted Chat, Vermillion Flycatcher, Western Wood-Peewee, Blue Grosbeak, Western Kingbird, Phainopepla, Summer Tanager, Western Tanager, Bell's Vireo, Wild Turkey, Scott's Oriole, Bullock's Oriole, Orchard Oriole, Painted Bunting, Northern Rough-winged Swallow, and Spotted Sandpiper. Common species observed in the upland areas included Cassin's Sparrow, Northern Mockingbird, Western Kingbird, Green-tailed Towhee, Ash-throated Flycatcher, Blue Grosbeak, Scaled Quail, and Pyrrhuloxia.

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Black-throated Sparrow (*Amphispiza bilineata*) was the most commonly counted species at Carlsbad Caverns NP in 2011.

Table 3.3.1. Habitat class, number of points, and sampling dates for each transect or grid at Carlsbad Caverns NP, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-CC1	Grassland	8	1	5/16/2011	--
CH-CC2	Grassland	12	1	5/15/2011	--
CH-CC3	Grassland	11	1	5/13/2011	--
CH-CC4	Grassland	6	1	5/14/2011	--
CH-CC5	Grassland	12	1	5/13/2011	--
CH-CC6	Grassland	10	1	5/14/2011	--
CH-CC7	Grassland	10	1	5/11/2011	--
CH-CC8	Grassland	6	1	5/12/2011	--
CH-CCRI	Riparian	8[1]	2	5/15/2011	5/16/2011

[1] 8 points were counted on the transect on each of the two visits in 2011.

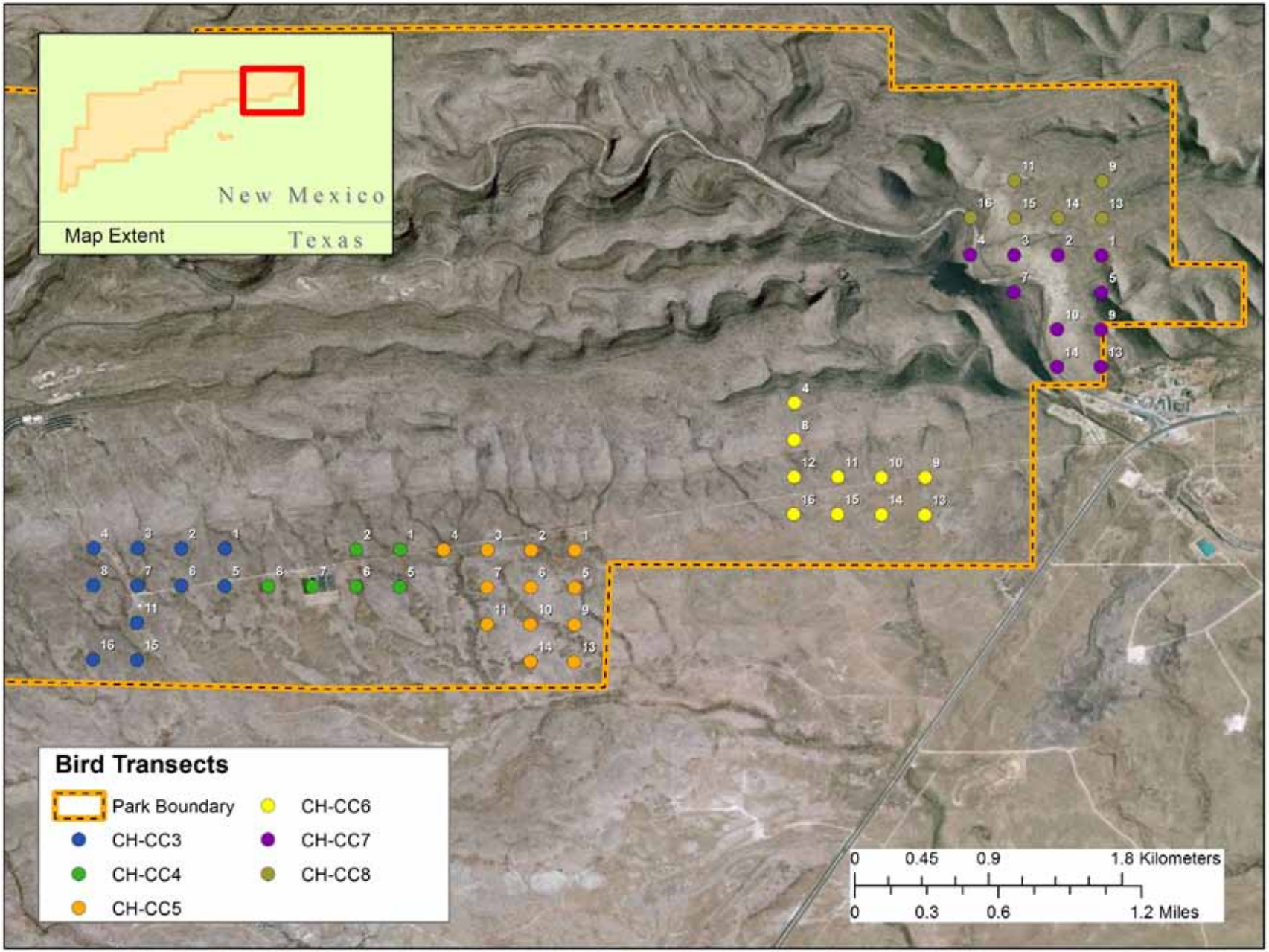

Figure 3.3.1-1. Point locations targeted for annual sampling at Carlsbad Caverns NP, East.

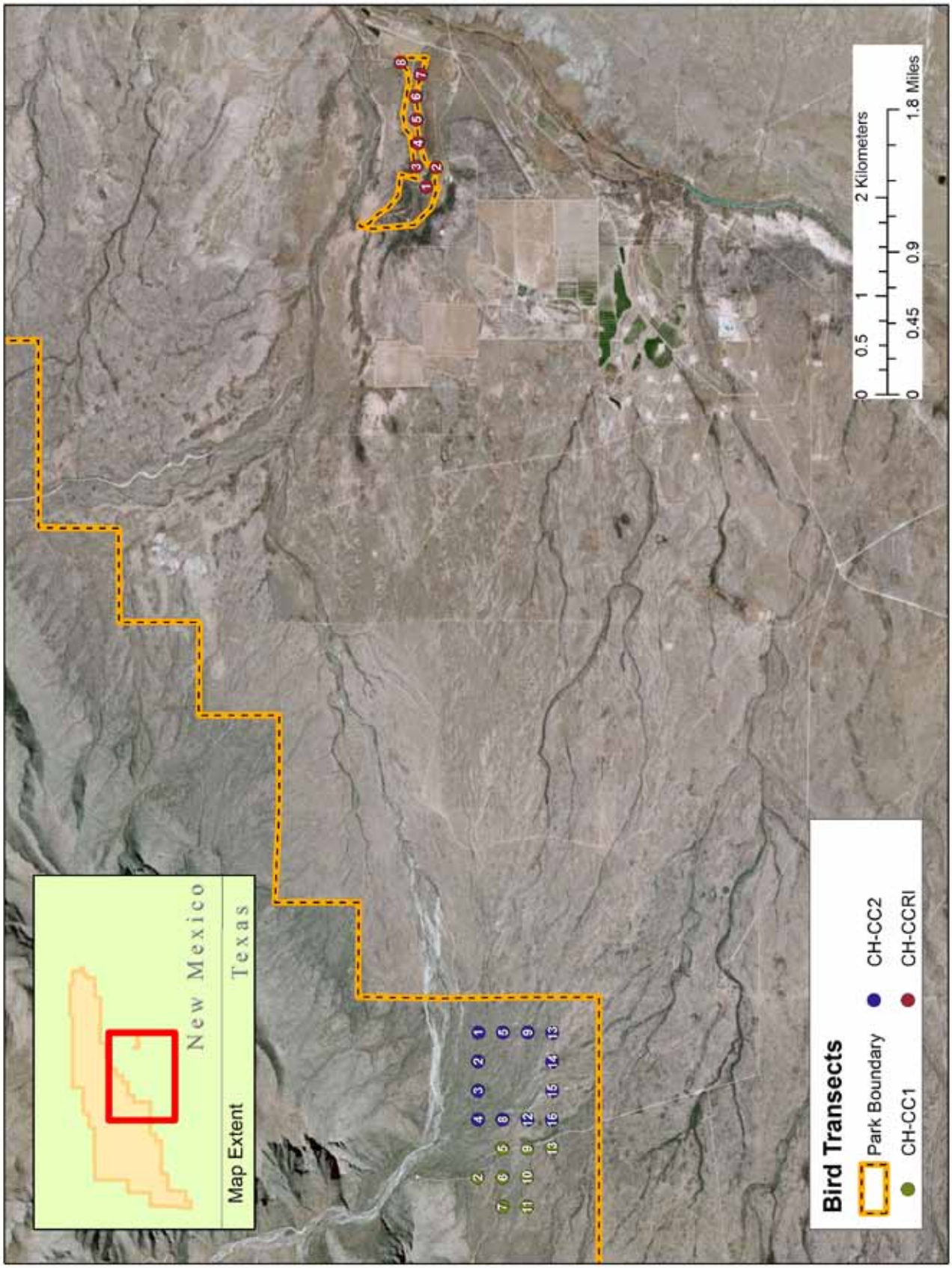

Figure 3.3.1-2. Point locations targeted for annual sampling at Carlsbad Caverns NP, West.

Table 3.3.2. Number of birds detected of each species in each habitat class, Carlsbad Caverns NP, 2011

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Black-throated Sparrow	87	1	88	8
Turkey Vulture	78	3	81	7
Northern Mockingbird	58	21	79	7
Western Kingbird	24	32	56	5
Chipping Sparrow	51	4	55	5
Brewer's Sparrow	50	--	50	4
White-winged Dove	5	42	47	4
Cassin's Sparrow	35	1	36	3
Cassin's Kingbird	14	20	34	3
Ash-throated Flycatcher	32	1	33	3
Scott's Oriole	27	3	30	3
Brown-headed Cowbird	7	22	29	3
Bell's Vireo	7	20	27	2
Mourning Dove	26	1	27	2
Wild Turkey	--	27	27	2
Scaled Quail	26	--	26	2
House Finch	11	12	23	2
Blue Grosbeak	21	1	22	2
Green-tailed Towhee	17	5	22	2
Pyrrhuloxia	22	--	22	2
White-crowned Sparrow	--	18	18	2
Bewick's Wren	15	2	17	1
Vermilion Flycatcher	--	16	16	1
Common Yellowthroat	--	13	13	1
Canyon Towhee	10	2	12	1
Curve-billed Thrasher	11	--	11	1
Phainopepla	--	11	11	1
Summer Tanager	--	11	11	1
Western Tanager	3	8	11	1
Yellow-rumped Warbler	9	2	11	1
Black-chinned Hummingbird	1	8	9	1
Western Wood-Pewee	1	8	9	1
Yellow-breasted Chat	--	9	9	1
Barn Swallow	2	6	8	1
Cliff Swallow	5	2	7	1
Killdeer	4	3	7	1
Wilson's Warbler	4	3	7	1
Lark Sparrow	4	2	6	1
Canyon Wren	5	--	5	0
Black-headed Grosbeak	4	--	4	0

Table 3.3.2. Number of birds detected of each species in each habitat class, Carlsbad Caverns NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Hermit Thrush	--	4	4	0
Ladder-backed Woodpecker	1	3	4	0
Lesser Goldfinch	--	4	4	0
Orchard Oriole	--	4	4	0
Common Nighthawk	--	3	3	0
Cordilleran Flycatcher	1	2	3	0
Painted Bunting	--	3	3	0
Rufous-crowned Sparrow	3	--	3	0
Say's Phoebe	2	1	3	0
Spotted Sandpiper	--	3	3	0
Eastern Meadowlark	2	--	2	0
Townsend's Warbler	2	--	2	0
Blue-gray Gnatcatcher	1	--	1	0
Broad-tailed Hummingbird	1	--	1	0
Bullock's Oriole	--	1	1	0
Cactus Wren	1	--	1	0
Gray Hawk	--	1	1	0
Great-tailed Grackle	--	1	1	0
Hooded Oriole	--	1	1	0
House Wren	1	--	1	0
Loggerhead Shrike	1	--	1	0
Marsh Wren	--	1	1	0
Northern Harrier	1	--	1	0
Northern Rough-winged Swallow	--	1	1	0
Rock Wren	1	--	1	0
Savannah Sparrow	1	--	1	0
Swainson's Hawk	--	1	1	0
Verdin	1	--	1	0
Violet-green Swallow	1	--	1	0
Yellow Warbler	--	1	1	0
Yellow-billed Cuckoo	--	1	1	0
Unidentified Bird	*23*	*2*	*25*	*2*
Unidentified Blackbird	*10*	*--*	*10*	*1*
Unidentified Oriole	*3*	*6*	*9*	*1*
Unidentified Sparrow	*8*	*1*	*9*	*1*
Unidentified Hummingbird	*3*	*1*	*4*	*0*
Unidentified Gnatcatcher	*3*	*--*	*3*	*0*
Unidentified Cardinal	*2*	*--*	*2*	*0*
Unidentified Flycatcher	*2*	*--*	*2*	*0*
Unidentified Hawk	*1*	*--*	*1*	*0*
Unidentified Kingbird	*1*	*--*	*1*	*0*

Table 3.3.2. Number of birds detected of each species in each habitat class, Carlsbad Caverns NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Unidentified Swallow	*1*	--	*1*	*0*
Total	**754**	**386**	**1140**	**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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Black-headed Grosbeak (*Pheucticus melanocephalus*) was observed in grassland habitat at Carlsbad Caverns NP in 2011.

3.4 Fort Davis National Historic Site

3.4.1 2011 sampling

During April of 2011, we sampled one grid in grassland habitat at Fort Davis NHS (Figure 3.4.1). We surveyed the grid two times, for a total of 42 point counts in grassland habitat at the park (Table 3.4.1).

3.4.2 Results and discussion

During 2011, 593 birds of 55 species were counted at Fort Davis NHS (Table 3.4.2). Turkey Vulture was the most commonly counted species (10%). White-winged Dove (7%), Chipping Sparrow (6%), House Sparrow (5%), Cassin's Kingbird (4%), and Canyon Wren (4%) were also common.

Fort Davis NHS was the second park we surveyed in 2011. The park is a small historic park with point-count stations covering the entire property. It was surveyed over two days, and then replicated for a total of four days' worth of survey effort. Common birds observed include Black-throated Sparrow, Canyon Wren, Rock Wren, Lark Sparrow, Cassin's Kingbird, White-winged Dove, Northern Mockingbird, House Sparrow, and Chipping Sparrow. There were abundant Black-chinned Hummingbirds at this site. Four new species, previously unrecorded in the park, Black-tailed Gnatcatcher, Cave Swallow, Lesser Nighthawk, and Virginia's Warbler, were detected during the survey.

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Several Black-chinned Hummingbirds (*Archilochus alexandri*) were detected at Fort Davis NHS in 2011. An immature female is shown here.

Table 3.4.1. Habitat class, number of points, and sampling dates for the grid at Fort Davis NHS, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-FODA	Grassland	22[1]	2	4/17/2011	4/30/2011

[1] Not all 22 points were sampled on the first visit in 2011.

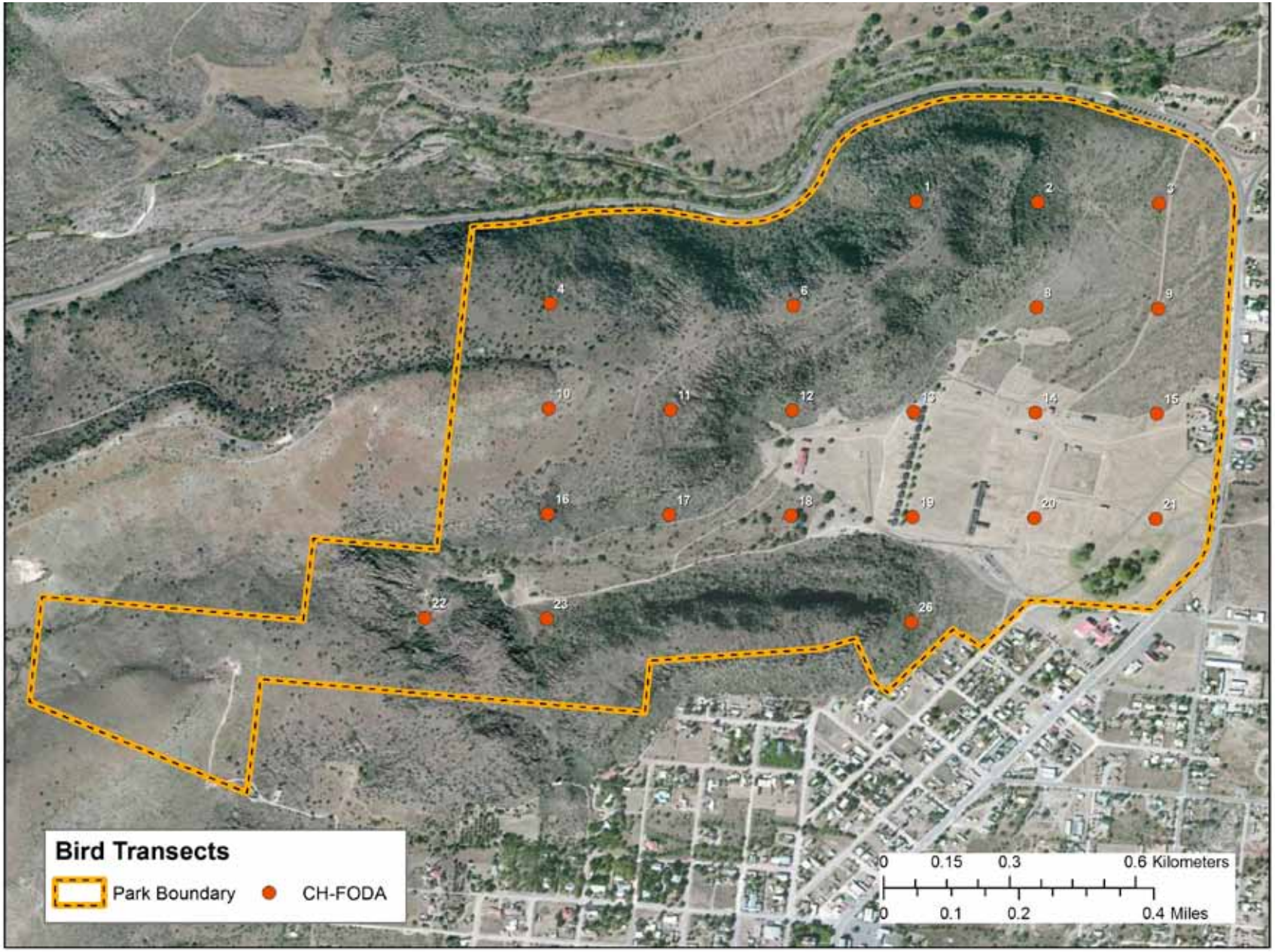

Figure 3.4.1. Point locations targeted for annual sampling at Fort Davis NHS.

Table 3.4.2. Number of birds detected of each species in each habitat class, Fort Davis NHS, 2011

Species	# of birds detected	
	Total (grassland)	% of total
Turkey Vulture	58	10
White-winged Dove	41	7
Chipping Sparrow	34	6
House Sparrow	31	5
Cassin's Kingbird	26	4
Canyon Wren	26	4
House Finch	24	4
Barn Swallow	23	4
Lark Sparrow	16	3
Canyon Towhee	16	3
Black-throated Sparrow	16	3
Rock Wren	14	2
Ash-throated Flycatcher	13	2
Cave Swallow	**12**	**2**
Cactus Wren	12	2
Green-tailed Towhee	11	2
Wilson's Warbler	10	2
Northern Mockingbird	10	2
Chihuahuan Raven	10	2
Vesper Sparrow	9	2
Lesser Goldfinch	9	2
Eurasian Collared-Dove	8	1
Brown-headed Cowbird	8	1
Cassin's Sparrow	7	1
Rufous-crowned Sparrow	6	1
Brewer's Sparrow	6	1
Yellow-rumped Warbler	5	1
Say's Phoebe	5	1
Blue-gray Gnatcatcher	4	1
Black-chinned Hummingbird	4	1
Bewick's Wren	4	1
Savannah Sparrow	3	1
Pyrrhuloxia	3	1
Phainopepla	3	1
Curve-billed Thrasher	3	1
Brewer's Blackbird	3	1
Black-tailed Gnatcatcher	**3**	**1**
Black-crested Titmouse	3	1
White-crowned Sparrow	2	0
Verdin	2	0
Summer Tanager	2	0
Northern Cardinal	2	0
Mourning Dove	2	0
Montezuma Quail	2	0
Western Wood-Pewee	1	0
Virginia's Warbler	**1**	**0**
Scott's Oriole	1	0
Scaled Quail	1	0
Ruby-crowned Kinglet	1	0
Northern Flicker	1	0
Lesser Nighthawk	**1**	**0**
Ladder-backed Woodpecker	1	0
Gray Flycatcher	1	0
Eastern Meadowlark	1	0
Blue Grosbeak	1	0
Unidentified Bird	*25*	*4*
Unidentified Hummingbird	*14*	*2*
Unidentified Swallow	*13*	*2*
Unidentified Cardinal	*6*	*1*
Unidentified Sparrow	*3*	*1*
Unidentified Warbler	*2*	*0*
Unidentified Flycatcher	*2*	*0*
Unidentified Thrush	*1*	*0*
Unidentified Tanager	*1*	*0*
Unidentified Jay	*1*	*0*
Unidentified Hawk	*1*	*0*
Unidentified Gnatcatcher	*1*	*0*
Unidentified Corvid	*1*	*0*
Total	**593**	**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.

3.5 Guadalupe Mountains National Park

3.5.1 2011 sampling

During May 2011, we sampled a total of ten transects/grids at Guadalupe Mountains NP (Figure 3.5.1). We conducted 98 point counts on nine grids in grassland habitat and 27 point counts on one transect in riparian habitat (Table 3.5.1), for a total of 125 point counts at the park in 2011. The grassland grids were surveyed once, while the riparian transect was surveyed twice.

3.5.2 Results and discussion

During 2011, 1,073 birds of 89 species were counted at Guadalupe Mountains NP (Table 3.5.2). Black-throated Sparrow was the most commonly counted species (8%). Other common species included Turkey Vulture (6%), Lark Bunting (5%), Brewer's Sparrow (5%), Scott's Oriole (4%), Scaled Quail (3%), and Rufous-crowned Sparrow (3%). Two new species were detected at the park in 2011: Bell's Vireo and Cave Swallow.

There were many interesting species recorded in McKittrick Canyon, including Bell's Vireo, Bullock's Oriole, Cassin's Vireo, Cave Swallow, Cooper's Hawk, Great Horned Owl, Hermit Warbler, Northern Waterthrush, and Yellow Warbler. Bird activity was otherwise moderate overall, including such species as Ash-throated Flycatcher, Scaled Quail, Black-throated Sparrow, Golden Eagle, and Horned Lark. Many of the randomly located grids were located near or on sand dunes, creosote flats, and basically a salt desert environment.

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Several Bullock's Oriole (*Icterus bullockii*) were detected at Guadalupe Mountains NP in 2011.

Table 3.5.1. Habitat class, number of points, and sampling dates for each transect or grid at Guadalupe Mountains NP, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-GM1	Grassland	11	1	5/6/2011	--
CH-GM2	Grassland	12	1	5/17/2011	--
CH-GM3	Grassland	9	1	5/11/2011	--
CH-GM4	Grassland	16	1	5/8/2011	--
CH-GM5	Grassland	10	1	5/9/2011	--
CH-GM6	Grassland	8	1	5/11/2011	--
CH-GM7	Grassland	14	1	5/9/2011	--
CH-GM8	Grassland	8	1	5/7/2011	--
CH-GM9	Grassland	10	1	5/10/2011	--
CH-GMRI	Riparian	16[1]	2	5/6/2011	5/7/2011

[1] Not all 16 points were sampled on the first visit in 2011.

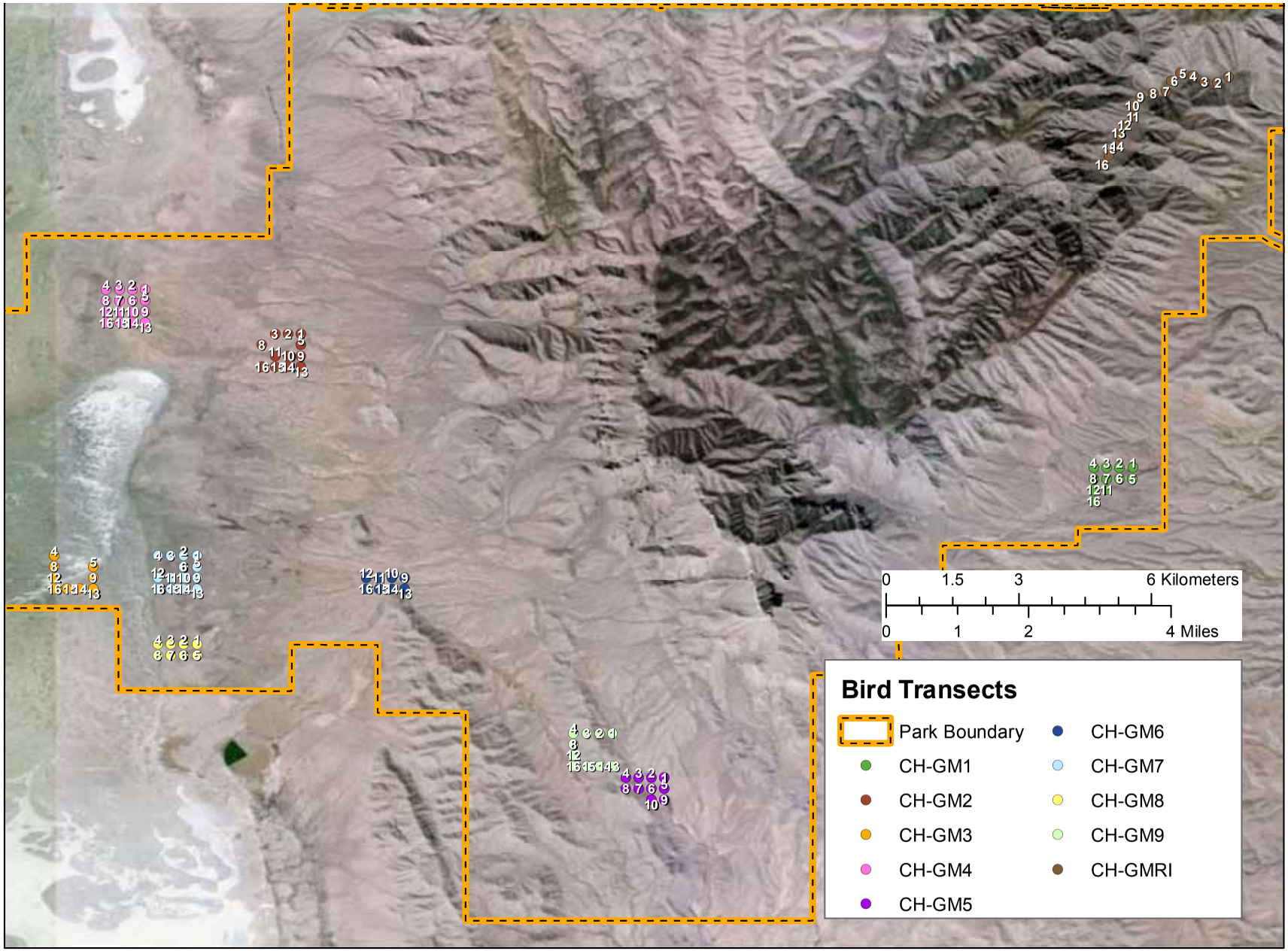

Figure 3.5.1. Point locations targeted for annual sampling at Guadalupe Mountains NP.

Table 3.5.2. Number of birds detected of each species in each habitat class, Guadalupe Mountains NP, 2011

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Black-throated Sparrow	80	1	81	8
Turkey Vulture	40	29	69	6
Lark Bunting	52	--	52	5
Brewer's Sparrow	50	--	50	5
Scott's Oriole	32	11	43	4
Scaled Quail	36	1	37	3
Rufous-crowned Sparrow	8	28	36	3
Barn Swallow	31	--	31	3
Lark Sparrow	27	--	27	3
Wilson's Warbler	10	16	26	2
Bewick's Wren	7	19	26	2
Violet-green Swallow	--	25	25	2
White-throated Swift	--	24	24	2
Canyon Wren	--	24	24	2
Ash-throated Flycatcher	19	5	24	2
Yellow-rumped Warbler	13	8	21	2
House Finch	20	1	21	2
Black-headed Grosbeak	2	19	21	2
Canyon Towhee	7	12	19	2
Chipping Sparrow	14	3	17	2
Lesser Goldfinch	16	--	16	1
Rock Wren	6	9	15	1
Lazuli Bunting	6	9	15	1
Western Kingbird	13	1	14	1
Curve-billed Thrasher	13	1	14	1
Cactus Wren	14	--	14	1
Northern Mockingbird	11	2	13	1
White-winged Dove	7	4	11	1
Say's Phoebe	9	2	11	1
Mourning Dove	10	1	11	1
Swainson's Hawk	10	--	10	1
Loggerhead Shrike	10	--	10	1
Cliff Swallow	10	--	10	1
Pyrrhuloxia	9	--	9	1
Cassin's Kingbird	4	5	9	1
White-crowned Sparrow	4	4	8	1
Hammond's Flycatcher	--	8	8	1
Cassin's Sparrow	8	--	8	1
Western Scrub-Jay	4	3	7	1
Hermit Thrush	2	5	7	1

Table 3.5.2. Number of birds detected of each species in each habitat class, Guadalupe Mountains NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Plumbeous Vireo	--	6	6	1
Ladder-backed Woodpecker	1	5	6	1
Broad-tailed Hummingbird	--	6	6	1
Black-chinned Sparrow	--	6	6	1
Summer Tanager	--	5	5	0
Green-tailed Towhee	2	3	5	0
Brown-headed Cowbird	5	--	5	0
Wild Turkey	--	4	4	0
Townsend's Warbler	1	3	4	0
Great-tailed Grackle	4	--	4	0
Great Horned Owl	2	2	4	0
Gray Vireo	1	3	4	0
Chihuahuan Raven	4	--	4	0
Bullock's Oriole	2	2	4	0
Blue-gray Gnatcatcher	--	4	4	0
Black-chinned Hummingbird	1	3	4	0
Western Tanager	1	2	3	0
Western Meadowlark	3	--	3	0
Verdin	3	--	3	0
Red-tailed Hawk	3	--	3	0
Horned Lark	3	--	3	0
Gray Flycatcher	2	1	3	0
Eastern Meadowlark	3		3	0
Cave Swallow	**2**	**1**	**3**	**0**
Virginia's Warbler	--	2	2	0
Swainson's Thrush	--	2	2	0
Phainopepla	2	--	2	0
Northern Harrier	2	--	2	0
Lesser Nighthawk	1	1	2	0
Juniper Titmouse	2	--	2	0
Cassin's Vireo	--	2	2	0
Burrowing Owl	2	--	2	0
Black-throated Gray Warbler	--	2	2	0
Bell's Vireo	**--**	**2**	**2**	**0**
American Kestrel	2	--	2	0
Yellow Warbler	--	1	1	0
Vermilion Flycatcher	1	--	1	0
Spotted Towhee	1	--	1	0
Pine Siskin	1	--	1	0
Northern Waterthrush	--	1	1	0

Table 3.5.2. Number of birds detected of each species in each habitat class, Guadalupe Mountains NP, 2011, cont.

Species	Habitat class		# of birds detected	
	Grassland	Riparian	Total	% of total
Northern Rough-winged Swallow	1	--	1	0
Hermit Warbler	--	1	1	0
Greater Roadrunner	--	1	1	0
Golden Eagle	1	--	1	0
Crissal Thrasher	1	--	1	0
Cooper's Hawk	--	1	1	0
Common Raven	--	1	1	0
Common Poorwill	1	--	1	0
Black-tailed Gnatcatcher	1	--	1	0
Unidentified Bird	*29*	--	*29*	*3*
Unidentified Thrasher	*3*	--	*3*	*0*
Unidentified Hummingbird	*2*	*1*	*3*	*0*
Unidentified Flycatcher	*1*	*2*	*3*	*0*
Unidentified Kingbird	*2*	--	*2*	*0*
Unidentified Blackbird	*2*	--	*2*	*0*
Unidentified Swallow	*1*	--	*1*	*0*
Unidentified Sparrow	*1*	--	*1*	*0*
Total	**717**	**356**	**1,073**	**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 White Sands National Monument

3.6.1 2011 sampling

During May of 2011, we sampled ten transects/grids at White Sands NM (Figures 3.6.1-1, -2). We conducted 111 point counts on ten grids in grassland habitat (Table 3.6.1). Each point was surveyed once in 2011.

3.6.2 Results and discussion

During 2011, 630 birds of 51 species were counted at White Sands NM (Table 3.6.2). The most commonly counted species was Black-throated Sparrow (23%). Northern Mockingbird (12%), Western Kingbird (9%), Horned Lark (6%), Cassin's Sparrow (5%), and Eastern Meadowlark (4%) were also common.

White Sands NM was the last park surveyed. In addition to the ten grids surveyed, we conducted an area search of the cottonwood grove near the visitor center. To conduct the search, we slowly walked the entire length of the cottonwood corridor, recording all species we detected and the number of each species detected. Once we reached the end of the corridor, we turned around and walked back along the corridor, looking for any species we may have missed the first time through. To avoid double counting of birds, we did not count any individuals on the way back, unless we encountered a new species. We started the survey one half hour before sunrise and finished at 8 am when we arrived back at the starting point.

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Horned Lark (*Eremophila alpestris*) was one of the most commonly counted species at White Sands NM in 2011.

Bird activity was relatively low at the park, especially out on the gypsum dunes. Common bird species observed included Cassin's Sparrow, Horned Lark, Northern Mockingbird, Western Kingbird, Eastern and Western Meadowlarks, and Black-throated Sparrows. One new species, Bell's Vireo, was detected at the park in 2011.

Table 3.6.1. Habitat class, number of points, and sampling dates for each transect or grid at White Sands NM, 2011

Transect/Grid	Habitat class	# points	# visits	Visit 1	Visit 2
CH-WH1	Grassland	12	1	5/21/2011	--
CH-WH2	Grassland	10	1	5/21/2011	--
CH-WH3	Grassland	10	1	5/20/2011	--
CH-WH5	Grassland	11	1	5/19/2011	--
CH-WH6	Grassland	12	1	5/20/2011	--
CH-WH7	Grassland	9	1	5/19/2011	--
CH-WH8	Grassland	16	1	5/21/2011	--
CH-WH9	Grassland	9	1	5/20/2011	--
CH-WH10	Grassland	10	1	5/19/2011	--
CH-WH11	Grassland	12	1	5/21/2011	--

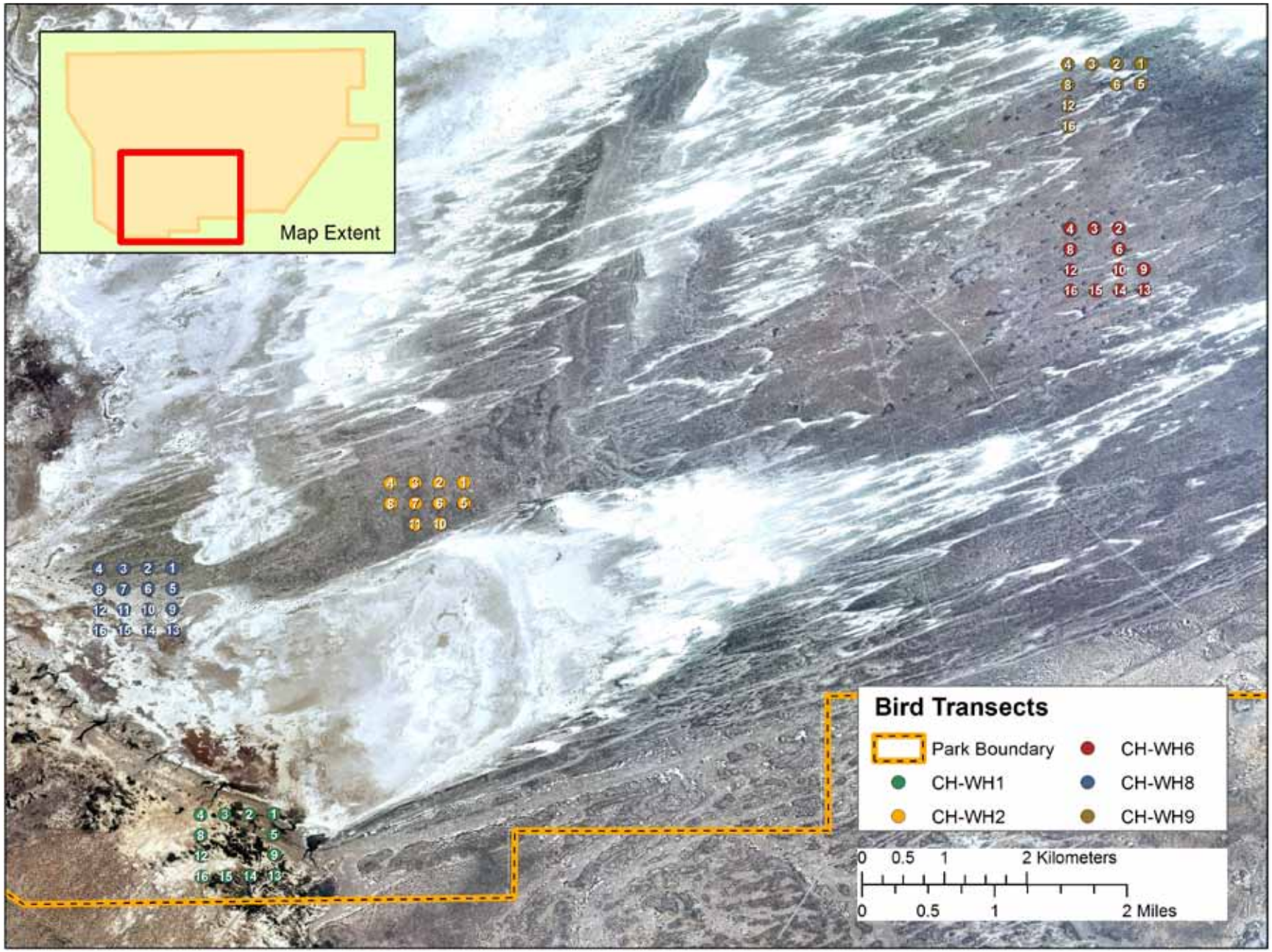

Figure 3.6.1-1. Point locations targeted for annual sampling at White Sands NM,South.

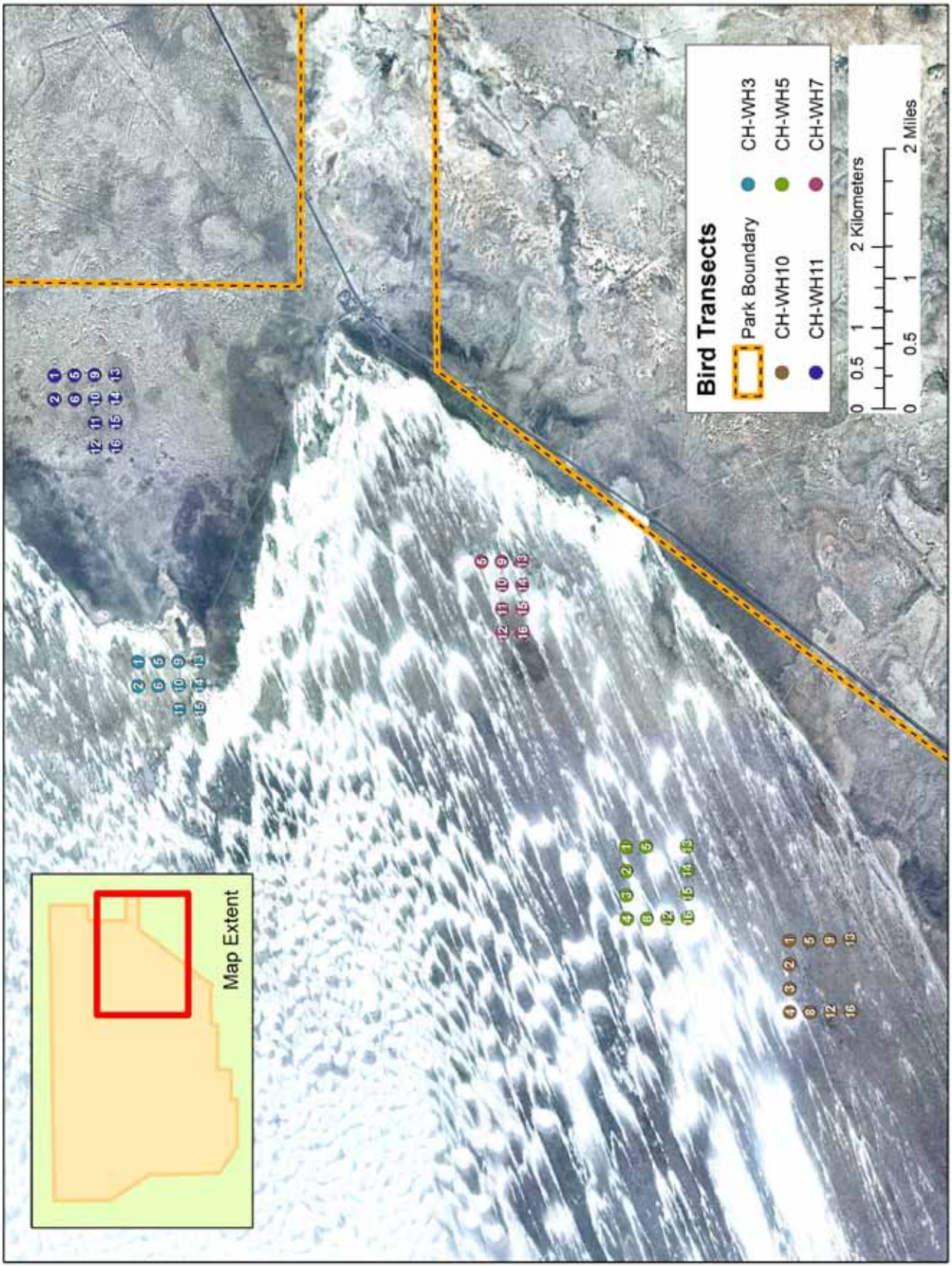

Figure 3.6.1-2. Point locations targeted for annual sampling at White Sands NM., East

Table 3.6.2. Number of birds detected of each species in each habitat class, White Sands NM, 2011

Species	# of birds detected	
	Total (grassland)	% of total
Black-throated Sparrow	147	23
Northern Mockingbird	78	12
Western Kingbird	59	9
Horned Lark	36	6
Cassin's Sparrow	31	5
Eastern Meadowlark	24	4
Scott's Oriole	22	3
Ash-throated Flycatcher	19	3
Violet-green Swallow	15	2
House Finch	15	2
Brewer's Sparrow	15	2
Lark Sparrow	11	2
Western Meadowlark	9	1
Mourning Dove	9	1
Chihuahuan Raven	9	1
Blue Grosbeak	9	1
Yellow-rumped Warbler	7	1
Greater Roadrunner	7	1
Barn Swallow	7	1
Western Wood-Pewee	6	1
White-winged Dove	4	1
White-crowned Sparrow	4	1
Swainson's Hawk	4	1
Pyrrhuloxia	4	1
Crissal Thrasher	4	1
Townsend's Warbler	3	0
Cliff Swallow	3	0
Wilson's Warbler	2	0
Phainopepla	2	0
Northern Rough-winged Swallow	2	0
MacGillivray's Warbler	2	0
Lesser Nighthawk	2	0
Green-tailed Towhee	2	0
Dusky Flycatcher	2	0
Curve-billed Thrasher	2	0
Brown-headed Cowbird	2	0
Verdin	1	0
Summer Tanager	1	0
Say's Phoebe	1	0
Rock Wren	1	0
Lesser Goldfinch	1	0
Ladder-backed Woodpecker	1	0
Hooded Oriole	1	0
Gambel's Quail	1	0
Chipping Sparrow	1	0
Cassin's Kingbird	1	0
Cactus Wren	1	0
Black-tailed Gnatcatcher	1	0
Black-chinned Hummingbird	1	0
Bewick's Wren	1	0
Bell's Vireo	**1**	**0**
Unidentified Bird	*22*	*3*
Unidentified Sparrow	*4*	*1*
Unidentified Kingbird	*4*	*1*
Unidentified Corvid	*4*	*1*
Unidentified Thrasher	*1*	*0*
Unidentified Hawk	*1*	*0*
Total	**630**	**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.

4 Literature Cited

Alcock, J. 2005. Animal behavior: An evolutionary approach. Sunderland, Ma.: Sinauer Associates.

Barrows, C. W., M. B. Swartz, W. L. Hodges, M. F. Allen, J. T. Rotenberry, B. L. Li, T. A. Scott, and X. W. Chen. 2005. A framework for monitoring multiple-species conservation plans. Journal of Wildlife Management 69:1333–1345.

Bennetts, R. E., B. F. Powell, A. D. Flesch, D. Angell, K. Beaupré, and W. L. Halvorson. 2012 (in review). Landbird monitoring protocol for the Sonoran Desert, Southern Plains, and Chihuahuan Desert Networks. Version 1.00. Natural Resource Report NPS/SOPN/NRTR-2012/00X. National Park Service, Fort Collins, Colorado.

Bibby, C. J., N. D. Burgess, D. A. Hill, and S. Mustoe. 2000. Bird census techniques. Second ed. London: Academic Press.

Bryce, S. A., R. M. Hughes, and P. R. Kaufmann. 2002. Development of a bird integrity index: Using bird assemblages as indicators of riparian condition. Environmental Management 30:294–310.

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling: Estimating abundance of biological populations. Oxford, U.K.: Oxford University Press.

Burnham, K. P., D. R. Anderson, and J. L. Laake. 1980. Estimation of density from line transect sampling of biological populations. Wildlife Monographs, no. 72.

Canterbury, G. E., T. E. Martin, D. R. Petit, L. J. Petit, and D. F. Bradford. 2000. Bird communities and habitat as ecological indicators of forest condition in regional monitoring. Conservation Biology 14:544–558.

Dale, V. H., and S. C. Beyeler. 2001. Challenges in the development and use of ecological indicators. Ecological Indicators 1:3–10.

Diefenbach, D. R., D. W. Brauning, and J. A. Mattice. 2003. Variability in grassland bird counts related to observer differences and species detection rates. Auk 120:1168–1179.

Field, S. A., A. J. Tyre, and H. P. Possingham. 2005. Optimizing allocation of monitoring effort under economic and observational constraints. Journal of Wildlife Management 69:473–482.

Holmes, R. T., and T. W. Sherry. 2001. Thirty-year bird population trends in an unfragmented temperate deciduous forest: Importance of habitat change. Auk 118:589–609.

Hutto, R. L. 1985. Habitat selection by nonbreeding, migratory, land birds. Pages 455–476 in M. L. Cody, ed., Habitat selection in birds. Orlando, Fla.: Academic Press.

Kendall, W. L., and G. C. White. 2009. A cautionary note on substituting spatial subunits for repeated temporal sampling in studies of site occupancy. Journal of Applied Ecology 46:1182-1188.

Krueper, D., J. Bart, and T. D. Rich. 2003. Response of vegetation and breeding birds to the removal of cattle on the San Pedro River, Arizona (USA). Conservation Biology 17:607–615.

MacKenzie, D. I., J. D. Nichols, J. A. Royle, K. H. Pollock, L. L. Bailey, and J. E. Hines. 2006. Occupancy estimation and modeling: Inferring patterns and dynamics of species. Burlington, Ma.: Elsevier Press.

MacKenzie, D. I., J. D. Nichols, J. E. Hines, M. G. Knutson, and A. B. Franklin. 2003. Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. Ecology 84:2200–2207.

Manley, P. N., W. J. Zielinski, M. D. Schlesinger, and S. R. Mori. 2004. Evaluation of a multiple-species approach to monitoring species at the ecoregional scale. Ecological Applications 14:296–310.

NPS (National Park Service). 1992. NPS-75: Natural resources inventory and monitoring guidelines. U.S. Department of Interior, Washington, D.C.

NPS, CHDN (Chihuahuan Desert Inventory and Monitoring Network). 2010. Chihuahuan Desert Network vital signs monitoring plan. Natural Resource Report NPS/CHDN/

NRR—2010/188. NationalPark Service, Fort Collins, Colorado.

Nichols, J. D., L. L. Bailey, A. F. O'Connell, N. W. Talancy, E. H. C. Grant, A. T. Gilbert, E. M. Annand, T. P. Husband, and J. E. Hines. 2008. Multi-scale occupancy estimation and modelling using multiple detection methods. Journal of Applied Ecology 45:1321-1329.

Pavlacky, D. C., J. A. Blakesley, G. C. White, D. J. Hanni, and P. M. Lukacs. in prep. Hierarchical multi-scale occupancy estimation for monitoring wildlife populations. Journal of Wildlife Management.

Powell, B. F., A. D. Flesch, T. Mau-Crimmins, D. Angell, K. Beaupre, and W. L. Halvorson. 2007. Landbird monitoring protocol for the Sonoran Desert Network. Version 1.02. Unpublished protocol to the National Park Service, Sonoran Desert Network Inventory and Monitoring Program, Tucson, Az.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309–313.

Ringold, P. L., J. Alegria, R. L. Czaplewski, B. S. Mulder, T. Tolle, and K. Burnett. 1996. Adaptive monitoring design for ecosystem management. Ecological Applications 6:745–747.

Sekercioglu, C. H. 2002. Impacts of birdwatching on human and avian communities. Environmental Conservation 29:282–289.

Stevens, L. E., and B. D. Gold. 2003. Monitoring for adaptive management of the Colorado River Ecosystem in Glen and Grand canyons. Pages 101–134 in D. E. Busch and J. C. Trexler, eds., Monitoring ecosystems: Interdisciplinary approaches for evaluating ecoregional initiatives. Washington, D.C.: Island Press.

Thomas, L., J. L. Laake, S. Strindberg, F. F. C. Marques, S. T. Buckland, D. L. Borchers, D. R. Anderson, K. P. Burnham, S. L. Pollard J. H. Hedley, J. R. B. Bishop, and T. A. Marques. 2005. Distance 5.0. Release Beta 5. Research unit for wildlife population assessment, University of St. Andrews, U.K. http:/ www.ruspa.st-and.ac.uk/distance.

Wiens, J. A. 1985. Habitat selection in variable environments: Shrub-steppe birds. Pages 191–226 *in* M. L. Cody, ed., Habitat selection in birds. Orlando, Fl.: Academic Press.

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