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Natural Resource Program Center

Landbird Monitoring in the Sonoran Desert Network

Annual Report, 2010

Natural Resource Technical Report NPS/SODN/NRTR—2011/418

ON THE COVER

White-winged dove (*Zenaida asiatica*). Photo ©Robert Shantz.

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Annual Report, 2010

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Acronyms

CAGR	Casa Grande Ruins National Monument
CHIR	Chiricahua National Monument
CORO	Coronado National Memorial
FOBO	Fort Bowie National Historic Site
GICL	Gila Cliff Dwellings National Monument
MOCA	Montezuma Castle National Monument
NHP	national historical park
NM	national monument
NMem	national memorial
NP	national park
NPS	National Park Service
ORPI	Organ Pipe Cactus National Monument
RMBO	Rocky Mountain Bird Observatory
SAGE	Saguaro National Park–Rincon Mountain District
SAGU	Saguaro National Park
SAGW	Saguaro National Park–Tucson Mountain District
SODN	Sonoran Desert Network
TONT	Tonto National Monument
TUMA	Tumacácori National Historical Park
TUZI	Tuzigoot National Monument

Executive Summary

In 2010, landbirds were surveyed within all 11 Sonoran Desert Network (SODN) 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 40 transects or grids were surveyed in 2010. Survey efforts were focused on the breeding season, when increased territorial behavior by songbirds results in higher detection rates and greater sampling efficiency. The window of primary breeding and, therefore, sampling was from April through June, with adjustments made for individual park visits based on latitude and elevation. We used point-transect surveys to estimate and monitor landbird population parameters. Surveys were conducted twice for each transect or grid to facilitate estimates of occupancy, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability.

We sampled a total of 542 points on 40 transects or grids. Of these, 358 points were sampled in upland habitats and 184 in riparian habitats. We recorded a total of 10,605 birds of 157 species on our survey points, with an additional 489 birds detected as flyovers. Saguaro National Park (SAGU) had the highest number of birds detected (n = 2,954), but also had the highest number of survey points. Casa Grande Ruins National Monument (CAGR) had the lowest number of birds detected (n = 429). Similarly, we observed the greatest number of species at SAGU (n = 88) and the fewest at CAGR (n = 30). Species richness and community composition varied widely among the parks surveyed. White-winged doves were the most commonly detected species within the SODN (n = 785). Fifteen species were detected only once during our surveys, and several others were detected only a few times. Four species (ash-throated flycatcher, brown-headed cowbird, house finch, and mourning dove) were detected at all 11 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, with five new species recorded for Chiricahua National Monument.

Minor changes made to the protocol in the previous year were adopted. 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 SODN 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. We are considering adding an additional revisit to each transect or grid.

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 Sonoran Desert Inventory & Monitoring Network (SODN) includes 11 parks in southern Arizona and New Mexico. Collectively, these parks are representative of most of the ecological communities present within the Sonoran Desert and Apache Highlands Ecoregions (NPS 2005).

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 SODN parks. Landbirds are a conspicuous component of many ecosystems and have high body temperatures, rapid metabolisms, and occupy high trophic levels. As such, changes in landbird populations may be indicators of changes in the biotic or abiotic components of the environment upon which they depend (Canterbury et al. 2000; Bryce et al. 2002). Relative to other vertebrates, landbirds are also highly detectable and can be efficiently surveyed with the use of numerous standardized methods (Bibby et al. 2000; Buckland et al. 2001).

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

Perhaps the most compelling reason to monitor landbird communities is that birds themselves are 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 recreational pastime in the U.S., and forms the basis of a large and sustainable industry (Sekercioglu 2002).

The SODN began monitoring birds in spring 2007; 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 SODN 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 that are complementary and together provide a comprehensive assessment of changing bird populations and communities.

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

We stratified most parks by mesic riparian and upland habitat classes, although SODN parks contain a wide range of upland vegetation (and, by extension, bird) communities. The dominant vegetation communities represented by upland areas in SODN parks can be further stratified into roughly four habitat types: desert, semi-desert grassland, pine–oak forest and woodland, and mixed conifer forest (Table 2.1.1-1).

Table 2.1.1-2. Number of transects of each habitat class surveyed in each SODN park unit, 2010

Park unit	Riparian	Upland
CAGR	--	1
CHIR	--	5
CORO	--	3
FOBO	1	1
GICL	1	1
MOCA–Castle Unit	2	1
MOCA–Well Unit	1	--
ORPI	2	4
SAGE	1	5
SAGW	--	5
TONT	1	1
TUMA	2	--
TUZI	2	--

Table 2.1.1-1. Habitat classes and types by park

Habitat class	Habitat types	Parks
Upland	Desert scrub	• Casa Grande Ruins National Monument (CAGR) • Montezuma Castle National Monument (MOCA) • Organ Pipe Cactus National Monument (ORPI) • Saguaro National Park–Tucson Mountain District (SAGW) • at <4,000 feet in Saguaro National Park–Rincon Mountain District (SAGE) and Tonto National Monument (TONT) • Tumacácori National Historical Park (TUMA) • Tuzigoot National Monument (TUZI)
Upland	Grassland/savanna	• Chiricahua National Monument (CHIR) • Coronado National Memorial (CORO) • Fort Bowie National Historic Site (FOBO)
Upland	Woodland	• CHIR • CORO • Gila Cliff Dwellings National Monument (GICL) • SAGE
Riparian	Riparian	• FOBO • GICL • MOCA–Castle Unit • MOCA–Well Unit • ORPI • SAGE • TONT • TUMA • TUZI

In 2010, we surveyed landbirds within all 11 SODN parks. Sample points were located along a transect for linear features (e.g., most riparian habitats) or a grid for area features. A total of 40 transects or grids were surveyed in 2010 (Table 2.1.1-2). In most parks, we used sites selected with methodology outlined in Powell et al. (2007). Exceptions occurred at Organ Pipe Cactus National Monument (NM) and Saguaro National Park (NP), because of safety concerns related to undocumented immigration and smuggling. Details of these exceptions are presented in Powell et al. (in review).

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 (in this case, both survey periods). 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 SODN parks.

The timing of breeding varies among species and depends on a number of factors, including latitude and elevation. Birds at southern latitudes and lower elevations tend to breed earlier than those at higher latitudes and elevations. Consequently, parks with a wide elevation range (e.g., SAGU) also had a wide range of sampling dates. The window of primary breeding and sampling was from April through June, with adjustments, as described above, for individual park visits based on latitude and elevation (Figure 2.1.2).

2.2 Bird Surveys

We used point-transect surveys to estimate and monitor landbird population parameters (Buckland et al. 2001). The point-transect approach evolved from the variable circular plot approach (Reynolds et al. 1980) and distance sampling of line transects (Burnham et al. 1980), where points are considered as a transect with zero distance (Buckland et al. 2001). For density estimates, the

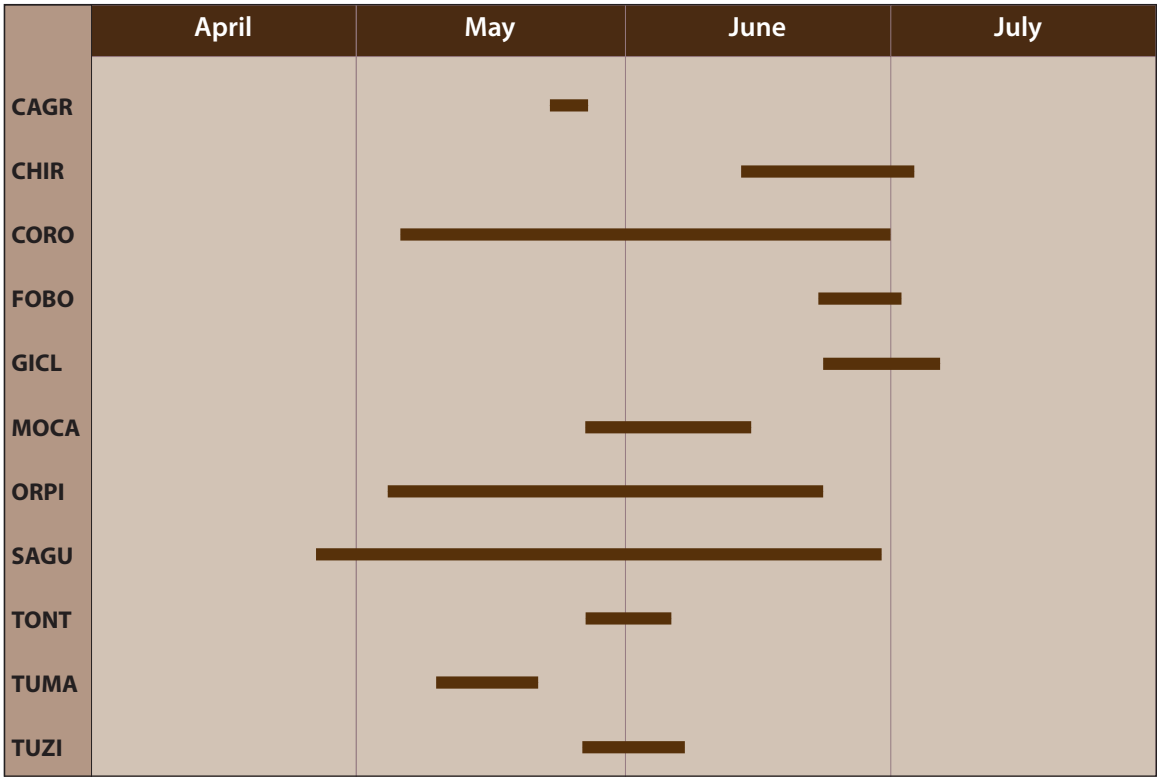


Figure 2.1.2. Dates when sampling was conducted in SODN parks, 2010.

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). 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 searched for species not recorded during the count period.

Surveys were conducted twice for each transect or grid to facilitate occupancy estimates, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability.

We spent six minutes at each point along the transect or grid and used a rangefinder to estimate the linear distance to each bird detected. Our current protocol of spending six minutes per site is consistent with other efforts being conducted by Rocky Mountain Bird Observatory (RMBO) and to increases efficiency by allowing more points to be surveyed.

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 SODN and other organizations as covariates when assessing 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

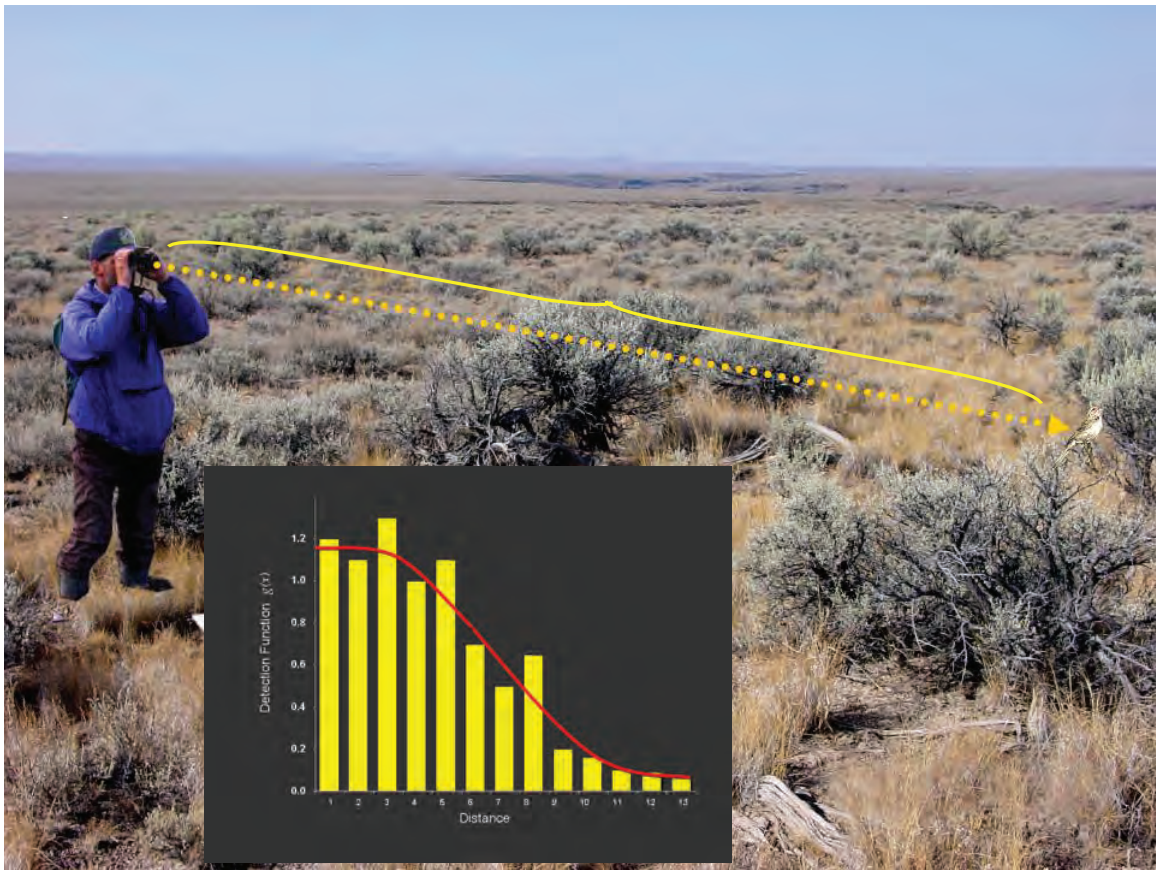


Figure 2.2. Distance sampling works by estimating a detection profile (graph) as a function of distance from which either individual or groups of birds are observed from the transect.

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.

2.4 Accessing the Data

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.

The Rocky Mountain Bird Observatory (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 SODN 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. SODN and its parks have easy access to the data through the RMBO Avian Data Center, http://www.rmbo.org/public/monitoring/CountsEffort.aspx (see Figure 2.4).

To access the data,

1. Visit http://www.rmbo.org/public/monitoring/
2. Click on the "Data Queries" tab
3. Click on "Species Counts (total individuals detected with effort)"
4. For a basic query about a park's bird data, make the following selections:
   Program: Sonoran Desert Network
   ManagementEntity: Sonoran Desert Network
   Management Unit: select desired park unit
   Habitat: select desired habitat
5. Click "Show All Available Species" for park list of species with data
6. Click "Submit Query" for query results

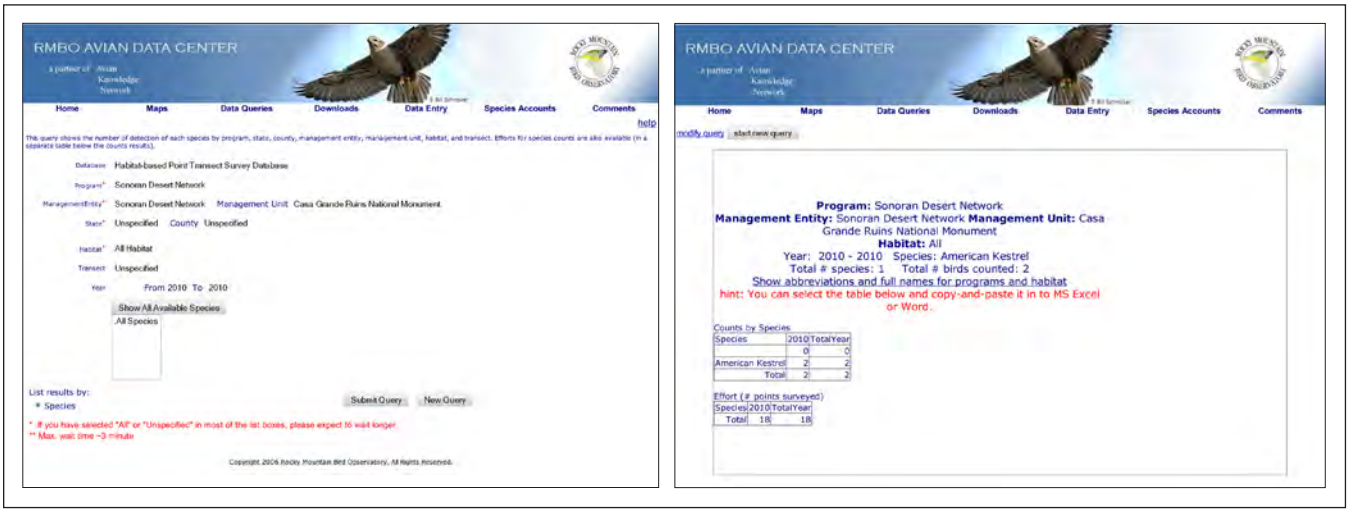


Figure 2.4. Screen shot of data query on Rocky Mountain Bird Observatory website (left) and results (right).

3 Results and Discussion

We sampled a total of 542 points on 40 transects or grids (Table 3-1). Of these, 358 points were sampled in upland habitats and 184 in riparian habitats. We recorded a total of 10,605 birds of 157 species on our survey points, with an additional 489 birds detected as flyovers.

Saguaro NP had the highest number of birds detected (n = 2,954), but also had the highest number of survey points. Casa Grande Ruins NM had the lowest number of birds detected (n = 429). Similarly, we observed the greatest number of species at Saguaro NP (n = 88) and the fewest at Casa Grande Ruins NM (n = 30) (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 survey points and visits, but also by the size and diversity of available habitats.

White-winged doves were the most commonly detected species within the SODN (n = 785) (see Table 3-3). Fifteen species were detected only once during surveys, and several others were detected only a few times.

Four species (ash-throated flycatcher, brown-headed cowbird, house finch, and mourning dove) were detected at all 11 parks, whereas numerous species were detected at one or very few parks (see Table 3-4).

Table 3-2. Number of species observed in each habitat class at each park, 2010

Park	Species detected		
	Upland	Riparian	Total[1]
Casa Grande Ruins NM	30	--	30
Chiricahua NM	63	--	63
Coronado NMem	61	--	61
Fort Bowie NHS	27	36	45
Gila Cliff Dwellings NM	48	47	62
Montezuma Castle NM	40	64	69
Organ Pipe Cactus NM	43	48[2]	55
Saguaro NP	76	50	88
Tonto NM	41	42	50
Tumacácori NHP	--	62	62
Tuzigoot NM	--	51	51
Total[1]	**132**	**124**	**157**

[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, and do not include incidental observations.

[2] Riparian habitat sampled at ORPI was xeroriparian, thus not directly comparable to more mesic habitats.

Table 3-1. Numbers of survey points and individual birds counted in each habitat class at each SODN park, 2010

Park	Grassland		Riparian		Total birds detected
	Survey points	Birds counted	Survey points	Birds counted	
Casa Grande Ruins NM	18	429	--	--	429
Chiricahua NM	67	1,181	--	--	1,181
Coronado NMem	33	452	--	--	452
Fort Bowie NHS	12	134	16	308	442
Gila Cliff Dwellings NM	12	178	14	275	453
Montezuma Castle NM	16	308	38	879	1,187
Organ Pipe Cactus NM	56	889	28	522	1,411
Saguaro NP	126	2,512	16	442	2,954
Tonto NM	18	312	16	314	626
Tumacácori NHP	--	--	28	696	696
Tuzigoot NM	--	--	28	774	774
Total	**358**	**6,395**	**184**	**4,210**	**10,605**

Note: Detections do not include flyovers. Survey points represent the sum of one or two visits, rather than independent visits.

Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2010

Common name	# of birds
White-winged dove	785
Gila woodpecker	641
Mourning dove	608
Gambel's quail	523
Ash-throated flycatcher	490
Brown-crested flycatcher	486
House finch	319
Lucy's warbler	291
Bewick's wren	253
Cactus wren	239
Black-throated sparrow	213
Phainopepla	212
Red-winged blackbird	194
Verdin	193
Northern mockingbird	185
Brown-headed cowbird	182
Canyon towhee	181
Curve-billed thrasher	166
Northern cardinal	152
Spotted towhee	148
Rufous-crowned sparrow	140
Bushtit	122
Great-tailed grackle	111
Gilded flicker	106
Mexican jay	105
Ladder-backed woodpecker	103
Western wood-pewee	100
Bullock's oriole	99
Cassin's kingbird	98
Yellow-breasted chat	95
Black-headed grosbeak	94
Blue grosbeak	94
Scott's oriole	93
Summer tanager	91
Turkey vulture	91
Yellow warbler	91
Lesser goldfinch	83
Bell's vireo	82
White-throated swift	79
Black-tailed gnatcatcher	78
Common raven	74
Bridled titmouse	72
Black-chinned hummingbird	66

Common name	# of birds
Purple martin	66
Abert's towhee	65
Pyrrhuloxia	62
Northern rough-winged swallow	60
Western kingbird	56
American robin	51
Black-throated gray warbler	51
Common yellowthroat	51
Blue-gray gnatcatcher	50
Song sparrow	48
Rufous-winged sparrow	47
Dusky-capped flycatcher	44
Hepatic tanager	44
Rock pigeon	42
Costa's hummingbird	40
Western scrub-jay	36
Acorn woodpecker	35
Canyon wren	35
Northern flicker	34
Warbling vireo	34
Vermilion flycatcher	33
Violet-green swallow	33
White-breasted nuthatch	33
Western tanager	32
Cliff swallow	30
European starling	30
Hooded oriole	28
Greater roadrunner	26
Eastern meadowlark	25
Plumbeous vireo	25
Wilson's warbler	24
House wren	23
Eurasian collared-dove	22
Lazuli bunting	22
Red-tailed hawk	22
Rock wren	22
Say's phoebe	22
Botteri's sparrow	20
American kestrel	19
Arizona woodpecker	19
Townsend's warbler	19
Anna's hummingbird	16
Black-chinned sparrow	16

Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2010, cont.

Common name	# of birds
Gray flycatcher	15
Hutton's vireo	15
Painted redstart	15
Pygmy nuthatch	14
Brewer's sparrow	13
Broad-billed hummingbird	12
Great horned owl	12
Yellow-rumped warbler	12
Broad-tailed hummingbird	11
Green-tailed towhee	10
Common black-hawk	9
Crissal thrasher	9
House Sparrow	9
Mallard	9
Varied bunting	9
Black phoebe	8
Grace's warbler	8
Pacific-slope flycatcher	8
Great blue heron	7
Magnificent hummingbird	7
Mexican chickadee	7
Virginia's warbler	7
Wild turkey	7
Gray hawk	6
MacGillivray's warbler	6
Northern beardless-tyrannulet	6
Red-naped sapsucker	6
Steller's jay	6
Band-tailed pigeon	5
Bronzed cowbird	5
Brown creeper	5
Burrowing owl	5
Dark-eyed junco	5
Green heron	5
Lesser nighthawk	5
Montezuma quail	5
Yellow-billed cuckoo	5
Yellow-eyed junco	5
Cooper's hawk	4
Cordilleran flycatcher	4
Harris's hawk	4
Hermit thrush	4
Indigo bunting	4
Lark sparrow	4
Tropical kingbird	4
Virginia rail	4
Western bluebird	4
White-crowned sparrow	4
Zone-tailed hawk	4
Common ground-dove	3
Hairy woodpecker	3
Loggerhead shrike	3
Gray vireo	2
Lark bunting	2
Pine siskin	2
Wood duck	2
Brewer's blackbird	1
Common merganser	1
Common poorwill	1
Crested caracara	1
Greater pewee	1
Hermit warbler	1
Juniper titmouse	1
Killdeer	1
Lewis's woodpecker	1
Lincoln's sparrow	1
Northern goshawk	1
Red-faced warbler	1
Rufous hummingbird	1
Sharp-shinned hawk	1
Thick-billed kingbird	1
Unidentified birds	*76*
Total	**10,605**

Note: Species are listed in rank order from most to least commonly detected. Number of birds is the total number of individuals counted in each habitat, excluding flyovers. 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.

Table 3-4. Parks where each species was detected through 2010

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Abert's towhee	*Melozone aberti*						●	o	●	●	●	●
Acorn woodpecker	*Melanerpes formicivorus*		●	o	o	●		o	o			
American avocet	*Recurvirostra americana*							o				
American coot	*Fulica americana*						o	o				o
American crow	*Corvus brachyrhynchos*											o
American goldfinch	*Spinus tristis*						o	o				
American kestrel	*Falco sparverius*	●	o	o	o	o	o	o	●	●	o	o
American pipit	*Anthus rubescens*	o			o		o	o			o	o
American redstart	*Setophaga ruticilla*		o					o				o
American robin	*Turdus migratorius*		●	o	o	●	●	o	o	o	o	o
American white pelican	*Pelecanus erythrorhynchos*							o		o		
American wigeon	*Anas americana*						o	o				o
Anna's hummingbird	*Calypte anna*	●	o	●	o		●	●	●	o	●	●
Arizona woodpecker	*Picoides arizonae*		●	o					o			
Ash-throated flycatcher	*Myiarchus cinerascens*	●	●	●	●	●	●	●	●	●	●	●
Baird's sandpiper	*Calidris bairdii*						o	o				
Bald eagle	*Haliaeetus leucocephalus*		o		o	o				o		o
Baltimore oriole	*Icterus galbula*										o	
Band-tailed pigeon	*Patagioenas fasciata*		●	o		o		o	o			
Bank swallow	*Riparia riparia*					o	o	o		o	o	o
Barn owl	*Tyto alba*	o		o	o	o	o	o	o	o	o	o
Barn swallow	*Hirundo rustica*	o	o	o	o	o	o	o	o	o	o	o
Bell's vireo	*Vireo bellii*			o	o	o	●	●	●	●	●	o
Belted kingfisher	*Megaceryle alcyon*						o		o			o
Bendire's thrasher	*Toxostoma bendirei*	o			o			o	o			o
Bewick's wren	*Thryomanes bewickii*	o	●	●	●	●	●	o	●	●	●	●
Black phoebe	*Sayornis nigricans*	o	o	o	o	●	●	o	o	o	o	●
Black rail	*Laterallus jamaicensis*							o				
Black tern	*Chlidonias niger*							o				o
Black vulture	*Coragyps atratus*			o	o			o	o		o	
Black-and-white warbler	*Mniotilta varia*							o				
Black-bellied whistling-duck	*Dendrocygna autumnalis*										o	
Black-chinned hummingbird	*Archilochus alexandri*	●	●	●	●	●	●	o	●	●	●	●
Black-chinned sparrow	*Spizella atrogularis*	o	●	●	●		o	o	●	o		

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Black-crowned night-heron	*Nycticorax nycticorax*						o	o			o	o
Black-headed grosbeak	*Pheucticus melanocephalus*		●	●	o	●	●	o	●	●	●	●
Black-necked stilt	*Himantopus mexicanus*	o						o				
Blackpoll warbler	*Dendroica striata*							o				
Black-tailed gnatcatcher	*Polioptila melanura*	o	●		●		●	●	●	●	o	o
Black-throated blue warbler	*Dendroica caerulescens*							o				
Black-throated gray warbler	*Dendroica nigrescens*	o	●	●	o	●	o	●	●	o	o	o
Black-throated green warbler	*Dendroica virens*							o				
Black-throated sparrow	*Amphispiza bilineata*	●	●	●	●		●	●	●	●	o	o
Blue grosbeak	*Passerina caerulea*		●	●	●	●	●	o	●	o	●	●
Blue-gray gnatcatcher	*Polioptila caerulea*	o	●	●	●	●	o	●	●	●	o	o
Blue-headed vireo	*Vireo solitarius*						o		o			
Blue-throated hummingbird	*Lampornis clemenciae*		o	o								
Blue-winged teal	*Anas discors*						o	o				o
Bonaparte's gull	*Chroicocephalus philadelphia*							o				o
Botteri's sparrow	*Peucaea botterii*		o	●	o							
Brewer's blackbird	*Euphagus cyanocephalus*	o			o	●	o	o	o	o	o	o
Brewer's sparrow	*Spizella breweri*	o	o	o	o	o	o	●	●	o	o	o
Bridled titmouse	*Baeolophus wollweberi*		●	●	●	o	●		o		●	o
Broad-billed hummingbird	*Cynanthus latirostris*		o	●	●			●	●		●	
Broad-tailed hummingbird	*Selasphorus platycercus*		●	●	o	●	o	●	o	o	●	o
Bronzed cowbird	*Molothrus aeneus*	o	o	o	o		o	o	●	o	o	●
Brown creeper	*Certhia americana*		●	o	o	●	o	o	o		o	o
Brown pelican	*Pelecanus occidentalis*							o				
Brown thrasher	*Toxostoma rufum*							o				
Brown-crested flycatcher	*Myiarchus tyrannulus*	o	o	●	●		●	●	●	●	●	●
Brown-headed cowbird	*Molothrus ater*	●	●	●	●	●	●	●	●	●	●	●
Buff-breasted flycatcher	*Empidonax fulvifrons*		o						o			
Buff-collared nightjar	*Caprimulgus ridgwayi*							o				
Bufflehead	*Bucephala albeola*						o	o				o
Bullock's oriole	*Icterus bullockii*	o	o	●	●	●	●	●	●	●	●	●
Burrowing owl	*Athene cunicularia*	●						o				

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Bushtit	*Psaltriparus minimus*		●	●	●	●	●	o	●	o	o	o
Cactus wren	*Campylorhynchus brunneicapillus*	o	●	o	●		o	●	●	●	o	o
California gull	*Larus californicus*							o				o
Calliope hummingbird	*Stellula calliope*		o	o	o	o	o	o	o		o	o
Canada goose	*Branta canadensis*						o	o				o
Canvasback	*Aythya valisineria*						o	o				o
Canyon towhee	*Melozone fusca*	o	●	●	●	●	●	●	●	●	●	●
Canyon wren	*Catherpes mexicanus*		●	●	●	●	●	o	●	●		o
Cassin's finch	*Carpodacus cassinii*		o	o	o		o		o	o		
Cassin's kingbird	*Tyrannus vociferans*	o	●	●	●	●	●	o	●	o	●	●
Cassin's sparrow	*Peucaea cassinii*		o	o	o				o		o	
Cassin's vireo	*Vireo cassinii*			o	o				o	o	o	
Cattle egret	*Bubulcus ibis*						o	o				o
Cedar waxwing	*Bombycilla cedrorum*		o	o	o		o	o	o	o	o	o
Chestnut-collared longspur	*Calcarius ornatus*			o								
Chihuahuan raven	*Corvus cryptoleucus*		o	o	o						o	
Chipping sparrow	*Spizella passerina*	o	o	o	o	o	o	o	o	o	o	o
Chukar	*Alectoris chukar*									o		
Cinnamon teal	*Anas cyanoptera*						o	o				o
Clapper rail	*Rallus longirostris*											o
Clark's nutcracker	*Nucifraga columbiana*		o			o		o	o			
Clay-colored sparrow	*Spizella pallida*							o				
Cliff swallow	*Petrochelidon pyrrhonota*	●	o		o	●	●	o	o	o	o	o
Common black-hawk	*Buteogallus anthracinus*		o		o	o	●	o	o		o	o
Common goldeneye	*Bucephala clangula*							o				o
Common ground-dove	*Columbina passerina*	o	o	o	o			o	●	o	●	
Common loon	*Gavia immer*						o	o				
Common merganser	*Mergus merganser*					o	●	o				o
Common moorhen	*Gallinula chloropus*							o				o
Common nighthawk	*Chordeiles minor*		o	o	o	o	o		o			o
Common poorwill	*Phalaenoptilus nuttallii*	o	●	o	o	o	o	o	o	o	o	o
Common raven	*Corvus corax*	●	●	●	●	●	●	o	●	●	●	●
Common snipe	*Gallinago gallinago*						o	o			o	o
Common tern	*Sterna hirundo*							o				

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Common yellowthroat	*Geothlypis trichas*					●	●	o	●		●	●
Cooper's hawk	*Accipiter cooperii*	o	o	o	●	o	●	o	o	●	o	o
Cordilleran flycatcher	*Empidonax occidentalis*		o	o		●		●	o			
Costa's hummingbird	*Calypte costae*	o		o	o		o	●	●	●	●	o
Crested caracara	*Caracara cheriway*							●	o			
Crissal thrasher	*Toxostoma crissale*	o	o	o	●		●	●	●	●	o	o
Curve-billed thrasher	*Toxostoma curvirostre*	●	o	●	o	o	o	●	●	●	o	
Dark-eyed junco	*Junco hyemalis*		o	o	o	●	o	o	o	o	o	o
Dickcissel	*Spiza americana*							o				
Double-crested cormorant	*Phalacrocorax auritus*							o		o	o	o
Dusky flycatcher	*Empidonax oberholseri*		o	o	o	o	o		o	o	o	o
Dusky-capped flycatcher	*Myiarchus tuberculifer*		●	●	o	o	o		o		●	o
Eared grebe	*Podiceps nigricollis*							o				o
Eastern bluebird	*Sialia sialis*		o	o					o			
Eastern meadowlark	*Sturnella magna*		o	●	o		o	o	o			o
Eastern phoebe	*Sayornis phoebe*							o			o	
Eastern whip-poor-will	*Caprimulgus vociferus*		o	o		o			o			
Elegant trogon	*Trogon elegans*		o	o			o		o			
Elf owl	*Micrathene whitneyi*	o	o	o	o	o	o	o	o	o	o	o
Eurasian collared-dove	*Streptopelia decaocto*	●	●				●			o	o	●
European starling	*Sturnus vulgaris*	●					●	o	o	o	o	●
Evening grosbeak	*Coccothraustes vespertinus*		o				o	o	o			
Ferruginous hawk	*Buteo regalis*	o	o				o	o				
Ferruginous pygmy-owl	*Glaucidium brasilianum*							o				
Flammulated owl	*Otus flammeolus*		o	o		o			o			
Forster's tern	*Sterna forsteri*							o				
Fox sparrow	*Passerella iliaca*			o				o	o			
Franklin's gull	*Larus pipixcan*											o
Gadwall	*Anas strepera*						o	o				o
Gambel's quail	*Callipepla gambelii*	●	●	●	●	o	●	●	●	●	●	●
Gila woodpecker	*Melanerpes uropygialis*	●	o	o	o		●	●	●	●	●	●
Gilded flicker	*Colaptes chrysoides*	●						●	●	●	o	

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Golden eagle	*Aquila chrysaetos*		o	o	o	o	o	o	o	o	o	o
Golden-crowned kinglet	*Regulus satrapa*		o					o	o			
Golden-crowned sparrow	*Zonotrichia atricapilla*							o				
Golden-winged warbler	*Vermivora chrysoptera*							o				
Grace's warbler	*Dendroica graciae*		●			●		o	o			
Grasshopper sparrow	*Ammodramus savannarum*		o	o	o							
Gray catbird	*Dumetella carolinensis*					o						
Gray flycatcher	*Empidonax wrightii*	o	o	●	o	●	o	●	●	o	o	o
Gray hawk	*Buteo nitidus*		o						●	o	●	
Gray vireo	*Vireo vicinior*		o		o		o	o	●	o	o	o
Great blue heron	*Ardea herodias*	o	o			●	●	o	o	o	o	●
Great egret	*Ardea alba*	o					o	o			o	o
Great horned owl	*Bubo virginianus*	●	o	●	o	o	o	●	●	o	o	●
Greater pewee	*Contopus pertinax*		o	o		●			o			
Greater roadrunner	*Geococcyx californianus*	o	o	o	●	●	o	o	●	●	o	o
Greater white-fronted goose	*Anser albifrons*						o					o
Greater yellowlegs	*Tringa melanoleuca*						o	o				o
Great-tailed grackle	*Quiscalus mexicanus*	●	o		o		●	o	o	o	●	●
Green heron	*Butorides virescens*						●	o				●
Green kingfisher	*Chloroceryle americana*										o	
Green-tailed towhee	*Pipilo chlorurus*	o	o	o	o	o	o	●	●	o	o	o
Green-winged teal	*Anas crecca*						o	o				o
Hairy woodpecker	*Picoides villosus*		●	o		●			o			
Hammond's flycatcher	*Empidonax hammondii*	o	o	o	o	o	o	o	o	o	o	o
Harris's hawk	*Parabuteo unicinctus*	o		o				o	●	o	o	
Heermann's gull	*Larus heermanni*							o				
Hepatic tanager	*Piranga flava*		●	●		●	o		●			
Hermit thrush	*Catharus guttatus*		o	o	o	●	o	o	o	o	o	o
Hermit warbler	*Dendroica occidentalis*	o	o	o				●	o			
Herring gull	*Larus argentatus*							o				
Hooded merganser	*Lophodytes cucullatus*							o	o			o
Hooded oriole	*Icterus cucullatus*	o	o	o	●		●	●	●	●	●	o
Horned lark	*Eremophila alpestris*	o	o	o	o		o	o				o
House finch	*Carpodacus mexicanus*	●	●	●	●	●	●	●	●	●	●	●

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
House sparrow	*Passer domesticus*	●		o			o	o	o	o	●	o
House wren	*Troglodytes aedon*		●	●	o	●	o	o	o	●	o	o
Hutton's vireo	*Vireo huttoni*		●	●	o	o	o	o	o	o	o	o
Inca dove	*Columbina inca*	o		o			o	o	o		o	o
Indigo bunting	*Passerina cyanea*				●	●	●	o	o	o	o	o
Juniper titmouse	*Baeolophus ridgwayi*		●		o	o	o		o			
Killdeer	*Charadrius vociferus*	o	o		o	o	o	o	o		o	●
Ladder-backed woodpecker	*Picoides scalaris*	o	●	●	●	o	●	●	●	●	●	●
Lark bunting	*Calamospiza melanocorys*	o		o	o	o	o	●	o			o
Lark sparrow	*Chondestes grammacus*	o	o	●	o	o	o	o	●	o	●	o
Lawrence's goldfinch	*Carduelis lawrencei*							o	o			
Lazuli bunting	*Passerina amoena*	●	o	●	o	o	●	●	●	o	●	o
Le Conte's thrasher	*Toxostoma lecontei*							o				
Least bittern	*Ixobrychus exilis*							o				o
Least grebe	*Tachybaptus dominicus*							o				
Least sandpiper	*Calidris minutilla*						o	o				o
Least tern	*Sterna antillarum*							o				
Lesser goldfinch	*Carduelis psaltria*	o	●	o	●	●	●	o	●	●	●	●
Lesser nighthawk	*Chordeiles acutipennis*	o			o		o	●	●	o	o	o
Lesser scaup	*Aythya affinis*						o	o				o
Lesser yellowlegs	*Tringa flavipes*						o	o				o
Lewis's woodpecker	*Melanerpes lewis*					●	o	o	o		o	
Lincoln's sparrow	*Melospiza lincolnii*	o	o	o	o	o	●	o	o	o	o	o
Loggerhead shrike	*Lanius ludovicianus*	o	o	o	o		o	●	o	o	o	o
Long-billed curlew	*Numenius americanus*							o				
Long-billed dowitcher	*Limnodromus scolopaceus*							o				
Long-eared owl	*Asio otus*		o		o	o		o	o			
Louisiana waterthrush	*Parkesia motacilla*										o	
Lucifer hummingbird	*Calothorax lucifer*			o								
Lucy's warbler	*Oreothlypis luciae*	●	o	o	●	o	●	●	●	●	●	●
MacGillivray's warbler	*Oporornis tolmiei*	o	o	o	o	o	●	●	●	o	●	●
Magnificent hummingbird	*Eugenes fulgens*		●	o					o			

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Magnolia warbler	*Dendroica magnolia*							o				
Mallard	*Anas platyrhynchos*	o				o	●	o	●	o	●	●
Marsh wren	*Cistothorus palustris*						o	o				o
Merlin	*Falco columbarius*	o		o	o	o	o	o	o	o	o	o
Mexican chickadee	*Poecile sclateri*		●									
Mexican jay	*Aphelocoma ultramarina*		●	●	o	o	o		●			
Montezuma quail	*Cyrtonyx montezumae*		●	●	●	o			o			
Mountain bluebird	*Sialia currucoides*		o	o			o	o	o		o	o
Mountain chickadee	*Poecile gambeli*					o			o			
Mourning dove	*Zenaida macroura*	●	●	●	●	●	●	●	●	●	●	●
Nashville warbler	*Oreothlypis ruficapilla*	o	o	o	o		o	o	o	o	o	o
Northern beardless-tyrannulet	*Camptostoma imberbe*		o				o	o	●	o	●	
Northern cardinal	*Cardinalis cardinalis*	o	o	●	●		●	●	●	●	●	●
Northern flicker	*Colaptes auratus*	o	●	o	o	●	o	o	o	o	●	●
Northern goshawk	*Accipiter gentilis*		●	o		o	o		o			
Northern harrier	*Circus cyaneus*	o	o	o	o		o	o	o	o		o
Northern mockingbird	*Mimus polyglottos*	●	●	●	●	o	●	●	●	●	●	●
Northern parula	*Parula americana*								o		o	
Northern pintail	*Anas acuta*						o	o				o
Northern pygmy-owl	*Glaucidium gnoma*		o	o	o	o	o		o			
Northern rough-winged swallow	*Stelgidopteryx serripennis*	o	o		o	o	●	o	o	o	o	●
Northern saw-whet owl	*Aegolius acadicus*		o	o		o	o		o			
Northern shoveler	*Anas clypeata*						o	o				o
Northern waterthrush	*Parkesia noveboracensis*				o		o	o			o	o
Olive warbler	*Peucedramus taeniatus*		o			o			o			
Olive-sided flycatcher	*Contopus cooperi*		o		o		o	o	o	o	o	o
Orange-crowned warbler	*Oreothlypis celata*	o	o	o	o	o	o	o	o	o	o	o
Osprey	*Pandion haliaetus*		o		o		o	o	o	o		o
Ovenbird	*Seiurus aurocapilla*			o				o			o	
Pacific-slope flycatcher	*Empidonax difficilis*		o	o	o		o	●	●	●	●	o
Painted bunting	*Passerina ciris*							o			o	
Painted redstart	*Myioborus pictus*	o	●	o		●	o	o	o	o		
Peregrine falcon	*Falco peregrinus*	o	o	o	o	o	o	o	o	o	o	o
Phainopepla	*Phainopepla nitens*	o	o	●	●		●	●	●	●	●	●

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Pied-billed grebe	*Podilymbus podiceps*						o	o				o
Pine siskin	*Spinus pinus*		o	●	o		o	o	o	o	o	o
Pinyon jay	*Gymnorhinus cyanocephalus*		o	o		o	o		o			
Plain-capped starthroat	*Heliomaster constantii*			o								
Plumbeous vireo	*Vireo plumbeus*		●	o	o	●	o		o	o	o	o
Prairie falcon	*Falco mexicanus*	o	o	o	o	o	o	o	o	o		o
Purple finch	*Carpodacus purpureus*							o	o			
Purple martin	*Progne subis*		o			●	o	o	●	o	o	o
Pygmy nuthatch	*Sitta pygmaea*		o			●			o			
Pyrrhuloxia	*Cardinalis sinuatus*	o	o	o	o			●	●	●	o	
Red crossbill	*Loxia curvirostra*		o			o	o		o			o
Red Phalarope	*Phalaropus fulicarius*							o				
Red-breasted merganser	*Mergus serrator*							o				
Red-breasted nuthatch	*Sitta canadensis*		o			o	o	o	o			
Red-breasted sapsucker	*Sphyrapicus ruber*							o				
Red-eyed vireo	*Vireo olivaceus*							o				
Red-faced warbler	*Cardellina rubrifrons*		o	o		●			o			
Redhead	*Aythya americana*						o	o				o
Red-naped sapsucker	*Sphyrapicus nuchalis*		o	o	o	●	o	o	o	o		o
Red-necked phalarope	*Phalaropus lobatus*							o				
Red-tailed hawk	*Buteo jamaicensis*	o	o	o	o	o	●	●	●	●	o	o
Red-winged blackbird	*Agelaius phoeniceus*	●					o	o	o	o	o	●
Ring-billed gull	*Larus delawarensis*							o				o
Ring-necked duck	*Aythya collaris*							o				o
Rock pigeon	*Columba livia*	●		o			o	o	o		o	o
Rock wren	*Salpinctes obsoletus*	o	●	●	●	●	o	o	●	●	o	o
Roseate spoonbill	*Platalea ajaja*							o				
Rose-breasted grosbeak	*Pheucticus ludovicianus*			o				o				
Rose-throated becard	*Pachyramphus aglaiae*										o	
Rough-legged hawk	*Buteo lagopus*		o								o	
Ruby-crowned kinglet	*Regulus calendula*	o	o	o	o		o	o	o	o	o	o
Ruddy duck	*Oxyura jamaicensis*						o	o				o

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Rufous hummingbird	*Selasphorus rufus*		o	o	o	●	o	o	o	o	o	o
Rufous-crowned sparrow	*Aimophila ruficeps*		●	●	●	●	o	●	●	●	●	o
Rufous-winged sparrow	*Aimophila carpalis*	o			o			●	●	o	●	
Sabine's gull	*Xema sabini*											o
Sage sparrow	*Amphispiza belli*						o	o				o
Sage thrasher	*Oreoscoptes montanus*					o	o	o	o			
Sandhill crane	*Grus canadensis*	o	o		o			o				
Savannah sparrow	*Passerculus sandwichensis*		o	o	o			o			o	
Say's phoebe	*Sayornis saya*	●	●	●	o	●	●	o	●	●	●	●
Scaled quail	*Callipepla squamata*		o	o	o				o			
Scarlet tanager	*Piranga olivacea*							o				
Scissor-tailed flycatcher	*Tyrannus forficatus*							o				
Scott's oriole	*Icterus parisorum*		●	●	●		o	●	●	●	●	●
Semipalmated plover	*Charadrius semipalmatus*							o				
Sharp-shinned hawk	*Accipiter striatus*	o	o	o	o	●	o	o	o	o	o	o
Short-eared owl	*Asio flammeus*						o					
Short-tailed hawk	*Buteo brachyurus*		o									
Snow goose	*Chen caerulescens*						o					
Snowy egret	*Egretta thula*						o	o			o	o
Solitary sandpiper	*Tringa solitaria*						o	o				o
Song sparrow	*Melospiza melodia*				o	o	●	o	o		●	●
Sora	*Porzana carolina*							o				o
Spotted owl	*Strix occidentalis*		o						o			
Spotted sandpiper	*Actitis macularius*				o	o	o	o	o		o	o
Spotted towhee	*Pipilo maculatus*		●	●	●	●	o	o	●	o		o
Steller's jay	*Cyanocitta stelleri*		o	o	o	●		o	o	o		
Stilt sandpiper	*Calidris himantopus*							o				
Streak-backed oriole	*Icterus pustulatus*										o	
Sulphur-bellied flycatcher	*Myiodynastes luteiventris*		o	o					o			
Summer tanager	*Piranga rubra*		●	o	●	o	●	o	●	●	●	●
Swainson's hawk	*Buteo swainsoni*	o	o	o	o	o	o	o	o	o	o	o
Swainson's thrush	*Catharus ustulatus*		o	o	o	o	o	o		o	o	o
Swamp sparrow	*Melospiza georgiana*							o				
Tennessee warbler	*Oreothlypis peregrina*							o				

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Thick-billed kingbird	*Tyrannus crassirostris*							o		o	●	
Townsend's solitaire	*Myadestes townsendi*		o	o	o	o	o	o	o	o	o	o
Townsend's warbler	*Dendroica townsendi*		o	●	o	o	o	●	●	o	o	o
Tree swallow	*Tachycineta bicolor*	o				o	o	o	o		o	o
Tropical kingbird	*Tyrannus melancholicus*							o			●	
Turkey vulture	*Cathartes aura*	o	●	●	●	●	●	●	●	●	o	o
Varied bunting	*Passerina versicolor*							o	●		o	
Varied thrush	*Ixoreus naevius*							o				
Vaux's swift	*Chaetura vauxi*						o	o	o		o	
Verdin	*Auriparus flaviceps*	●	o	●	●		●	●	●	●	●	●
Vermilion flycatcher	*Pyrocephalus rubinus*	o	o	o	o	o	o	o	●	o	●	o
Vesper sparrow	*Pooecetes gramineus*	o	o	o	o	o	o	o	o		o	o
Violet-crowned hummingbird	*Amazilia violiceps*			o							o	
Violet-green swallow	*Tachycineta thalassina*	o	o	●	o	●	●	o	o	o	o	o
Virginia rail	*Rallus limicola*											●
Virginia's warbler	*Oreothlypis virginiae*	o	o	●	o	●	o	o	●	o	o	o
Warbling vireo	*Vireo gilvus*		o	o	o	●	●	o	●	o	●	●
Western bluebird	*Sialia mexicana*		●	o	o	●	o	o	o	o		o
Western grebe	*Aechmophorus occidentalis*							o				
Western kingbird	*Tyrannus verticalis*	●	●	●	o	o	●	●	●	●	●	●
Western meadowlark	*Sturnella neglecta*	o	o	o	o		o	o	o	o	o	o
Western sandpiper	*Calidris mauri*	o					o	o				o
Western screech-owl	*Megascops kennicottii*	o	o	o	o	o	o	o	o	o	o	o
Western scrub-jay	*Aphelocoma californica*		●	●	●	●	o		●	o	o	o
Western tanager	*Piranga ludoviciana*	o	●	●	o	●	●	●	●	●	●	●
Western wood-pewee	*Contopus sordidulus*	o	●	●	o	●	●	o	●	●	●	●
Whiskered screech-owl	*Megascops trichopsis*		o	o					o			
White-breasted nuthatch	*Sitta carolinensis*		●	o	o	●	●		●		●	o
White-crowned sparrow	*Zonotrichia leucophrys*	●	o	o	o	o	o	●	o	o	●	o
White-eared hummingbird	*Hylocharis leucotis*		o	o							o	
White-faced Ibis	*Plegadis chihi*	o						o			o	o
White-tailed Kite	*Elanus leucurus*			o				o				

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

Table 3-4. Parks where each species was detected through 2010, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
White-throated sparrow	*Zonotrichia albicollis*				o			o			o	
White-throated swift	*Aeronautes saxatalis*	o	●	●	●	o	●	o	●	o	o	o
White-winged dove	*Zenaida asiatica*	●	●	●	●	o	●	●	●	●	●	o
Wild turkey	*Meleagris gallopavo*		o	●		o			o			
Willet	*Tringa semipalmata*						o	o				
Williamson's sapsucker	*Sphyrapicus thyroideus*		o	o		o	o		o			
Willow flycatcher	*Empidonax traillii*					o		o				o
Wilson's phalarope	*Phalaropus tricolor*						o	o				o
Wilson's warbler	*Wilsonia pusilla*	o	o	●	o	o	●	●	●	●	●	o
Wood duck	*Aix sponsa*						●	o				o
Wood stork	*Mycteria americana*							o				
Worm-eating warbler	*Helmitheros vermivorum*										o	
Yellow warbler	*Dendroica petechia*	o	o	o	o	o	●	o	●	o	●	●
Yellow-bellied sapsucker	*Sphyrapicus varius*									o		
Yellow-billed cuckoo	*Coccyzus americanus*		o	o	o	o	●		●	o	o	●
Yellow-breasted chat	*Icteria virens*			o	o	●	●	o	●	o	●	●
Yellow-eyed junco	*Junco phaeonotus*		●	o					o			
Yellow-green vireo	*Vireo flavoviridis*								o			
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	o				o	o	o	o	o	o	o
Yellow-rumped warbler	*Dendroica coronata*	o	o	●	o	o	●	●	●	o	o	o
Yellow-throated vireo	*Vireo flavifrons*						o			o	o	
Zone-tailed hawk	*Buteo albonotatus*	o	o	o	●	o	o	o	o	o	o	o

● = species detected in 2010 survey

o = species not detected in 2010 survey, but known to occur in the park

3.1 Casa Grande Ruins National Monument

3.1.1 2010 sampling

During May of 2010, we sampled nine survey points on one grid two times each for a total sample of 18 at Casa Grande Ruins NM (Figure 3.1.1). The single grid was in upland (desert scrub) habitat (Table 3.1.1).

3.1.2 Results and discussion

During 2009, 429 birds of 30 species were counted at Casa Grande Ruins NM (Table 3.1.2). Great-tailed grackle was the most commonly counted species (24%), followed by mourning dove (17%), rock pigeon (10%), and Gambel's quail (9%). A new species recorded for the national monument this year was the lazuli bunting.

Species diversity and bird numbers were noticeably higher in 2010, given the wet winter and presence of surface water in the adjacent agricultural fields. Large flocks of blackbird, dove, and finch dominated the monument's few habitat zones. As expected, the most numerous species were great-tailed grackle, white-winged and mourning doves, and house finch, with Brewer's and red-winged blackbirds also present in higher numbers. Large flocks of blackbirds and groups of doves were noted as flyovers and also detected at lengthy distances in the sparse and open desert and agricultural habitats where visibility is quite good because of the flat terrain. Few migrants were noted in the limited habitat, including olive-sided flycatcher, western wood-pewee, western tanager, black-headed grosbeak, warbling vireo, Townsend's warbler, and pine siskin. Nesting burrowing owls were holding territories as in previous years, and nesting great horned owls with large fledglings were observed in the ruins ramada, where they have been regular in past years. A pair of loggerhead shrikes were detected adjacent to the transect.

Table 3.1.1. Habitat type, number of survey points, and sampling dates for each transect or grid at Casa Grande Ruins NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
U	Upland	Desert scrub	9	2	5/23/2010	5/28/2010

The mourning dove (*Zenaida macroura*) was the second-most commonly counted species at Casa Grande Ruins NM in 2010.

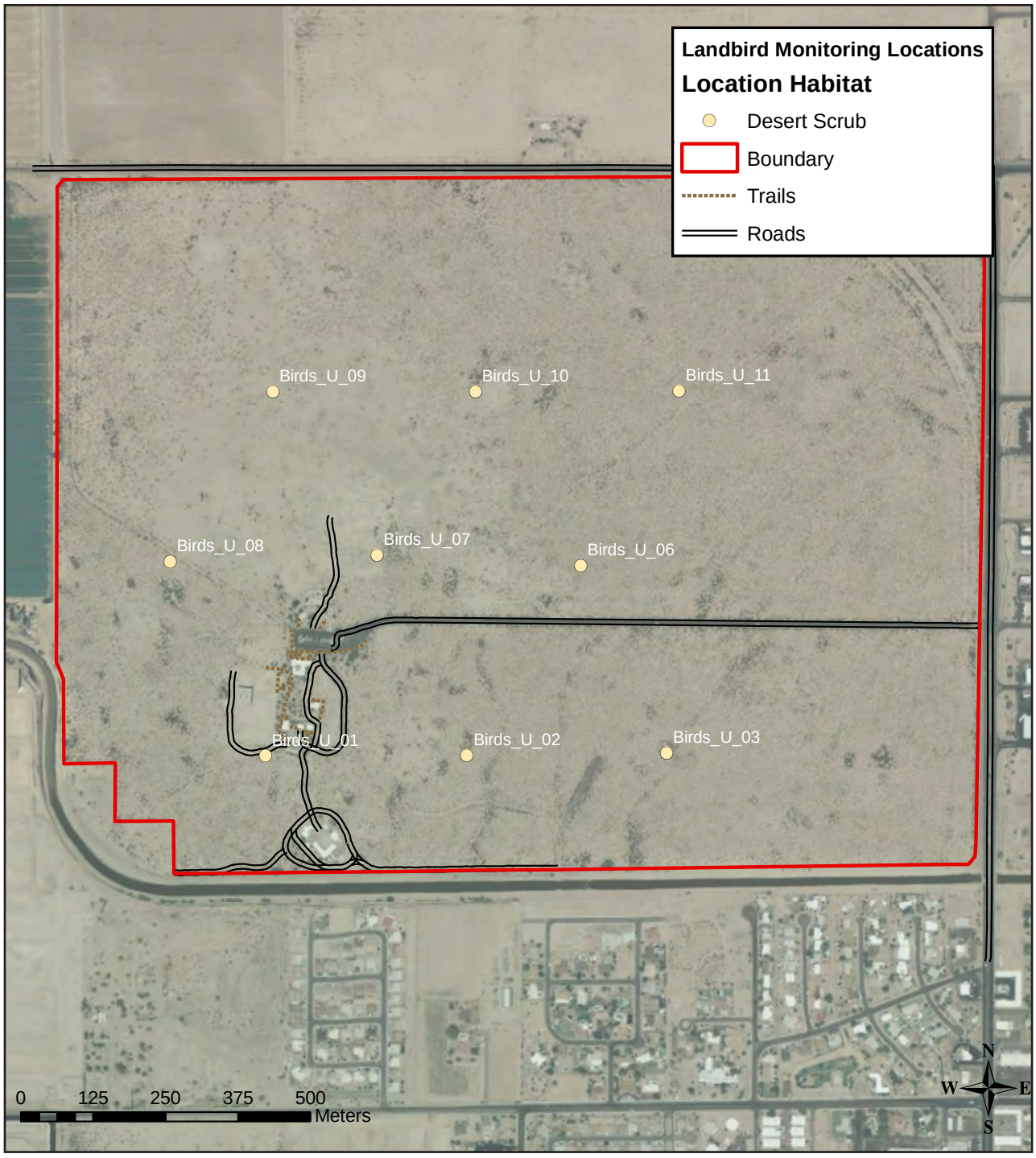


Figure 3.1.1. Point locations sampled at Casa Grande Ruins National Monument, 2010.

Table 3.1.2. Number of birds detected of each species counted, Casa Grande Ruins NM, 2010

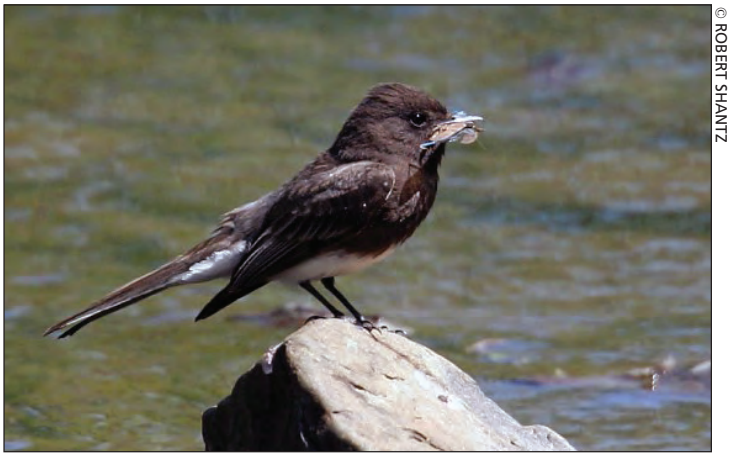
Species	# of birds detected: Total (desert scrub habitat)	# of birds detected: % of total
Great-tailed grackle	102	24%
Mourning dove	74	17%
Rock pigeon	42	10%
Gambel's quail	38	9%
House finch	30	7%
Red-winged blackbird	28	7%
European starling	26	6%
Verdin	12	3%
Eurasian collared-dove	11	3%
Northern mockingbird	9	2%
Brown-headed cowbird	6	1%
Gilded flicker	6	1%
House sparrow	6	1%
White-winged dove	6	1%
Burrowing owl	5	1%
Anna's hummingbird	3	1%
Cliff swallow	3	1%
Say's phoebe	3	1%
American kestrel	2	0%
Ash-throated flycatcher	2	0%
Black-chinned hummingbird	2	0%
Common raven	2	0%
Curve-billed thrasher	2	0%
Gila woodpecker	2	0%
Great horned owl	2	0%
Black-throated sparrow	1	0%
Lazuli bunting	**1**	**0%**
Lucy's warbler	1	0%
Western kingbird	1	0%
White-crowned sparrow	1	0%
Total	**429**	**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 Chiricahua National Monument

3.2.1 2010 sampling

During June and July of 2010, we sampled five transects, each with seven points, two times each for a total sample of 67 survey points at Chiricahua NM (Figure 3.2.1; only four points were surveyed during the second visit to transect White). All transects were in the upland habitat class of either grassland savanna or woodland habitat types (Table 3.2.1).



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The first confirmed observation of a black phoebe (*Sayornis nigricans*) at Chiricahua NM was recorded in 2010.

3.2.2 Results and discussion

During 2010, 1,181 birds of 63 species were counted at Chiricahua NM (not including three incidental species; Table 3.2.2). Bewick's wren were the most commonly counted species (7%). Also common were Mexican jay (7%), spotted towhee (6%), and bushtit (6%). Five new species were recorded for the monument in 2010: black-tailed gnatcatcher, Eurasian collared-dove, black phoebe (incidental), Cassin's sparow (incidental), and short-tailed hawk (incidental).

Diversity of habitat and terrain contributed to the monument's high bird diversity and numbers observed at the two new mid-elevation transects, Picket Canyon and Whitetail Canyon. Notable species included yellow-eyed junco, magnificent hummingbird, Arizona woodpecker, band-tailed pigeon, juniper titmouse, dusky-capped flycatcher, painted redstart, and hepatic tanager, as well as a juvenile northern goshawk seen and heard at Whitetail Canyon.

The highlight of 2010 for the monument was the sighting of a light morph adult short-tailed hawk—a new species for the park—observed from Massai Point above Rhyolite Canyon. Short-tailed hawks are rare, recent arrivals to the area from the Sky-Island mountains of northern Mexico. A pair regularly nests a few miles south of the monument at Barfoot Lookout in the higher elevations of the Chiricahua Mountains. Barfoot Lookout is visible from Massai Point. The bird was most likely a foraging member of the pair, rather than a different individual holding a territory in the park. The sighting confirms the species as a new addition for the park and is somewhat overdue given the proximity of the breeding pair in recent years. The pair fledged two young this year, and it is possible the species may establish a small population adjacent to the park.

A pair of singing Cassin's sparrows were detected in the open grassland at the monument's entrance booth, displaying from mesquite on both sides of the boundary fence. The pair was on territory (birds arrived or remained on a defended breeding site), singing and displaying in breeding mode prior to the onset of the monsoon rains. Their behavior suggested nesting, though this was not confirmed. Their presence in and adjacent to the park in suitable habitat is encouraging, as Cassin's sparrows are more common in mesquite grasslands further west and have been somewhat absent this far east in recent years. This sighting is the first for the park.

Table 3.2.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Chiricahua NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
High2	Upland	Woodland	7	2	6/19/2010	7/4/2010
Mid1	Upland	Woodland	7	2	6/18/2010	7/3/2010
Mid2	Upland	Grassland/Savanna	7	2	6/18/2010	7/3/2010
Picket	Upland	Grassland/Savanna	7	2	6/20/2010	7/2/2010
White	Upland	Woodland	7[a]	2	6/20/2010	7/2/2010

[a] = only four of the seven survey points were sampled during Visit 2

A single singing black phoebe was noted at the visitor center along the lush riparian stretch of flowing Bonita Creek. Black phoebes are attracted to water for feeding and nesting, and have been detected outside the park at cattle tanks, small creeks, and other aquatic resources. The bird's presence in the canyon is interesting, as the breeding season for this resident species is much earlier in the spring and summer. In years of good surface water flow, black phoebes may move into lush, low mountain canyons to breed, and the species should be looked for as a returning breeder in future seasons. This may have been a non-territorial wanderer attracted by the good flow in the creek. This appears to be the first record of the black phoebe for the monument.

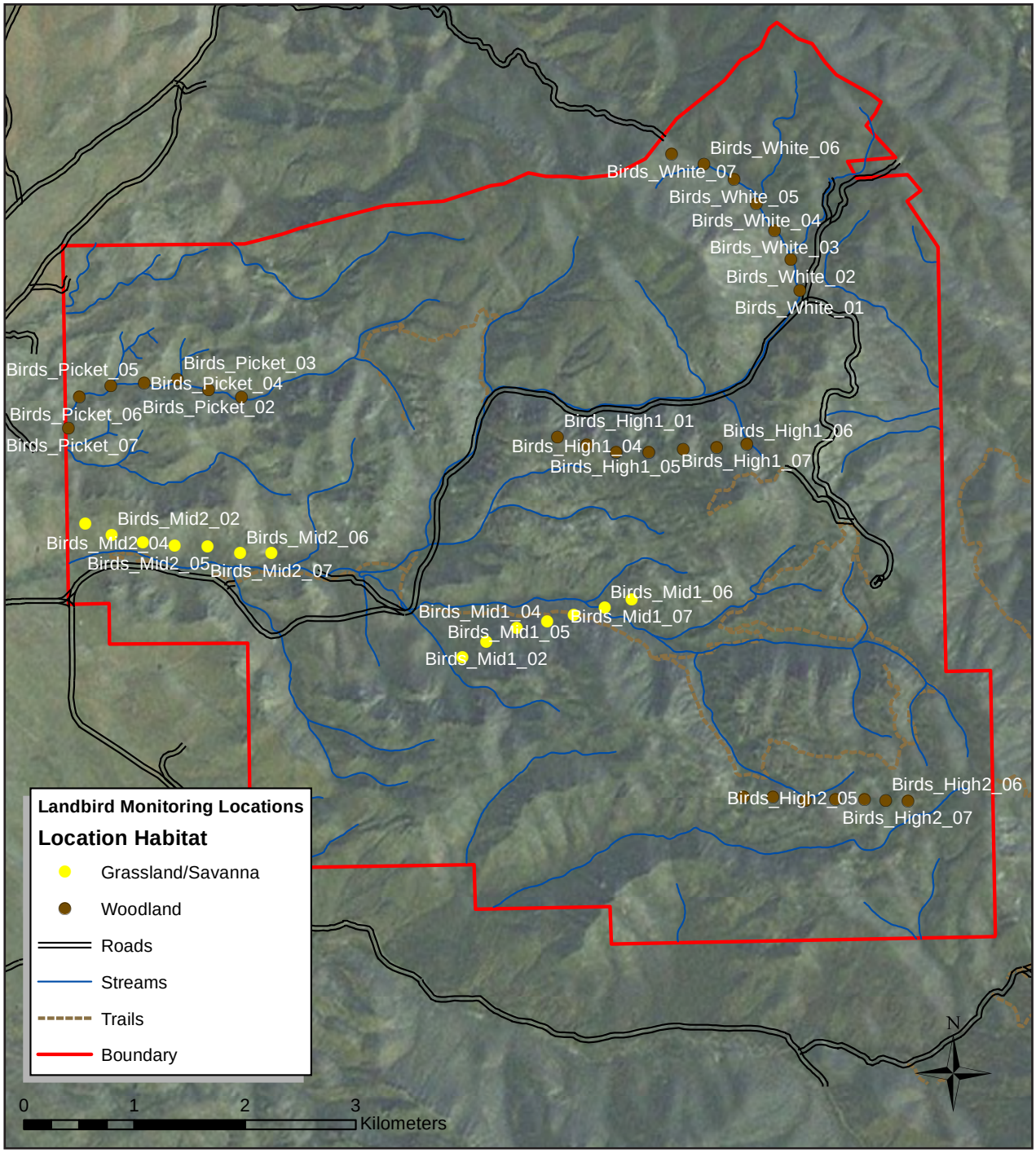

Figure 3.2.1. Point locations sampled at Chiricahua National Monument, 2010.

Table 3.2.2. Number of birds detected of each species in each habitat type, Chiricahua NM, 2010

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Woodland	Total	% of total
Bewick's wren	39	47	86	7%
Mexican jay	43	38	81	7%
Spotted towhee	21	49	70	6%
Bushtit	29	39	68	6%
Rufous-crowned sparrow	29	35	64	5%
Ash-throated flycatcher	27	33	60	5%
Black-headed grosbeak	27	27	54	5%
Western wood-pewee	29	18	47	4%
Bridled titmouse	16	26	42	4%
Black-throated gray warbler	16	24	40	3%
White-throated swift	--	37	37	3%
Mourning dove	20	15	35	3%
Hepatic tanager	14	20	34	3%
Acorn woodpecker	16	12	28	2%
Dusky-capped flycatcher	14	11	25	2%
Canyon wren	9	15	24	2%
Blue-gray gnatcatcher	6	17	23	2%
Scott's oriole	9	13	22	2%
Canyon towhee	11	10	21	2%
Cassin's kingbird	19	1	20	2%
Arizona woodpecker	7	12	19	2%
Turkey vulture	2	17	19	2%
White-breasted nuthatch	11	8	19	2%
White-winged dove	15	2	17	1%
Plumbeous vireo	5	10	15	1%
Hutton's vireo	3	11	14	1%
American robin	2	11	13	1%
Northern mockingbird	8	5	13	1%
Black-chinned hummingbird	7	5	12	1%
Common raven	4	8	12	1%
Northern flicker	--	10	10	1%
Ladder-backed woodpecker	5	4	9	1%
Painted redstart	4	5	9	1%
Gambel's quail	8	--	8	1%
House finch	6	2	8	1%
Magnificent hummingbird	2	5	7	1%
Mexican chickadee	--	7	7	1%
Brown-headed cowbird	4	2	6	1%
Western scrub-jay	--	6	6	1%
Band-tailed pigeon	1	4	5	0%
Grace's warbler	1	4	5	0%

Table 3.2.2. Number of birds detected of each species in each habitat type, Chiricahua NM, 2010, cont.

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Woodland	Total	% of total
House wren	2	3	5	0%
Western kingbird	4	1	5	0%
Yellow-eyed junco	--	5	5	0%
Broad-tailed hummingbird	--	4	4	0%
Brown creeper	3	1	4	0%
Cactus wren	2	2	4	0%
Rock wren	3	1	4	0%
Black-chinned sparrow	1	2	3	0%
Black-throated sparrow	3	--	3	0%
Blue grosbeak	2	1	3	0%
Western bluebird	--	3	3	0%
Black-tailed gnatcatcher	**--**	**2**	**2**	**0%**
Eurasian collared-dove	**2**	**--**	**2**	**0%**
Western tanager	--	2	2	0%
Common poorwill	1	--	1	0%
Hairy woodpecker	--	1	1	0%
Juniper titmouse	--	1	1	0%
Lesser goldfinch	1	--	1	0%
Montezuma quail	1	--	1	0%
Northern goshawk	--	1	1	0%
Say's phoebe	1	--	1	0%
Summer tanager	1	--	1	0%
Black phoebe	**Incidental**	**--**	**--**	
Cassin's sparrow	**Incidental**	**--**	**--**	
Short-tailed hawk	**Incidental**	**--**	**--**	
Unidentified hummingbird	*2*	*3*	*5*	*0%*
Unidentified bird	*--*	*3*	*3*	*0%*
Unidentified Empidonax	*1*	*--*	*1*	*0%*
Unidentified kingbird	*1*	*--*	*1*	*0%*
Total	**520**	**661**	**1181**	**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. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.3 Coronado National Memorial

3.3.1 2010 sampling

During May and June of 2010, we sampled three transects at Coronado National Memorial (NMem; Figure 3.3.1), two with seven points and one with five points. Two transects (401 and 502) were in the grassland savanna habitat type with seven points each and were sampled twice. One transect was in the woodland habitat type (402) with five survey points and was sampled once (Table 3.3.1). A total of 33 survey points were sampled at Coronodo NMem.

Mexican jay (*Aphelocoma ultramarina*) was a more commonly counted species at Coronado NMem in 2010.

3.3.2 Results and discussion

During 2010, 452 birds of 61 species were counted at Coronado (Table 3.3.2). Mourning dove was the most commonly counted species (7%). Ash-throated flycatcher (6%), eastern meadowlark (6%), white-winged dove (5%), Bewick's wren (5%), and Mexican jay were also common. No new species were detected in the park in 2010.

After a rainy winter, the mesquite grassland transect along the international border fence was notably lush, and increased numbers of eastern meadowlark, Cassin's and Botteri's sparrows, and western kingbird were observed. Wild turkeys were detected at a survey station in the oaks around a homeowner's yard and are known to frequent the area for the water features. American kestrel and loggerhead shrike were observed nesting off transect, though they have not been detected annually in recent years. The montane transects yielded the expected oak-chaparral species with numerous detections of spotted towhee, Mexican jay, rufous-crowned sparrow, Bewick's wren, western scrub-jay, Montezuma quail, black-chinned sparrow, hepatic tanager, Scott's oriole, and dusky-capped flycatcher. Exciting reports for the year included a nesting pair of sulphur-bellied flycatcher and a solitary migrant male elegant trogon in the narrow riparian strip of Montezuma Canyon; both species are rare in the park. A credible observation of a plain-capped starthroat at Montezuma Pass was reported later in the season. The starthroat is a vagrant hummingbird from Mexico frequents flowering agaves in the summer. There have been very few sightings in the memorial over the past two decades.

Table 3.3.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Coronado NMem, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
401	Upland	Grassland/Savanna	7	2	5/8/2010	6/15/2010
402	Upland	Woodland	5	1	5/9/2010	--
502	Upland	Grassland/Savanna	7	2	5/9/2010	6/30/2010

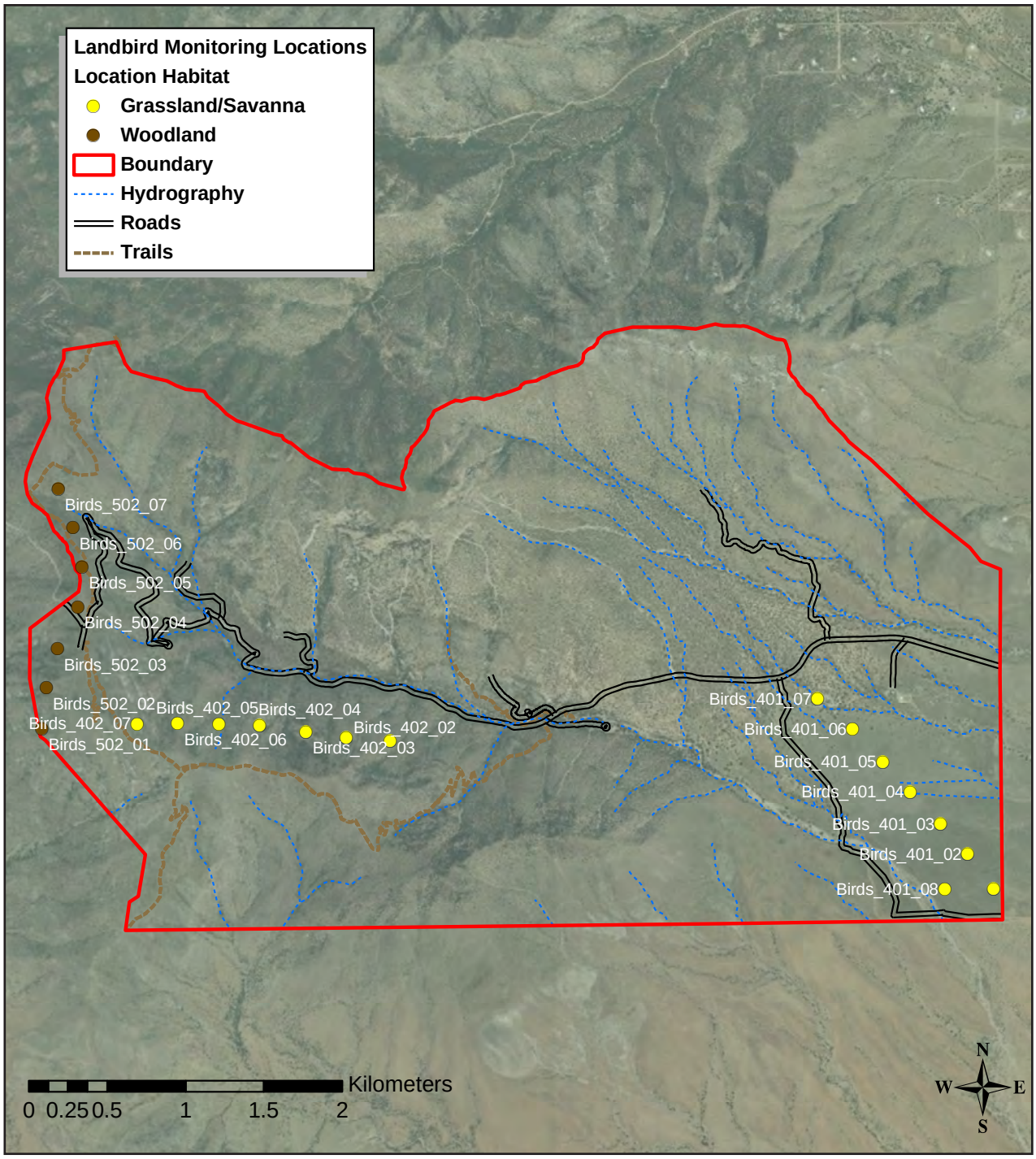

Figure 3.3.1. Point locations sampled at Coronado National Memorial, 2010.

Table 3.3.2. Number of birds detected of each species in each habitat type, Coronado NMem, 2010

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Woodland	Total	% of total
Mourning dove	27	4	31	7%
Ash-throated flycatcher	12	15	27	6%
Eastern meadowlark	25	--	25	6%
White-winged dove	19	3	22	5%
Bewick's wren	6	15	21	5%
Bushtit	6	15	21	5%
Mexican jay	12	9	21	5%
Botteri's sparrow	20	--	20	4%
House finch	12	6	18	4%
Rufous-crowned sparrow	2	16	18	4%
Spotted towhee	6	12	18	4%
Western kingbird	15	--	15	3%
Cassin's kingbird	5	8	13	3%
Bullock's oriole	4	7	11	2%
Northern mockingbird	11	--	11	2%
Scott's oriole	--	11	11	2%
Western scrub-jay	--	11	11	2%
Canyon towhee	2	8	10	2%
Wild turkey	7	--	7	2%
Yellow-rumped warbler	2	5	7	2%
Black-headed grosbeak	--	6	6	1%
Blue grosbeak	6	--	6	1%
Black-chinned sparrow	2	3	5	1%
Dusky-capped flycatcher	2	3	5	1%
Rock wren	--	5	5	1%
Townsend's warbler	2	3	5	1%
Broad-tailed hummingbird	1	3	4	1%
Common raven	3	1	4	1%
Curve-billed thrasher	2	2	4	1%
Brown-crested flycatcher	3	--	3	1%
Canyon wren	--	3	3	1%
Hepatic tanager	--	3	3	1%
Montezuma quail	2	1	3	1%
Phainopepla	3	--	3	1%
Say's phoebe	3	--	3	1%
Turkey vulture	3	--	3	1%
Violet-green swallow	--	3	3	1%
Western wood-pewee	--	3	3	1%
Wilson's warbler	2	1	3	1%
Anna's hummingbird	--	2	2	0%

Table 3.3.2. Number of birds detected of each species in each habitat type, Coronado NMem, 2010, cont.

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Woodland	Total	% of total
Black-chinned hummingbird	1	1	2	0%
Black-throated gray warbler	--	2	2	0%
Black-throated sparrow	2	--	2	0%
Blue-gray gnatcatcher	1	1	2	0%
Bridled Titmouse	2	--	2	0%
Gambel's quail	2	--	2	0%
Gray flycatcher	2	--	2	0%
Lark sparrow	2	--	2	0%
Pine siskin	--	2	2	0%
Virginia's warbler	2	--	2	0%
White-throated swift	2	--	2	0%
Broad-billed hummingbird	--	1	1	0%
Brown-headed cowbird	1	--	1	0%
Great horned owl	--	1	1	0%
House wren	--	1	1	0%
Hutton's vireo	--	1	1	0%
Ladder-backed woodpecker	1	--	1	0%
Lazuli bunting	--	1	1	0%
Northern cardinal	1	--	1	0%
Verdin	1	--	1	0%
Western tanager	--	1	1	0%
Unidentified bird	*6*	--	*6*	*1%*
Total	**253**	**199**	**452**	**100%**

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

3.4 Fort Bowie National Historic Site

3.4.1 2010 sampling

During June and July of 2010, we sampled two transects or grids at Fort Bowie National Historic Site (NHS; Figure 3.4.1). One transect was in the riparian habitat class with eight survey points and one transect was in the desert scrub habitat type (upland) with six survey points. Each transect was visited twice for a total sample of 28 points (Table 3.4.1).

Ash-throated flycatcher (*Myiarchus cinerascens*) was the most commonly counted species at Fort Bowie NHS in 2010.

3.4.2 Results and discussion

During 2010, 442 birds of 45 species were counted at Fort Bowie NHS (Table 3.4.2). The ash-throated flycatcher was the most commonly counted species (9%). Northern mockingbird (9%), mourning dove (7%), canyon towhee (6%), rufous-crowned sparrow (6%), white-winged dove (6%), and northern cardinal (6%) were also common. No new species were detected in the park in 2010.

The riparian corridor along Siphon Canyon once again hosted the most bird activity, with summer breeders and migrants appearing prominently along the small stream from Apache Spring. Species with confirmed breeding were summer tanager, Cooper's hawk, common raven, black-chinned hummingbird, crissal thrasher, blue grosbeak, Bell's vireo, Cassin's kingbird, and lesser goldfinch, all within the narrow riparian stretch. The zone-tailed hawk nest was again occupied, with the adult pair in close attendance and, although the nest stage was not determined, their behavior seemed to suggest that there were small young in the nest. Western scrub-jays were noted in small groups and gray vireo was detected off transect but not in the nesting territory from previous years. The large turkey vulture roost appeared healthy, with more than 40 birds found in the same area as in recent years, and singing indigo buntings were noted in several locations in the park. The upland transect did not have as much diversity as last year, but western scrub-jay, Scott's oriole, Bewick's wren, northern mockingbird, western and Cassin's kingbirds, and American kestrel were noted in suitable breeding habitats.

Table 3.4.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Fort Bowie NHS, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
SPN	Riparian	Riparian	8	2	6/21/2010	7/1/2010
UpW	Upland	Grassland/Savanna	6	2	6/21/2010	7/1/2010

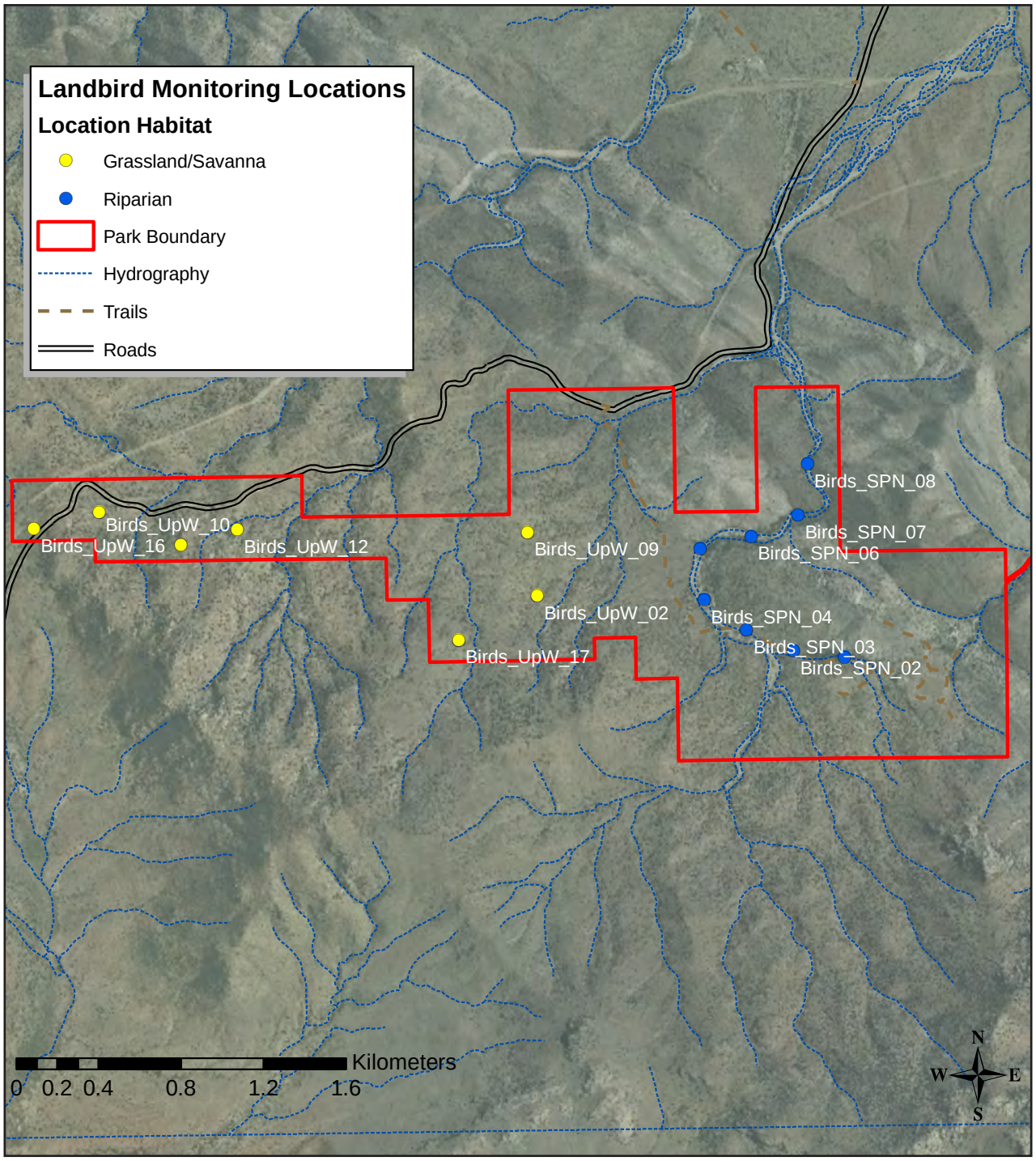

Figure 3.4.1. Point locations sampled at Fort Bowie National Historic Site, 2010.

Table 3.4.2. Number of birds detected of each species in each habitat type, Fort Bowie NHS, 2010

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Riparian	Total	% of total
Ash-throated flycatcher	8	32	40	9%
Northern mockingbird	30	9	39	9%
Mourning dove	18	11	29	7%
Canyon towhee	9	19	28	6%
Rufous-crowned sparrow	17	11	28	6%
White-winged dove	6	22	28	6%
Northern cardinal	--	26	26	6%
Bewick's wren	4	18	22	5%
Turkey vulture	--	21	21	5%
Black-throated sparrow	5	14	19	4%
Cassin's kingbird	1	15	16	4%
Western scrub-jay	6	9	15	3%
Cactus wren	2	12	14	3%
House finch	2	9	11	2%
Common raven	1	8	9	2%
Gambel's quail	5	4	9	2%
Scott's oriole	2	7	9	2%
Black-chinned hummingbird	--	7	7	2%
Blue grosbeak	--	7	7	2%
Phainopepla	1	5	6	1%
Bushtit	--	5	5	1%
Summer tanager	--	5	5	1%
Brown-headed cowbird	2	2	4	1%
Hooded oriole	--	4	4	1%
Ladder-backed woodpecker	2	2	4	1%
Lucy's warbler	--	4	4	1%
Verdin	--	4	4	1%
Zone-tailed hawk	--	4	4	1%
Blue-gray gnatcatcher	3	--	3	1%
White-throated swift	--	3	3	1%
Bridled titmouse	2	--	2	0%
Broad-billed hummingbird	--	2	2	0%
Greater roadrunner	--	2	2	0%
Black-chinned sparrow	1	--	1	0%
Black-tailed gnatcatcher	1	--	1	0%
Brown-crested flycatcher	1	--	1	0%
Bullock's oriole	--	1	1	0%
Canyon wren	1	--	1	0%
Cooper's hawk	--	1	1	0%
Crissal thrasher	--	1	1	0%

Table 3.4.2. Number of birds detected of each species in each habitat type, Fort Bowie NHS, 2010, cont.

Species	Habitat type		# of birds detected	
	Grassland/ Savanna	Riparian	Total	% of total
Indigo bunting	--	1	1	0%
Lesser goldfinch	--	1	1	0%
Montezuma quail	1	--	1	0%
Rock wren	1	--	1	0%
Spotted towhee	1	--	1	0%
Unidentified bird	*1*	--	*1*	*0%*
Total	**134**	**308**	**442**	**100%**

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

3.5 Gila Cliff Dwellings National Monument

3.5.1 2010 sampling

During June and July of 2010, we sampled two transects at Gila Cliff Dwellings NM (Figure 3.5.1). One transect was in riparian habitat with seven survey points and one was in upland habitat with six survey points. Each transect was surveyed twice for a total sample of 26 survey points(Table 3.5.1).

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The Brewer's blackbird (*Euphagus cyanocephalus*) was observed in a new upland transect at Gila Cliff Dwellings NM in 2010.

3.5.2 Results and discussion

During 2010, 453 birds of 62 species were counted at Gila Cliff Dwellings NM (Table 3.5.2). Spotted towhee was the most commonly counted species (11%). American robin (8%), violet-green swallow (5%), northern flicker (5%), and black-headed grosbeak (5%) were also common. No new species were recorded during the surveys in 2010.

The riparian transect was very active with breeders, such as cordilleran flycatcher, yellow-breasted chat, blue grosbeak, summer tanager, and yellow warbler, as well as pine-oak juniper species, including western scrub-jay, Virginia's warbler, purple martin, and northern flicker. Numbers and diversity seemed higher than 2009. In 2010, a nesting pair of red-naped sapsucker were noted, as was a Lewis's woodpecker. An new upland transect was added on the higher pine-oak juniper slopes and atop the mesa above the cliff dwellings. This transect yielded some interesting species, such as Brewer's blackbird, pygmy nuthatch, bushtit, greater pewee, hepatic tanager, red-faced warbler, dark-eyed junco, Steller's jay, Grace's warbler, and broad-tailed hummingbird. Common black-hawk and common merganser were noted off-transect in suitable breeding habitat, and the great blue heron rookery was active again.

Table 3.5.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Gila Cliff Dwellings NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
RIP	Riparian	Riparian	7	2	6/22/2010	7/5/2010
Up	Upland	Woodland	6	2	6/22/2010	7/6/2010

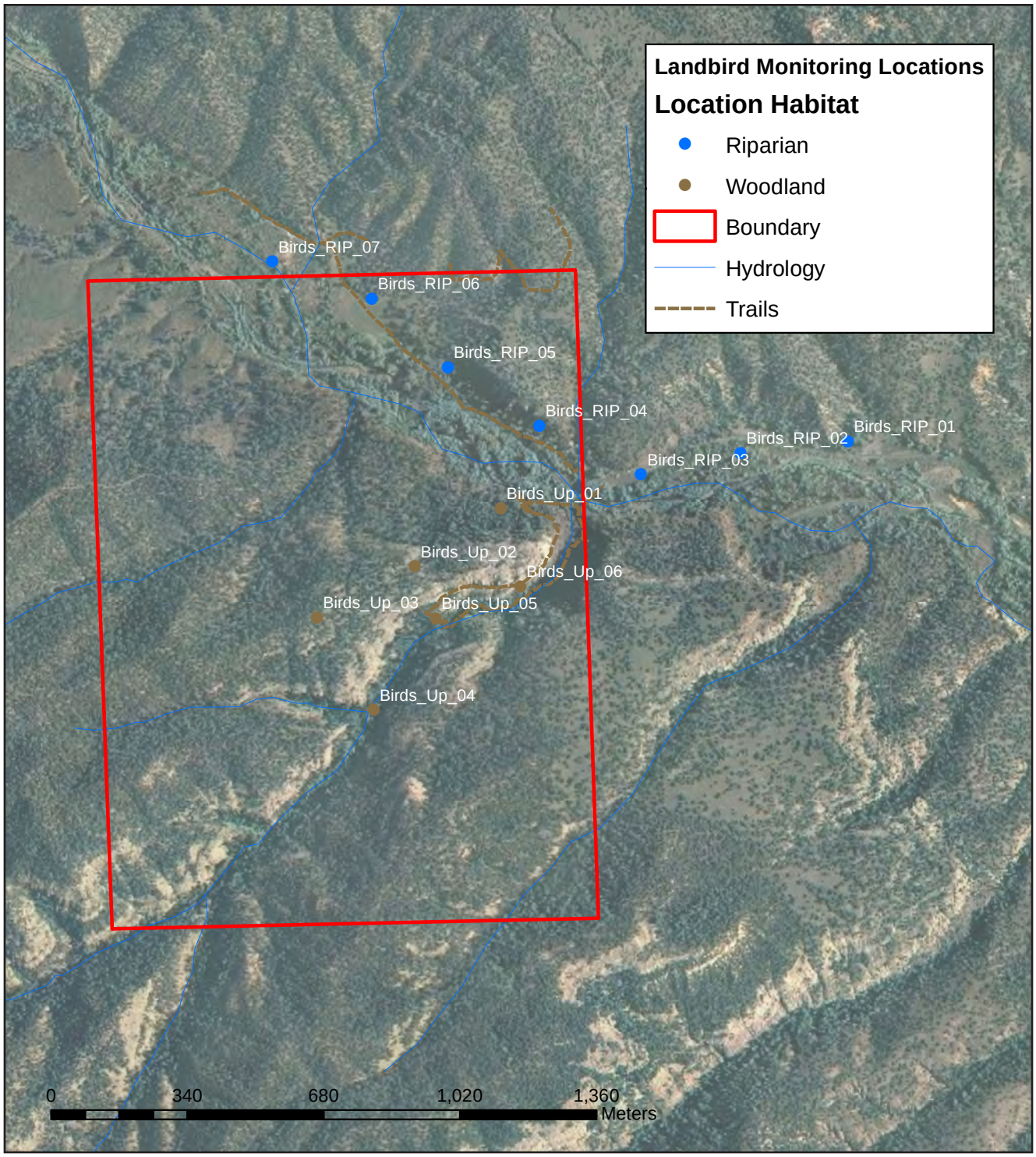

Figure 3.5.1. Point locations sampled at Gila Cliff Dwellings National Monument, 2010.

Table 3.5.2. Number of birds detected of each species in each habitat type, Gila Cliff Dwellings NM, 2010

Species	Habitat type		# of birds detected	
	Woodland	Riparian	Total	% of total
Spotted towhee	18	34	52	11%
American robin	10	27	37	8%
Violet-green swallow	5	18	23	5%
Northern flicker	7	15	22	5%
Black-headed grosbeak	7	14	21	5%
Bushtit	3	16	19	4%
Warbling vireo	1	17	18	4%
Western wood-pewee	2	14	16	4%
Blue grosbeak	3	12	15	3%
House wren	1	14	15	3%
Ash-throated flycatcher	14	--	14	3%
Pygmy nuthatch	12	2	14	3%
Yellow-breasted chat	--	12	12	3%
Mourning dove	6	4	10	2%
Plumbeous vireo	6	4	10	2%
White-breasted nuthatch	6	2	8	2%
Acorn woodpecker	5	2	7	2%
Bewick's wren	5	2	7	2%
Gray flycatcher	5	2	7	2%
House finch	3	4	7	2%
Common raven	3	3	6	1%
Lesser goldfinch	--	6	6	1%
Painted redstart	3	3	6	1%
Red-naped sapsucker	2	4	6	1%
Rufous-crowned sparrow	1	5	6	1%
Steller's jay	2	4	6	1%
Brown-headed cowbird	4	1	5	1%
Dark-eyed junco	5	--	5	1%
Black-throated gray warbler	2	2	4	1%
Canyon towhee	2	2	4	1%
Cassin's kingbird	2	2	4	1%
Common yellowthroat	1	3	4	1%
Hepatic tanager	2	2	4	1%
Hermit thrush	4	--	4	1%
Blue-gray gnatcatcher	3	--	3	1%
Cordilleran flycatcher	1	2	3	1%
Grace's warbler	3	--	3	1%
Purple martin	--	3	3	1%
Rock wren	3	--	3	1%
Turkey vulture	1	2	3	1%

Table 3.5.2. Number of birds detected of each species in each habitat type, Gila Cliff Dwellings NM, 2010, cont.

Species	Habitat type		# of birds detected	
	Woodland	Riparian	Total	% of total
Western scrub-jay	2	1	3	1%
Black phoebe	--	2	2	0%
Canyon wren	--	2	2	0%
Greater roadrunner	2	--	2	0%
Hairy woodpecker	1	1	2	0%
Virginia's warbler	--	2	2	0%
Western tanager	2	--	2	0%
Black-chinned hummingbird	--	1	1	0%
Brewer's blackbird	1	--	1	0%
Broad-tailed hummingbird	1	--	1	0%
Brown creeper	1	--	1	0%
Bullock's oriole	--	1	1	0%
Cliff swallow	1	--	1	0%
Great blue heron	1	--	1	0%
Greater pewee	--	1	1	0%
Indigo bunting	--	1	1	0%
Lewis's woodpecker	--	1	1	0%
Red-faced warbler	1	--	1	0%
Rufous hummingbird	--	1	1	0%
Say's phoebe	--	1	1	0%
Sharp-shinned hawk	--	1	1	0%
Western bluebird	1	--	1	0%
Unidentified bird	*1*	--	*1*	*0%*
Total	**178**	**275**	**453**	**100%**

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

3.6 Montezuma Castle National Monument

3.6.1 2010 sampling

During May and June of 2010, we sampled four transects at Montezuma Castle NM (Figures 3.6.1-1 and 3.6.1-2). Three transects were located at the Castle Unit: two in riparian habitats and one in upland desert scrub. Six survey points were sampled in each riparian transect and eight points were sampled in the upland desert scrub transect. The one transect at the Well Unit was in riparian habitat with seven survey points. Each point was surveyed twice for a total sample of 54 at Montezuma Castle NM (Table 3.6.1).

Overall, Lucy's warbler (*Vermivora luciae*) was the most commonly counted species at Montezuma Castle NM in 2010.

3.6.2 Results and discussion

During 2010, 1,187 birds of 69 species were counted at Montezuma Castle NM (Tables 3.6.2-1 and 3.6.2-2). Overall, Lucy's warbler was the most commonly counted species, followed by the brown-crested flycatcher. At the Castle Unit, the most commonly counted species were house finch and Lucy's warbler (8% each). Brown-crested flycatcher (7%), northern rough-winged swallow (6%), mourning dove (5%), and phainopepla (5%) were also common. At the Well Unit, the most commonly counted species was the Gila woodpecker, accounting for 11% of detections. Also common were yellow warbler (9%), mourning dove (9%), Lucy's warbler (7%), and brown-crested flycatchers (7%). No new species were documented in 2010.

The expected riparian breeders were numerous and frequently detected. Species included song sparrow, Bewick's wren, yellow-breasted chat, Abert's towhee, Bell's vireo, summer tanager, brown-crested flycatcher, and yellow warbler. Nesting common black-hawks were observed tending to young at sites used in past years, common merganser were noted, wood duck were observed in suitable breeding habitat, and killdeer were observed with young at the settling ponds near the visitor center at the Castle Unit. Eurasian collared-doves were detected several times on different riparian transects, and they seemed to have moved into the park and established near the visitor center. Previously, they were noted just outside the park in the nearby residential neighborhood. Also noteworthy were detections of white-winged doves in the riparian zone at both parks. This species is uncommon for the Verde Valley, but might be on the rise.

Table 3.6.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Montezuma Castle NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
R1 (Castle Unit)	Riparian	Riparian	6	2	5/26/2010	6/11/2010
R2 (Castle Unit)	Riparian	Riparian	6	2	5/25/2010	6/13/2010
Up1 (Castle Unit)	Upland	Desert scrub	8	2	5/25/2010	6/12/2010
R (Well Unit)	Riparian	Riparian	7	2	5/26/2010	6/7/2010

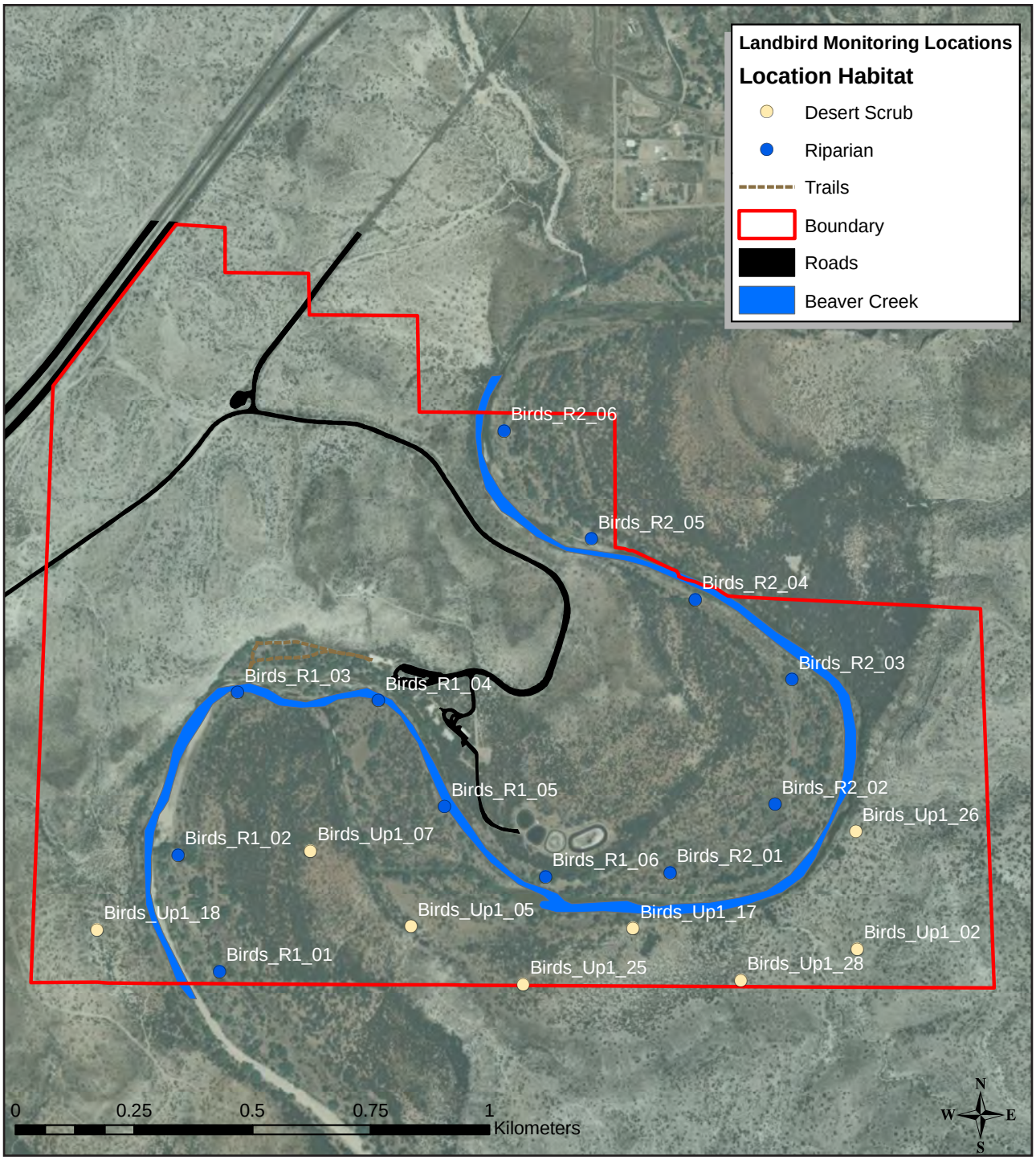

Figure 3.6.1-1. Point locations sampled at Montezuma Castle National Monument, Castle Unit, 2010.

Table 3.6.2-1. Number of birds detected of each species in each habitat type, Montezuma Castle NM–Castle Unit, 2010

Species	Habitat type		# of birds detected	
	Desert scrub	Riparian	Total	% of total
House finch	35	37	72	8%
Lucy's warbler	20	50	70	8%
Brown-crested flycatcher	18	43	61	7%
Northern rough-winged swallow	6	46	52	6%
Mourning dove	13	28	41	5%
Phainopepla	18	22	40	5%
Ash-throated flycatcher	25	14	39	4%
Bewick's wren	11	24	35	4%
Gambel's quail	17	18	35	4%
Lesser goldfinch	13	15	28	3%
Bullock's oriole	10	17	27	3%
Cliff swallow	10	16	26	3%
Gila woodpecker	7	19	26	3%
Blue grosbeak	7	17	24	3%
Brown-headed cowbird	5	19	24	3%
Summer tanager	6	15	21	2%
Yellow warbler	6	14	20	2%
Yellow-breasted chat	9	11	20	2%
Western wood-pewee	6	11	17	2%
Ladder-backed woodpecker	9	7	16	2%
Abert's towhee	--	15	15	2%
Verdin	10	5	15	2%
Cassin's kingbird	3	11	14	2%
Western kingbird	2	10	12	1%
Bridled titmouse	--	11	11	1%
Northern mockingbird	6	4	10	1%
Black-chinned hummingbird	5	3	8	1%
Northern cardinal	4	4	8	1%
Eurasian collared-dove	1	6	7	1%
Violet-green swallow	--	7	7	1%
Common black-hawk	1	5	6	1%
Warbling vireo	--	6	6	1%
Bell's vireo	2	3	5	1%
Common yellowthroat	--	5	5	1%
Hooded oriole	2	3	5	1%
Black-throated sparrow	3	--	3	0%
Canyon towhee	3	--	3	0%
Common raven	1	2	3	0%
European starling	--	3	3	0%
Great blue heron	--	3	3	0%

Table 3.6.2-1. Number of birds detected of each species in each habitat type, Montezuma Castle NM–Castle Unit, 2010, cont.

Species	Habitat type		# of birds detected	
	Desert scrub	Riparian	Total	% of total
Red-tailed hawk	2	1	3	0%
Turkey vulture	3	--	3	0%
White-throated swift	--	3	3	0%
Anna's hummingbird	1	1	2	0%
Black-headed grosbeak	--	2	2	0%
Cooper's hawk	--	2	2	0%
Crissal thrasher	2	--	2	0%
Indigo bunting	--	2	2	0%
Lazuli bunting	--	2	2	0%
Mallard	--	2	2	0%
Say's phoebe	--	2	2	0%
Western tanager	2	--	2	0%
White-breasted nuthatch	--	2	2	0%
Wood duck	--	2	2	0%
Black phoebe	--	1	1	0%
Black-tailed gnatcatcher	1	--	1	0%
Canyon wren	--	1	1	0%
Common merganser	--	1	1	0%
Song sparrow	--	1	1	0%
White-winged dove	1	--	1	0%
Wilson's warbler	--	1	1	0%
Yellow-rumped warbler	--	1	1	0%
Unidentified bird	*1*	*1*	*2*	*0%*
Unidentified hummingbird	*1*	--	*1*	*0%*
Total	**308**	**577**	**885**	**100%**

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

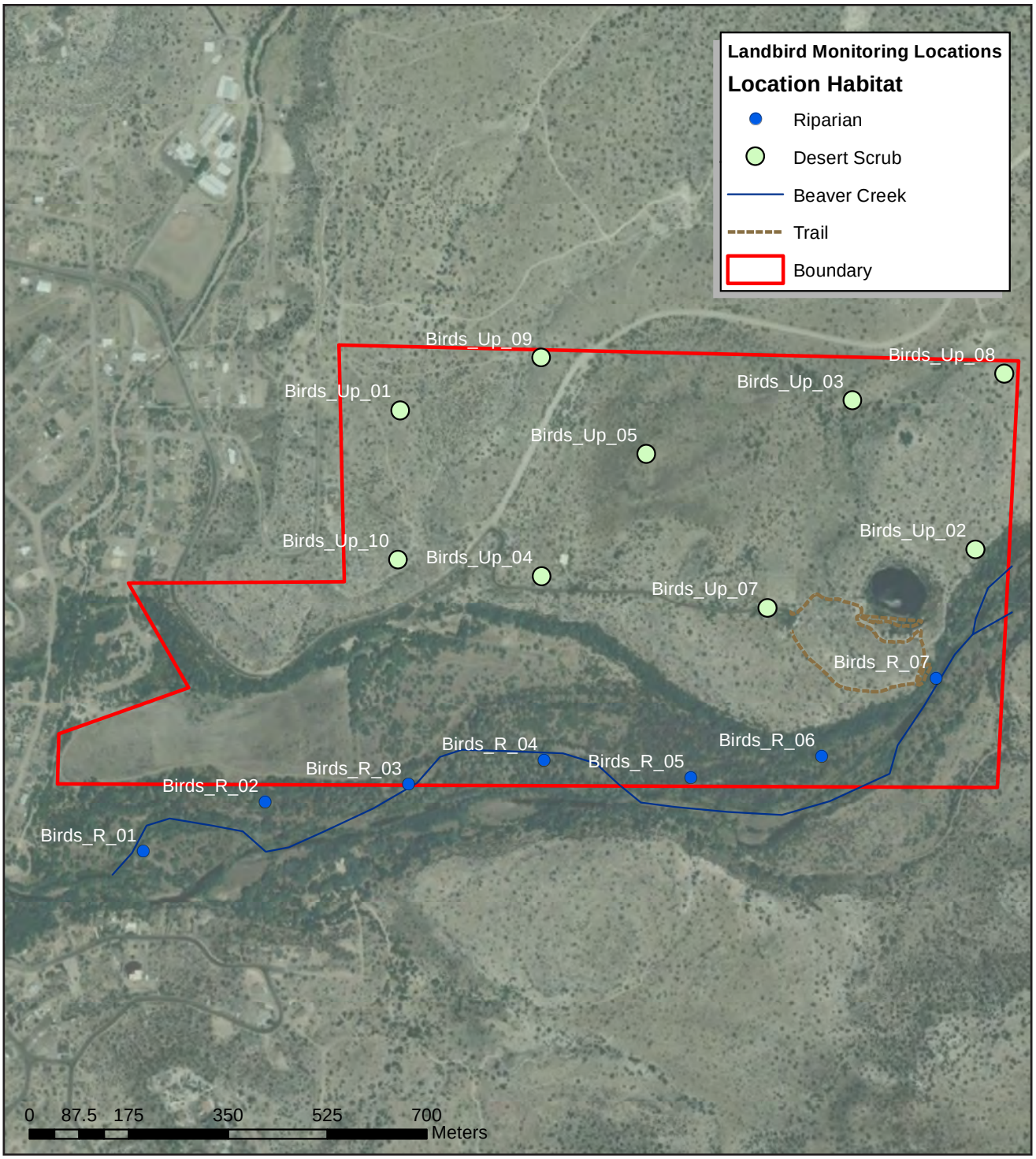

Figure 3.6.1-2. Point locations sampled at Montezuma Castle National Monument, Well Unit, 2010.

Table 3.6.2-2. Number of birds detected of each species in each habitat type, Montezuma Castle NM–Well Unit, 2010

Species	# of birds detected	
	Total (riparian habitat)	% of total
Gila woodpecker	32	11%
Yellow warbler	28	9%
Mourning dove	27	9%
Lucy's warbler	21	7%
Brown-crested flycatcher	20	7%
Bewick's wren	14	5%
Blue grosbeak	14	5%
Lesser goldfinch	14	5%
Yellow-breasted chat	14	5%
Summer tanager	12	4%
Song sparrow	10	3%
Phainopepla	9	3%
Brown-headed cowbird	6	2%
Ladder-backed woodpecker	6	2%
Western wood-pewee	6	2%
Black-chinned hummingbird	5	2%
House finch	5	2%
Northern cardinal	5	2%
Western tanager	5	2%
Abert's towhee	4	1%
Ash-throated flycatcher	4	1%
Black phoebe	4	1%
Warbling vireo	4	1%
Anna's hummingbird	3	1%
Common black-hawk	3	1%
Yellow-billed cuckoo	3	1%
Bridled titmouse	2	1%
Bullock's oriole	2	1%
Bushtit	2	1%
Cassin's kingbird	2	1%
Northern rough-winged swallow	2	1%
Western kingbird	2	1%
American robin	1	0%
Black-headed grosbeak	1	0%
Canyon wren	1	0%
Common raven	1	0%
Common yellowthroat	1	0%
Gambel's quail	1	0%
Great-tailed grackle	1	0%
Green heron	1	0%
Lincoln's sparrow	1	0%
MacGillivray's warbler	1	0%
White-breasted nuthatch	1	0%
White-winged dove	1	0%
Total	**302**	**100%**

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

3.7 Organ Pipe Cactus National Monument

3.7.1 2010 sampling

During May of 2010, we sampled six transects, each with seven points, two times each for a total sample of 84 at Organ Pipe Cactus NM (Figure 3.7.1). Two transects were in riparian (xeroriparian) habitats and four were in upland (desert scrub) habitats (Table 3.7.1).

3.7.2 Results and discussion

During 2010, 1,411 birds of 55 species were counted at Organ Pipe NM (Table 3.7.2). White-winged dove was the most commonly counted species (17%). Gambel's quail (10%), mourning dove (9%), Gila woodpecker (9%), brown-crested flycatcher (8%) were also common. No new species were detected in the park in 2010.

A very wet winter with persistent rain transformed the usually dry monument; many bird species favored the abundance of seasonal flowers and lush new growth, particularly along the narrow xeroriparian washes which supported large ironwood, desert willow, and palo verde trees. Numerous and diverse migrants passed through in good numbers, including the uncommon hermit warbler and olive-sided flycatcher, and along with lingering winter birds, such as lark bunting and green-tailed towhee. Breeding desert residents responded well to the wet winter, and juveniles of Gila woodpecker, cactus wren, mourning dove, curve-billed thrasher, verdin, Gambel's quail, Costa's hummingbird, and black-throated sparrow were abundant. A rufous-backed robin, a vagrant from Mexico, wintered in a fruiting hackberry grove that attracted many spring warbler, tanager, grosbeak, vireo, flycatcher, and thrush. Harris's hawks nested by the visitor center, and a single crested caracara was observed. The caracara is a rare species known to breed in the monument. A large flock of more than 150 American white pelicans soaring over the rugged Ajo Mountains were observed and were photographically documented by a park ranger. Recently confirmed nesting violet-green swallows were observed using saguaro cactus cavities—a dramatic setting for the species, which favors aspens in the cool, high mountains much further northeast.

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A crested caracara (*Caracara cheriway*), a rare species known to breed at Organ Pipe Cactus NM, was observed in 2010.

Table 3.7.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Organ Pipe Cactus NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
R1	Riparian	Xeroriparian	7	2	5/5/2010	5/21/2010
R2	Riparian	Xeroriparian	7	2	5/4/2010	5/20/2010
U1	Upland	Desert scrub	7	2	5/6/2010	5/22/2010
U12	Upland	Desert scrub	7	2	5/5/2010	5/21/2010
U4	Upland	Desert scrub	7	2	5/4/2010	5/20/2010
U5	Upland	Desert scrub	7	2	5/6/2010	5/22/2010

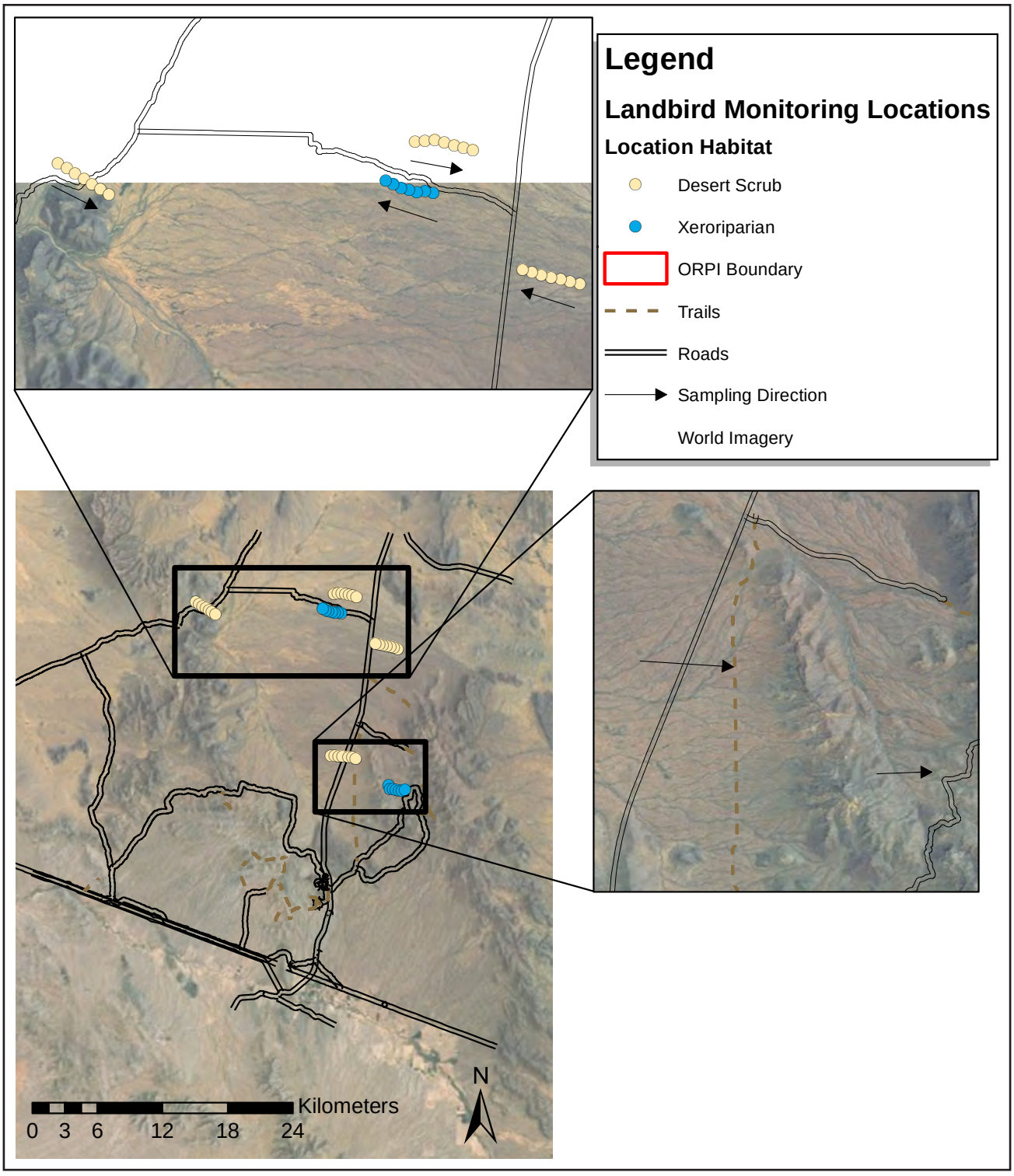

Figure 3.7.1. Point locations sampled at Organ Pipe Cactus National Monument, 2010.

Table 3.7.2. Number of birds detected of each species in each habitat type, Organ Pipe Cactus NM, 2010

Species	Habitat type		# of birds detected	
	Desert scrub	Xeroriparian	Total	% of total
White-winged dove	155	81	236	17%
Gambel's quail	85	51	136	10%
Mourning dove	95	37	132	9%
Gila woodpecker	88	41	129	9%
Brown-crested flycatcher	79	32	111	8%
Ash-throated flycatcher	54	34	88	6%
Cactus wren	34	31	65	5%
Curve-billed thrasher	41	18	59	4%
Black-throated sparrow	37	15	52	4%
Northern mockingbird	28	16	44	3%
Phainopepla	11	26	37	3%
Verdin	14	18	32	2%
Black-tailed gnatcatcher	21	6	27	2%
Scott's oriole	12	9	21	1%
Canyon towhee	6	14	20	1%
Gilded flicker	12	8	20	1%
Lucy's warbler	12	7	19	1%
House finch	15	2	17	1%
Brown-headed cowbird	7	6	13	1%
Townsend's warbler	4	8	12	1%
Costa's hummingbird	2	9	11	1%
Brewer's sparrow	8	2	10	1%
Wilson's warbler	6	3	9	1%
Ladder-backed woodpecker	7	1	8	1%
Northern cardinal	1	6	7	0%
Blue-gray gnatcatcher	2	4	6	0%
Pyrrhuloxia	2	4	6	0%
Red-tailed hawk	4	1	5	0%
Green-tailed towhee	1	3	4	0%
Lazuli bunting	2	2	4	0%
Rufous-winged sparrow	3	1	4	0%
Turkey vulture	1	3	4	0%
Western tanager	3	1	4	0%
Crissal thrasher	--	3	3	0%
Hooded oriole	1	2	3	0%
Lesser nighthawk	3	--	3	0%
Loggerhead shrike	3	--	3	0%
Pacific-slope flycatcher	3	--	3	0%
Black-throated gray warbler	--	2	2	0%
Bullock's oriole	1	1	2	0%

Table 3.7.2. Number of birds detected of each species in each habitat type, Organ Pipe Cactus NM, 2010, cont.

Species	Habitat type		# of birds detected	
	Desert scrub	Xeroriparian	Total	% of total
Lark bunting	1	1	2	0%
Anna's hummingbird	--	1	1	0%
Bell's vireo	--	1	1	0%
Broad-billed hummingbird	1	--	1	0%
Broad-tailed hummingbird	--	1	1	0%
Cordilleran flycatcher	--	1	1	0%
Crested caracara	1	--	1	0%
Gray flycatcher	1	--	1	0%
Great horned owl	1	--	1	0%
Hermit warbler	--	1	1	0%
MacGillivray's warbler	--	1	1	0%
Rufous-crowned sparrow	--	1	1	0%
Western kingbird	--	1	1	0%
White-crowned sparrow	--	1	1	0%
Yellow-rumped warbler	--	1	1	0%
Unidentified bird	*16*	*2*	*18*	*1%*
Unidentified sparrow	*3*	*--*	*3*	*0%*
Unidentified hummingbird	*1*	*1*	*2*	*0%*
Unidentified woodpecker	*1*	*--*	*1*	*0%*
Total	**889**	**522**	**1411**	**100%**

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

3.8 Saguaro National Park

3.8.1 2010 sampling

During April, May, or June of 2010, we sampled 11 transects at Saguaro NP (Figures 3.8.1-1 and 3.8.1-2). Six transects were in the Rincon Mountain District (SAGE). Five of these were in the upland habitat class: four in desert scrub habitat types with seven or six survey points each, one in woodland habitat type with four survey points, and one in a riparian habitat with eight survey points. The transects in the desert scrub and riparian habitats were visited twice and the woodland habitat was visited once. The other five transects, all in upland desert scrub habitat with six to eight survey points each and visited twice, were in the Tucson Mountain District (SAGW). The total sample at Saguaro NP was 144 `(Table 3.8.1).

The common yellowthroat (*Geothlypis trichas*) was confirmed for the first time at Saguaro NP in 2010.

3.8.2 Results and discussion

During 2010, 2,954 birds of 88 species were counted at Saguaro NP (Tables 3.8.2-1 and 3.8.2-2). White-winged dove and Gila woodpecker were the most commonly counted species. At the Rincon Mountain District (SAGE), 1,464 birds of 81 species were counted. Species counted in the highest numbers were white-winged dove (12%), Gila woodpecker (8%), brown-crested flycatcher (6%), ash-throated flycatcher (6%), and Gambel's quail (6%). At the Tucson Mountain District (SAGW), 1,490 birds of 56 species were counted. Species counted in the highest numbers were white-winged dove (16%), Gila woodpecker (15%), Gambel's quail (8%), ash-throated flycatcher (5%), cactus wren (5%), and verdin (5%). One new species, the common yellowthroat, was documented at the park in 2010.

The heavy winter rains were very beneficial to the desert scrub residents at both park units and numbers of common species seemed high. Gila woodpecker, mourning and white-winged doves, cactus wren, Gambel's quail, house finch, ash-throated flycatcher, and verdin were most commonly detected in the upland transects. A migrant gray vireo was again detected singing in lush desert scrub, nesting Harris's hawks held the same territory, and a great horned owl nest observed with large young in a saguaro. Both peregrine and prairie falcons were again detected within the parks, although nesting was not confirmed. A lowland wintering spotted towhee in desert scrub was unusual, as were lingering singing Brewer's sparrow.

Along Rincon Creek at SAGE, stream levels and surface water pools were unusually high from the bountiful winter rains, and snow melt from the Rincon Mountains contributed to lush riparian undergrowth, attracting good numbers of yellow-breasted chat and Bell's vireo, species which have been absent in dry years. A female common yellowthroat along the riparian stretch was the first confirmed report for the park; the habitat could be suitable for nesting in wetter years. Gray and zone-tailed hawks, great horned owl, yellow warbler, northern beardless-tyrannulet, and yellow-billed cuckoo were also present. A pair of "Mexican" mallards favored a suitable breeding stretch of the creek. Nesting vermilion flycatchers, Cassin's and western kingbirds, rufous-winged sparrows, and purple martins seemed more numerous than recent years.

The high-elevation transects in the Rincon Mountains at SAGE were canceled due to a crewmember injury, and were thus not surveyed at all.

Table 3.8.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Saguaro NP, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
SAGE-008	Upland	Desert scrub	7	2	5/13/2010	6/27/2010
SAGE-112	Upland	Desert scrub	7	2	5/11/2010	6/26/2010
SAGE-115	Upland	Desert scrub	7	2	5/11/2010	6/25/2010
SAGE-125	Upland	Woodland	4	1	6/1/2010	--
SAGE-139	Upland	Desert scrub	6	2	5/12/2010	6/24/2010
SAGE-LRC	Riparian	Riparian	8	2	5/13/2010	6/28/2010
SAGW-204	Upland	Desert scrub	7	2	4/30/2010	6/17/2010
SAGW-212	Upland	Desert scrub	6	2	4/27/2010	5/30/2010
SAGW-213	Upland	Desert scrub	7	2	4/29/2010	6/10/2010
SAGW-238	Upland	Desert scrub	6	2	4/26/2010	6/16/2010
SAGW-239	Upland	Desert scrub	8	2	4/28/2010	5/29/2010

Harris's hawks (*Geothlypis trichas*) were observed in the same territory at Saguaro NP in 2010 as they were in 2009.

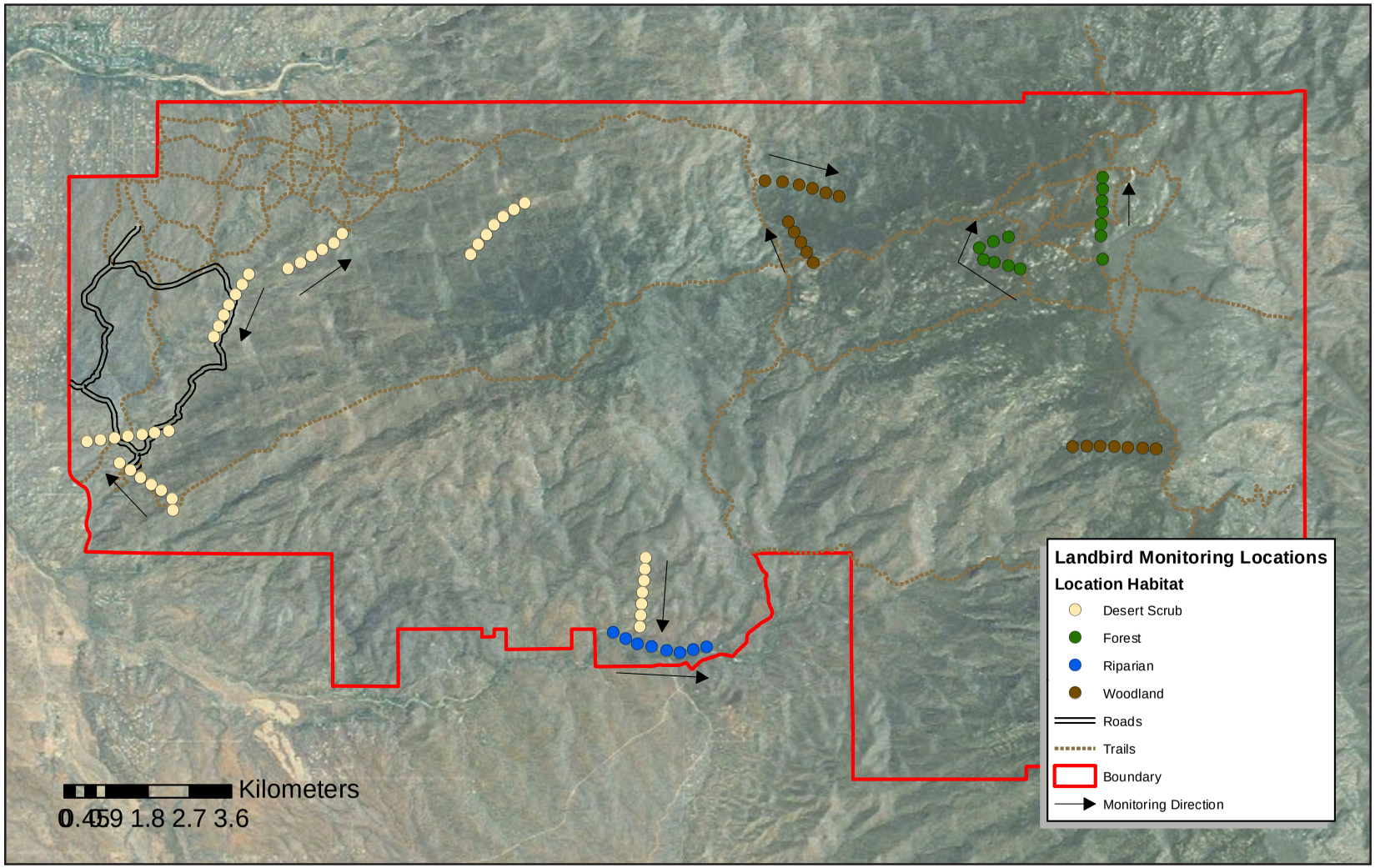

Figure 3.8.1-1. Point locations sampled at Saguaro National Park, Rincon Mountain District, 2010.

Table 3.8.2-1. Number of birds detected of each species in each habitat type, Saguaro NP–Rincon Mountain District, 2010

Species	Habitat type			# of birds detected	
	Desert scrub	Riparian	Woodland	Total	% of total
White-winged dove	133	40	3	176	12%
Gila woodpecker	88	35	--	123	8%
Brown-crested flycatcher	59	34	--	93	6%
Ash-throated flycatcher	68	13	5	86	6%
Gambel's quail	56	26	--	82	6%
Mourning dove	49	22	3	74	5%
Lucy's warbler	34	34	--	68	5%
Cactus wren	47	11	--	58	4%
Black-throated sparrow	47	3	--	50	3%
House finch	32	13	--	45	3%
Canyon towhee	29	5	--	34	2%
Purple martin	17	15	--	32	2%
Verdin	19	12	--	31	2%
Bell's vireo	9	19	--	28	2%
Northern cardinal	14	13	--	27	2%
Curve-billed thrasher	21	5	--	26	2%
Phainopepla	17	8	--	25	2%
Pyrrhuloxia	23	--	--	23	2%
Brown-headed cowbird	14	6	--	20	1%
Ladder-backed woodpecker	9	7	3	19	1%
Rufous-winged sparrow	12	7	--	19	1%
Bewick's wren	--	8	9	17	1%
Black-tailed gnatcatcher	17	--	--	17	1%
Gilded flicker	13	4	--	17	1%
Bullock's oriole	13	2	--	15	1%
Greater roadrunner	8	5	2	15	1%
Black-chinned hummingbird	3	8	--	11	1%
Lesser goldfinch	2	9	--	11	1%
Rufous-crowned sparrow	5	--	6	11	1%
Vermilion flycatcher	--	11	--	11	1%
Abert's towhee	--	10	--	10	1%
Northern mockingbird	7	3	--	10	1%
Scott's oriole	9	--	--	9	1%
Costa's hummingbird	7	1	--	8	1%
Summer tanager	1	7	--	8	1%
Turkey vulture	8	--	--	8	1%
Black-chinned sparrow	--	--	7	7	0%
Bushtit	--	--	7	7	0%
Cassin's kingbird	--	7	--	7	0%
Blue grosbeak	3	3	--	6	0%
Common raven	5	--	1	6	0%

Table 3.8.2-1. Number of birds detected of each species in each habitat type, Saguaro NP–Rincon Mountain District, 2010, cont.

Species	Habitat type			# of birds detected	
	Desert scrub	Riparian	Woodland	Total	% of total
Red-tailed hawk	5	1	--	6	0%
Spotted towhee	--	--	6	6	0%
American kestrel	5	--	--	5	0%
Black-headed grosbeak	3	--	2	5	0%
Great horned owl	1	4	--	5	0%
Western kingbird	--	5	--	5	0%
Yellow warbler	--	5	--	5	0%
Blue-gray gnatcatcher	--	--	4	4	0%
Bronzed cowbird	2	2	--	4	0%
Mallard	--	4	--	4	0%
Hepatic tanager	--	--	3	3	0%
Mexican jay	--	--	3	3	0%
Rock wren	3	--	--	3	0%
Say's phoebe	2	1	--	3	0%
Varied bunting	3	--	--	3	0%
Western tanager	3	--	--	3	0%
Yellow-rumped warbler	3	--	--	3	0%
Black-throated gray warbler	1	--	1	2	0%
Broad-billed hummingbird	--	1	1	2	0%
Gray hawk	--	2	--	2	0%
Lazuli bunting	2	--	--	2	0%
Warbling vireo	--	2	--	2	0%
Wilson's warbler	--	2	--	2	0%
Yellow-breasted chat	--	2	--	2	0%
Canyon wren	1	--	--	1	0%
Common ground-dove	--	1	--	1	0%
Common yellowthroat	**--**	**1**	**--**	**1**	**0%**
Crissal thrasher	1	--	--	1	0%
Gray flycatcher	1	--	--	1	0%
Green-tailed towhee	1	--	--	1	0%
Hooded oriole	1	--	--	1	0%
Lark sparrow	1	--	--	1	0%
MacGillivray's warbler	--	1	--	1	0%
Northern beardless-tyrannulet	--	1	--	1	0%
Pacific-slope flycatcher	--	--	1	1	0%
Virginia's warbler	--	--	1	1	0%
Western scrub-jay	--	--	1	1	0%
Western wood-pewee	--	--	1	1	0%
White-breasted nuthatch	--	--	1	1	0%
Yellow-billed cuckoo	--	1	--	1	0%
Unidentified woodpecker	*6*	--	--	*6*	*0%*

Table 3.8.2-1. Number of birds detected of each species in each habitat type, Saguaro NP–Rincon Mountain District, 2010, cont.

Species	Habitat type			# of birds detected	
	Desert scrub	Riparian	Woodland	Total	% of total
Unidentified bird	*4*	*--*	*--*	*4*	*0%*
Unidentified flicker	*3*	*--*	*--*	*3*	*0%*
Unidentified warbler	*1*	*--*	*--*	*1*	*0%*
Total	**951**	**442**	**71**	**1,464**	**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.

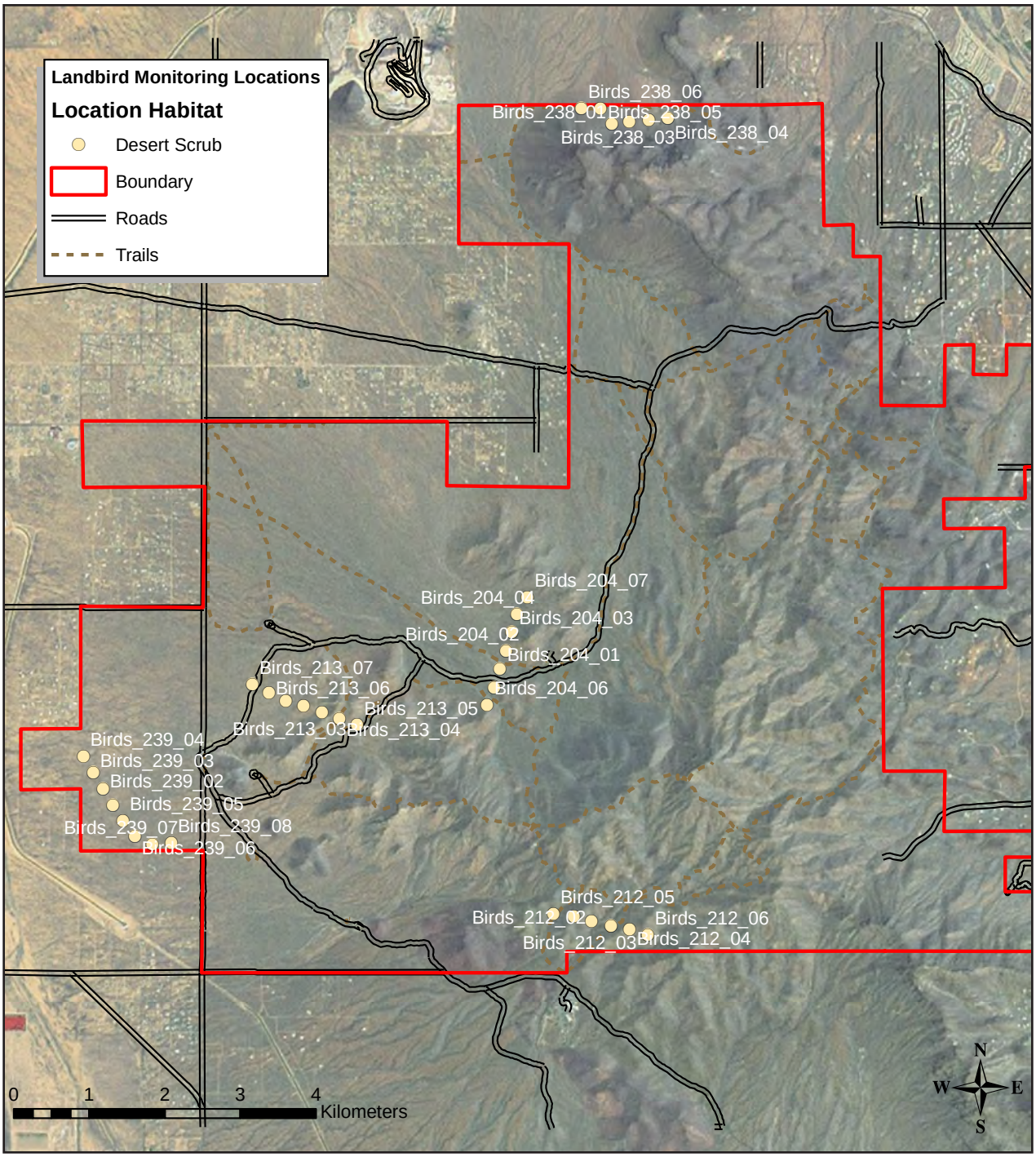

Figure 3.8.1-2. Point locations sampled at Saguaro National Park, Tucson Mountain District, 2010.

Table 3.8.2-2. Number of birds detected of each species in each habitat type, Saguaro NP–Tucson Mountain District, 2010

Species	# of birds detected: Total (desert scrub habitat)	# of birds detected: % of total
White-winged dove	242	16%
Gila woodpecker	223	15%
Gambel's quail	113	8%
Ash-throated flycatcher	77	5%
Cactus wren	70	5%
Verdin	68	5%
Curve-billed thrasher	67	4%
Gilded flicker	57	4%
Mourning dove	54	4%
Brown-crested flycatcher	53	4%
House finch	41	3%
Black-throated sparrow	34	2%
White-throated swift	34	2%
Northern cardinal	32	2%
Purple martin	31	2%
Canyon towhee	30	2%
Brown-headed cowbird	29	2%
Pyrrhuloxia	28	2%
Ladder-backed woodpecker	22	1%
Rufous-winged sparrow	19	1%
Black-tailed gnatcatcher	18	1%
Scott's oriole	13	1%
American kestrel	9	1%
Common raven	8	1%
Lucy's warbler	8	1%
Turkey vulture	8	1%
Costa's hummingbird	7	0%
Lazuli bunting	7	0%
Greater roadrunner	6	0%
Lesser goldfinch	6	0%
Red-tailed hawk	6	0%
Varied bunting	6	0%
Bullock's oriole	5	0%
Green-tailed towhee	5	0%
Northern mockingbird	5	0%
Rock wren	5	0%
Gray flycatcher	4	0%
Harris's hawk	4	0%
Wilson's warbler	4	0%
Brewer's sparrow	3	0%
Western kingbird	3	0%
Anna's hummingbird	2	0%
Bell's vireo	2	0%
Black-headed grosbeak	2	0%
Gray vireo	2	0%
Great horned owl	2	0%
Hooded oriole	2	0%
Lesser nighthawk	2	0%
Phainopepla	2	0%
Townsend's warbler	2	0%
Virginia's warbler	2	0%
Western wood-pewee	2	0%
Black-throated gray warbler	1	0%
MacGillivray's warbler	1	0%
Rufous-crowned sparrow	1	0%
Spotted towhee	1	0%
Total	**1,490**	**100%**

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

3.9 Tonto National Monument

3.9.1 2010 sampling

During May and June of 2010, we sampled two transects at Tonto NM (Figure 3.9.1). One transect was in riparian habitat with eight survey points. The other was in upland (desert scrub) habitat with nine survey points. Each point was surveyed twice for a total sample of 34 at Tonto NM (Table 3.9.1).

3.9.2 Results and discussion

During 2010, 626 birds of 50 species were counted at Tonto NM (Table 3.9.2). The Gambel's quail was the most commonly counted species (9%). Black-throated sparrow (8%), Bell's vireo (6%), and mourning dove (6%) were also common. No new species were observed in 2010.

Migration was not as prominent in the narrow riparian strip; species diversity was low through this otherwise prime migrant trap. A handful of warbler, flycatcher, vireo, tanager, and grosbeak were present, and the site still hosted a nesting pair of Cooper's hawk at the same nest as in previous years. Three territorial singing male indigo buntings were present along the canyon bottom in 2010—the species can be absent in some years. A healthy turkey vulture and white-throated swift roost and nesting population were in the same cliff dwelling area as in previous years. Interesting species from the riparian and upland transect included crissal thrasher, gray vireo, lazuli bunting, and gilded flicker. Just north of the monument and visible from the park on the shores of adjacent Lake Roosevelt, nesting western grebes were observed where they regularly breed.

Table 3.9.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Tonto NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
RIP	Riparian	Riparian	8	2	5/24/2010	6/5/2010
UpW	Upland	Desert scrub	9	2	5/24/2010	6/4/2010

A nesting pair of Cooper's hawks (*Accipiter cooperii*) were observed in the same nest as previous years at Tonto NM in 2010.

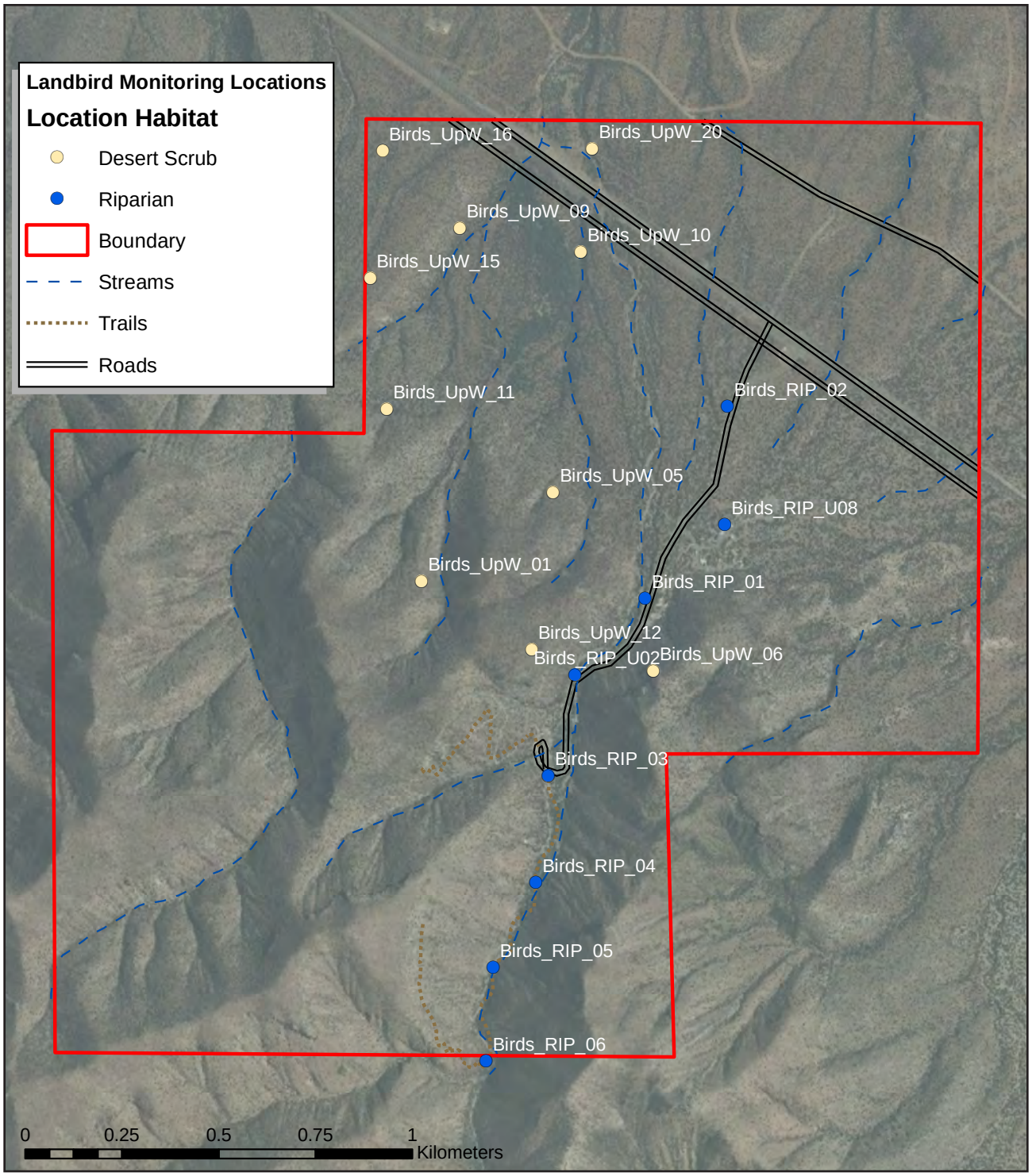

Figure 3.9.1. Point locations sampled at Tonto National Monument, 2010.

Table 3.9.2. Number of birds detected of each species in each habitat type, Tonto NM, 2010

Species	Habitat type		# of birds detected	
	Desert scrub	Riparian	Total	% of total
Gambel's quail	37	17	54	9%
Black-throated sparrow	27	22	49	8%
Bell's vireo	9	30	39	6%
Mourning dove	15	20	35	6%
Northern mockingbird	17	15	32	5%
Gila woodpecker	17	14	31	5%
Ash-throated flycatcher	16	13	29	5%
Brown-crested flycatcher	13	16	29	5%
Cactus wren	12	16	28	4%
Canyon towhee	14	14	28	4%
Northern cardinal	8	17	25	4%
Lucy's warbler	12	12	24	4%
Turkey vulture	17	5	22	4%
House finch	10	11	21	3%
White-winged dove	13	5	18	3%
Costa's hummingbird	3	10	13	2%
Black-tailed gnatcatcher	10	2	12	2%
Hooded oriole	1	11	12	2%
Verdin	7	5	12	2%
Rufous-crowned sparrow	4	6	10	2%
Blue-gray gnatcatcher	6	3	9	1%
Curve-billed thrasher	4	4	8	1%
Phainopepla	2	6	8	1%
Brown-headed cowbird	1	5	6	1%
Gilded flicker	3	3	6	1%
Western tanager	5	1	6	1%
Common raven	3	2	5	1%
Pyrrhuloxia	4	1	5	1%
Say's phoebe	2	3	5	1%
Scott's oriole	1	4	5	1%
Summer tanager	--	4	4	1%
Western kingbird	2	2	4	1%
American kestrel	3	--	3	0%
Pacific-slope flycatcher	--	3	3	0%
Abert's towhee	--	2	2	0%
Bewick's wren	2	--	2	0%
Canyon wren	--	2	2	0%
Crissal thrasher	1	1	2	0%
House wren	2	--	2	0%
Lesser goldfinch	--	2	2	0%

Table 3.9.2. Number of birds detected of each species in each habitat type, Tonto National Monument, 2010, cont.

Species	Habitat type		# of birds detected	
	Desert scrub	Riparian	Total	% of total
Red-tailed hawk	1	1	2	0%
Black-chinned hummingbird	1	--	1	0%
Black-headed grosbeak		1	1	0%
Bullock's oriole	1	--	1	0%
Cooper's hawk	--	1	1	0%
Greater roadrunner	1	--	1	0%
Ladder-backed woodpecker	--	1	1	0%
Rock wren	1	--	1	0%
Western wood-pewee	1	--	1	0%
Wilson's warbler	--	1	1	0%
Unidentified bird	*3*	--	*3*	*0%*
Total	**312**	**314**	**626**	**100%**

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

3.10 Tumacácori National Historical Park

3.10.1 2010 sampling

During May of 2010, we sampled two transects at Tumacácori National Historical Park (NHP; Figure 3.10.1). Both transects were in riparian habitat with seven survey points each. Each point was surveyed twice for a total sample of 28 survey points at Tumacácori NHP (Table 3.10.1).

3.10.2 Results and discussion

During 2010, 696 birds of 62 species were counted at Tumacácori NHP (Table 3.10.2). Brown-crested flycatcher were the most commonly counted species (11%). Gila woodpecker (7%), brown-headed cowbird (6%), Bewick's wren (6%), and Lucy's warbler (6%) were also common. No new species were recorded in 2010.

The lush riparian corridor along the east transect continued to host higher numbers and species diversity, with many of the expected summer breeders, such as yellow warbler, summer tanager, yellow-breasted chat, Bell's vireo, and brown-crested flycatcher, in healthy attendance. Residents such as Bewick's wren, Abert's towhee, Gila woodpecker, lesser goldfinch, brown-headed cowbird, and song sparrow were also noted in high numbers. Several pairs of gray hawk were observed nesting along and adjacent to the east transect, and a pair of territorial tropical kingbird were encountered in prime nesting habitat where they have bred in recent years. The west transect, consisting primarily of mesquite woodland and open agricultural fields, hosted large numbers of blackbird and dove and open country flycatcher, kingbird, sparrow, and finch. Flyover black-bellied whistling-duck and numerous paired common ground-dove were a nice addition, and interesting vagrant species in and adjacent to the park included hooded and Kentucky warbler, white-eyed vireo, Baltimore oriole, and northern parula.

Brown-crested flycatchers (*Myiarchus tyrannulus*) were most commonly counted species at Tumacácori NHP in 2010.

Table 3.10.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Tumacácori NHP, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
Est	Riparian	Riparian	7	2	5/10/2010	5/18/2010
Wst	Riparian	Riparian	7	2	5/10/2010	5/18/2010

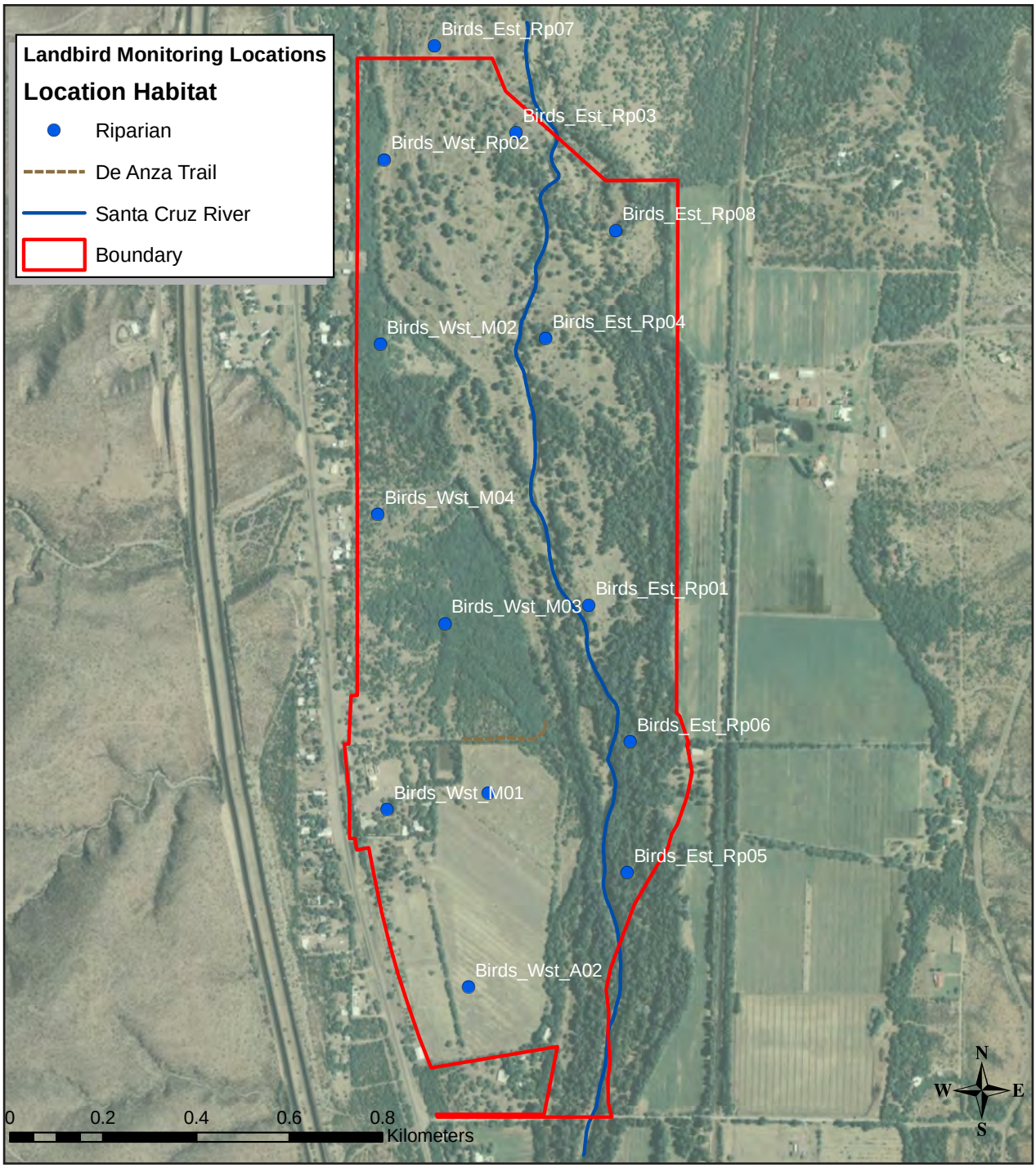

Figure 3.10.1. Point locations sampled at Tumacácori National Historical Park, 2010.

Table 3.10.2. Number of birds detected of each species in each habitat type, Tumacácori NHP, 2010

Species	# of birds detected	
	Total (riparian habitat)	% of total
Brown-crested flycatcher	76	11%
Gila woodpecker	52	7%
Brown-headed cowbird	41	6%
Bewick's wren	39	6%
Lucy's warbler	39	6%
White-winged dove	38	5%
Summer tanager	32	5%
Yellow warbler	23	3%
Vermilion flycatcher	22	3%
Cassin's kingbird	20	3%
House finch	20	3%
Phainopepla	20	3%
Song sparrow	20	3%
Yellow-breasted chat	19	3%
Bullock's oriole	17	2%
Northern cardinal	16	2%
Dusky-capped flycatcher	14	2%
Bridled titmouse	13	2%
Mourning dove	13	2%
Ladder-backed woodpecker	11	2%
Ash-throated flycatcher	8	1%
Bell's vireo	7	1%
Blue grosbeak	7	1%
Common raven	7	1%
Lesser goldfinch	7	1%
Verdin	7	1%
Abert's towhee	6	1%
Broad-billed hummingbird	6	1%
Western wood-pewee	6	1%
Gambel's quail	5	1%
Lazuli bunting	5	1%
Northern beardless-tyrannulet	5	1%
Rufous-winged sparrow	5	1%
Western kingbird	5	1%
Western tanager	5	1%
Common yellowthroat	4	1%
Gray hawk	4	1%
Tropical kingbird	4	1%
Wilson's warbler	4	1%
Black-chinned hummingbird	3	0%
House sparrow	3	0%
Anna's hummingbird	2	0%
Common ground-dove	2	0%
Great-tailed grackle	2	0%
White-breasted nuthatch	2	0%
White-crowned sparrow	2	0%
Black-headed grosbeak	1	0%
Broad-tailed hummingbird	1	0%
Canyon towhee	1	0%
Costa's hummingbird	1	0%
Hooded oriole	1	0%
Lark sparrow	1	0%
MacGillivray's warbler	1	0%
Mallard	1	0%
Northern flicker	1	0%
Northern mockingbird	1	0%
Pacific-slope flycatcher	1	0%
Rufous-crowned sparrow	1	0%
Say's phoebe	1	0%
Scott's oriole	1	0%
Thick-billed kingbird	1	0%
Warbling vireo	1	0%
Unidentified bird	*11*	*2%*
Unidentified woodpecker	*1*	*0%*
Total	**696**	**100%**

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

3.11 Tuzigoot National Monument

3.11.1 2010 sampling

During May and June of 2010, we sampled two transects at Tuzigoot NM (Figure 3.11.1). Both transects were in riparian habitats with seven survey points each. Each transect was sampled twice for a total sample of 28 at Tuzigoot NM (Table 3.11.1).

3.11.2 Results and discussion

During 2010, 774 birds of 51 species were counted at Tuzigoot NM (Table 3.11.2). Red-winged blackbird were the most commonly counted species (21%). Phainopepla (8%), mourning dove (7%), Gambel's quail (5%), brown-crested flycatcher (5%), Lucy's warbler (5%), and common yellowthroat (5%) were also common. No new species were recorded during the surveys.

The large breeding population of red-winged blackbirds at Tavasci Marsh continued to be healthy, with plenty of mated pairs and confirmed breeding at several sites within the park. Interesting reports from the marsh by the Audubon Society's marshbird monitoring surveys included least bittern, Virginia rail, sora and marsh wrens, and an unconfirmed report of common moorhen, which had been detected at the marsh last year. Green heron, wood duck, black-crowned night-heron, and great blue heron were again confirmed breeding at the marsh. Double-crested cormorant, belted kingfisher, and a pair of mallards were also present at the marsh.

Table 3.11.1. Habitat type, number of survey points, and sampling dates for each transect or grid, Tuzigoot NM, 2010

Transect/Grid	Habitat class	Habitat type	Survey points	# visits	Visit 1	Visit 2
Est	Riparian	Riparian	7	2	5/27/2010	6/8/2010
Wst	Riparian	Riparian	7	2	5/27/2010	6/6/2010

Phainopepla (*Phainopepla nitens*) was the second-most commonly counted species at Tuzigoot NM in 2010.

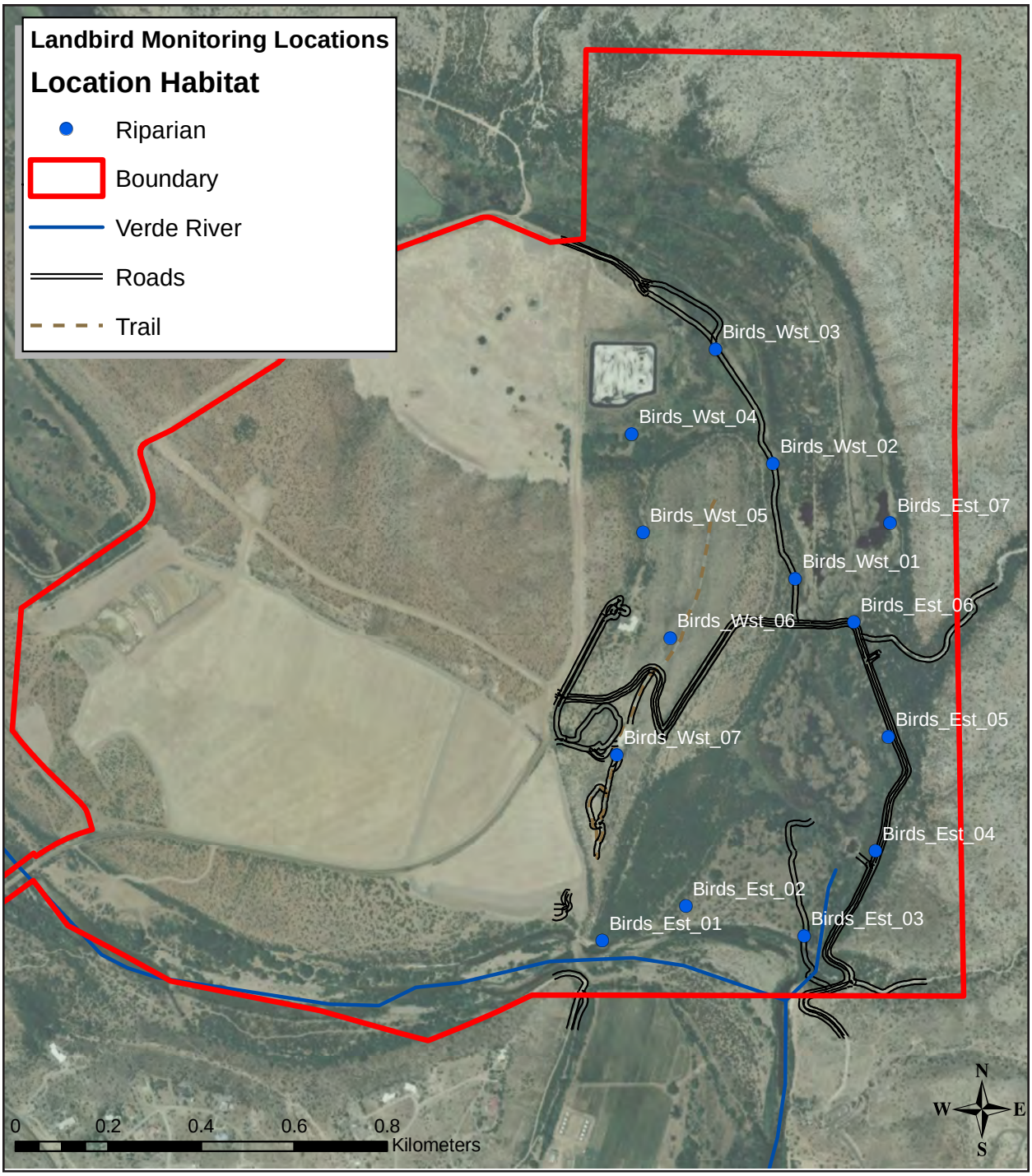

Figure 3.11.1. Point locations sampled at Tuzigoot National Monument, 2010.

Table 3.11.2. Number of birds detected of each species in each habitat type, Tuzigoot NM, 2010

Species	# of birds detected: Total (riparian habitat)	# of birds detected: % of total
Red-winged blackbird	166	21%
Phainopepla	62	8%
Mourning dove	53	7%
Gambel's quail	40	5%
Brown-crested flycatcher	39	5%
Lucy's warbler	37	5%
Common yellowthroat	36	5%
Abert's towhee	28	4%
Yellow-breasted chat	28	4%
House finch	24	3%
Gila woodpecker	23	3%
Brown-headed cowbird	21	3%
Bullock's oriole	17	2%
Song sparrow	17	2%
Ash-throated flycatcher	16	2%
Yellow warbler	15	2%
Black-chinned hummingbird	14	2%
Blue grosbeak	12	2%
Common raven	11	1%
Northern mockingbird	11	1%
Verdin	11	1%
Bewick's wren	10	1%
Summer tanager	8	1%
Lesser goldfinch	7	1%
Great-tailed grackle	6	1%
Ladder-backed woodpecker	6	1%
Northern rough-winged swallow	6	1%
Northern cardinal	5	1%
Green heron	4	1%
Virginia rail	4	1%
Great blue heron	3	0%
Say's phoebe	3	0%
Warbling vireo	3	0%
Western kingbird	3	0%
Canyon towhee	2	0%
Cassin's kingbird	2	0%
Eurasian collared-dove	2	0%
Mallard	2	0%
Scott's oriole	2	0%
Western tanager	2	0%
Anna's hummingbird	1	0%
Black phoebe	1	0%
Black-headed grosbeak	1	0%
Bronzed cowbird	1	0%
European starling	1	0%
Great horned owl	1	0%
Killdeer	1	0%
MacGillivray's warbler	1	0%
Northern flicker	1	0%
Western wood-pewee	1	0%
Yellow-billed cuckoo	1	0%
Unidentified bird	*1*	*0%*
Unidentified hummingbird	*1*	*0%*
Total	774	100%

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

3.12 Changes to the Protocol

3.12.1 Field methods

A minor change to our field approach will be made. We are currently weighing the advantages against the cost of adding an additional revisit to each transect or grid. Some preliminary analyses have indicated that a substantial gain in precision results from having three visits to each transect, rather than two.

We adopted a change from last year: we will change our approach to recording detections while walking from one sample point to the next. We limited the species we record while walking from one sample point to the next to a small list of noteworthy species, as these detections provide little advantage to our overall analysis.

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