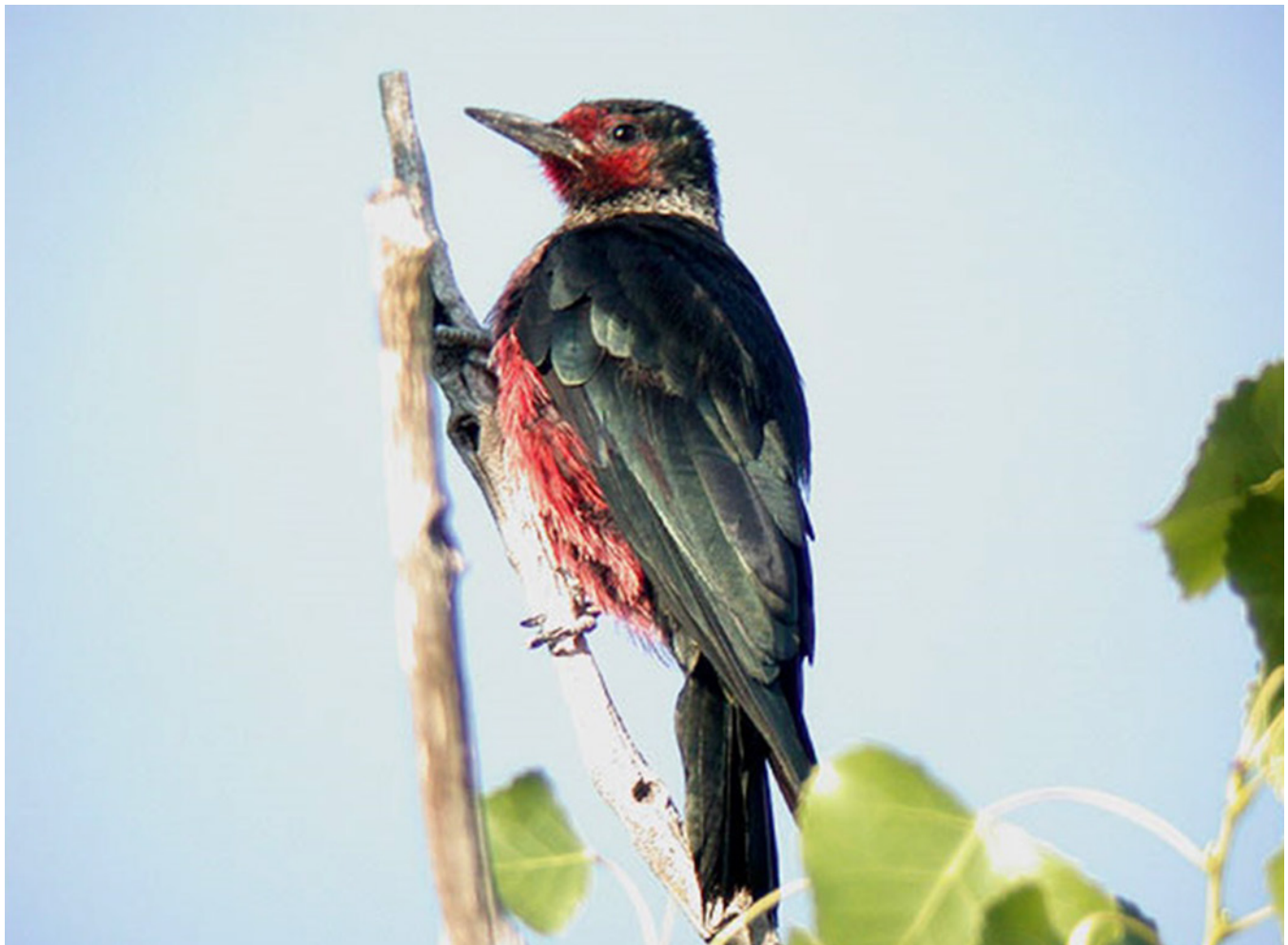




Landbird Monitoring in the Northern Colorado Plateau Network

2015 Field Season

Natural Resource Report NPS/NCPN/NRR—2016/1316



ON THE COVER

Lewis's woodpecker. ©Bill Schmoker (used with permission).

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Executive Summary

In 2015, the Bird Conservancy of the Rockies (Bird Conservancy), in cooperation with its partner, the National Park Service (NPS), completed its eleventh year of a habitat-based landbird monitoring program in park units of the Northern Colorado Plateau Network. This program is designed to provide rigorous population trend data for most diurnal, regularly occurring breeding landbird species throughout the network. This population information is useful for land managers and supports the National Park Service's goal of long-term monitoring of biological indicators for network parks.

In 2015, Bird Conservancy biologists surveyed 45 survey locations within 11 NPS units. Fifteen transects were located in each of the three habitats of interest: low-elevation riparian, pinyon-juniper, and sage shrubland. For the second year, each location was surveyed once instead of twice, as in all years before 2014. Because of the decrease in sampling effort, fewer species and individuals were recorded than in past years. Bird Conservancy staff do not expect the decrease in effort to significantly impact density estimates. However, a decrease in number of detections for a species in a given year due to decreased effort may impact the percent coefficient of variation for that species. In addition to the habitat-based surveys, four point counts and four area searches were conducted at Pipe Spring National Monument using a modified monitoring design.

In 2015, all assigned habitat-based surveys were completed between May 11 and June 24. A total of 4,298 birds of 113 species were recorded. Observers detected 1,340 birds of 77 species in low-elevation riparian; 1,076 birds of 64 species in pinyon-juniper; and 1,882 birds of 81 species in sage shrubland habitat. Two species were recorded that had not been detected as part of this monitoring program in previous years. Common grackle was recorded at Curecanti National Recreation Area and Lewis's woodpecker was recorded at Capitol Reef National Park.

In addition to the habitat-based surveys, four point counts and four area searches were completed at Pipe Spring National Monument. Observers detected a total of 231 birds of 35 species during surveys at the monument. Fifty-one birds of 18 species were detected during point counts and 180 birds and 17 additional species during nocturnal and diurnal area searches. In 2015, cedar waxwing, western wood-pewee, and yellow-breasted chat, already designated as present in the monument, were detected for the first time during Bird Conservancy surveys. Prairie falcon, designated as unconfirmed, was also detected. Two species (orange-crowned warbler and yellow-headed blackbird) were detected for the first time on this project and are new species for the park.

With each year of additional data, the Bird Conservancy is able to provide more precise estimates for more species in each habitat. This year, staff estimated densities of 63 species in at least one habitat. The data yielded robust density estimates (coefficient of variation <50%) for 38 species in at least one habitat. Observers recorded 45 bird species that are of conservation or management concern throughout the Northern Colorado Plateau Network and estimated densities for 28 of these species.

Author Information

The Bird Conservancy of the Rockies

Connecting people, birds and land

Mission: Conserving birds and their habitats through science, education and land stewardship

Vision: Native bird populations are sustained in healthy ecosystems

Bird Conservancy of the Rockies conserves birds and their habitats through an integrated approach of science, education and land stewardship. Our work radiates from the Rockies to the Great Plains, Mexico and beyond. Our mission is advanced through sound science, achieved through empowering people, realized through stewardship and sustained through partnerships. Together, we are improving native bird populations, the land and the lives of people.

Core Values

1. Science provides the foundation for effective bird conservation.
2. Education is critical to the success of bird conservation.
3. Stewardship of birds and their habitats is a shared responsibility.

Goals

1. Guide conservation action where it is needed most by conducting scientifically rigorous monitoring and research on birds and their habitats within the context of their full annual cycle.
2. Inspire conservation action in people by developing relationships through community outreach and science-based, experiential education programs.
3. Contribute to bird population viability and help sustain working lands by partnering with landowners and managers to enhance wildlife habitat.
4. Promote conservation and inform land management decisions by disseminating scientific knowledge and developing tools and recommendations.

Acronyms

BCR	bird conservation region
CV	coefficient of variation
D	density
IMBCR	Integrated Monitoring in Bird Conservation Regions
LCL	lower confidence limit
LR	low-elevation riparian
n	number of independent detections used in analyses
NABCI	U.S. North American Bird Conservation initiative
NCPN	Northern Colorado Plateau Network
NM	national monument
NPS	National Park Service
NRA	National Recreation Area
PIF	Partners in Flight
PJ	pinyon-juniper
NM	national monument
NP	national park
SA	sage shrubland
UCL	upper confidence limit

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1 Introduction

1.1 Program history

In 2015, the Bird Conservancy of the Rockies (Bird Conservancy), in cooperation with its partner, the National Park Service (NPS), completed the eleventh year of a habitat-based landbird monitoring program in the Northern Colorado Plateau Network (NCPN). This program is designed to provide rigorous population trend data on most diurnal, regularly occurring breeding landbird species in 11 national parks in Colorado, Utah, and Wyoming.

In addition to monitoring landbird populations, this program also supports the NCPN's efforts to develop long-term natural resource monitoring plans for its park units. Modeled after the Bird Conservancy's habitat-based program, Monitoring Colorado's Birds (Leukering et al. 2005), the NCPN project is consistent with goals emphasized by the U.S. North American Bird Conservation Initiative Monitoring Subcommittee in 2007. Pipe Spring National Monument (NM), in Arizona, was also sampled for the seventh year using a modified monitoring design.

1.2 Reasons for monitoring

Monitoring is an essential component of wildlife management and conservation science (Witmer 2005; Marsh and Trenham 2008). Common goals of population monitoring are to estimate the population status of target species and to detect changes in populations over time (Thompson et al. 1998; Sauer and Knutson 2008). Effective monitoring programs can identify species that are at-risk due to small or declining populations (Dreitz et al. 2006), provide an understanding of how management actions affect populations (Alexander et al. 2008; Lyons et al. 2008), evaluate population responses to landscape alteration and climate change (Baron et al. 2008; Lindenmayer and Likens 2009), and provide basic information on species distributions.

The apparent large-scale declines of avian populations and the loss, fragmentation, and degradation of native habitats highlight the need for extensive and rigorous landbird monitoring programs (Rich et al. 2004; U.S. NABCIC 2009). Population monitoring helps achieve the intent of legislation, such

as the Migratory Bird Treaty Act (1918), National Environmental Policy Act (1969), Endangered Species Act (1973), National Forest Management Act (1976), and various state laws (Manley et al. 1993; Sauer 1993).

1.3 Monitoring objectives

This program uses the Partners in Flight (PIF) Plan (Rich et al. 2004) as a template for bird conservation. PIF is a partnership of federal and state agencies, industry, non-governmental organizations, and many others, with the goal of conserving North American birds. In 1991, PIF began developing a formal species assessment process to provide consistent scientific evaluations of conservation status for all landbird species in North America and identify the most important focus areas for the conservation of each species. This process applies quantitative rule sets to data on population size, distribution, trends, threats, and regional abundance of birds to rank species in terms of biological vulnerability and regional status. The process results in global and regional conservation assessments of each bird species that can be used to objectively assign regional and continental conservation priorities among birds.

This landbird monitoring program is designed to provide population status and trend information for regularly occurring breeding landbird species within low-elevation riparian, pinyon-juniper, and sage shrubland habitats. Initially, the goal is to provide early warning information for all monitored species through a habitat-based approach to data collection. After establishing this monitoring framework, we anticipate these data will prompt additional research to determine possible reasons for observed changes and enable better informed management decisions.

The Bird Conservancy maintains a high-quality, online database of raw and summarized data that is accessible to collaborators and the public. These data can be used to generate decision-support tools, such as population estimate models, to help guide conservation efforts and provide a better measure of conservation success. The database can be accessed via the Rocky Mountain Avian Data Center website, <http://rmbo.org/v3/avian/ExploretheData.aspx>.

2 Methods

2.1 Study area

In 2005, the NPS selected three habitats in which to implement NCPN landbird monitoring: low-elevation riparian (LR), pinyon-juniper (PJ), and sage shrubland (SA). A panel of NPS resource managers selected these habitats because they represent distinct bird communities. Monitoring bird populations in each of these habitats will lead to a better understanding of how management techniques affect bird populations. During the spring and summer of 2005, staff from the Rocky Mountain Bird Observatory (now the Bird Conservancy of the Rockies) established 45 transect locations (15 in each habitat, Figures 2-1 to 2-3; figures begin on page 6). In 2009, four point-count locations were added at Pipe Spring National Monument. In 2011, area inventories began at Pipe Spring NM, with the goal of providing more information regarding species presence within the park (Figure 2-4).

2.2 Habitats

2.2.1 Low-elevation riparian

This habitat comprises mostly isolated stands of Fremont cottonwood (*Populus fremontii*) and boxelder (*Acer negundo*) along perennial streams, sometimes within deeply cut canyons. Tamarisk (*Tamarix* spp.), also known as saltcedar, an exotic species that has invaded much of the LR habitat of the western United States, is also present in this habitat. While the NPS is working to eradicate tamarisk in many park units, it is still fairly common in some areas.

2.2.2 Pinyon-juniper

Pinyon-juniper (PJ) habitat typically occurs at elevations just above 1,500 meters in the study area. PJ is present on most of the ridges and mesas, and is the most abundant habitat in the NCPN. Pinyon pine (*Pinus edulis*) and juniper species (*Juniperus* spp.) are dominant in this habitat. The relative abundance and composition of these species can vary significantly, and PJ habitat sometimes contains a significant sage component.

2.2.3 Sage shrubland

The sagebrush shrubland (SA) community is also common on the Colorado Plateau. The stands of sage surveyed in the NCPN are generally narrow “fingers” of pure sage and point-count stations are often near forests. The most common sagebrush species in the NCPN are big sagebrush (*Artemisia tridentata*) and mountain sagebrush (*Artemisia frigida*).

2.2.4 Habitats at Pipe Spring National Monument

There are four point-count stations in a mixture of pinyon-juniper, low-elevation riparian, and semidesert shrubland habitats at Pipe Spring NM. Semidesert shrubland habitat is a dry landscape containing shrubs but lacking a co-dominant grass component. Dominant shrubs may include greasewood (*Sarcobatus* spp.), barberry (*Berberis* spp.), and saltbush (*Atriplex* spp.). If sagebrush is present, it is not the dominant shrub or is co-dominant with another species. The ground-cover layer is typically dominated by bare ground and rock, with limited forbs and grasses present.

2.3 Sampling design

The NPS and Bird Conservancy selected survey sites during the winter of 2005. For PJ and SA habitats, GIS and the Southwest Regional Re-GAP Analysis Project were used to randomly select sites from a pool of habitat “stands” large enough to accommodate transects (Lowry et al. 2005). Areas with >50% slope were excluded from the list of potential sites to ensure that selected stands could be accessed safely on foot.

For LR survey sites, options were limited to crossable streams, excluding the Colorado, Green, Gunnison, and Virgin rivers. Due to the limited amount of riparian habitat, survey locations were manually selected. Bird Conservancy staff groundproofed riparian stands and established transects in 2005. During groundproofing, it was discovered that a few of the stands did not fit the selection criteria. In these cases, replacement stands were chosen following the same protocol. These same locations have been surveyed every year since 2005.

Point-count and area-search locations at Pipe Spring NM were placed in each distinct habitat represented in the monument as previously described, with attention paid to each location being spaced at least 250 meters apart. Area-search start locations were selected in order to efficiently cover all areas of the monument. Point counts have been conducted at Pipe Spring NM every year since 2009. Area searches have been performed each year since 2011.

2.4 Sampling methods

Bird Conservancy field biologists with excellent aural and visual bird-identification skills conducted field work in 2015. Prior to conducting surveys, technicians completed an intensive, seven-day training program to ensure full understanding of field protocols, review bird and plant identification, and practice distance estimation in a variety of habitats.

Landbird populations in each habitat were sampled following the protocol modified by Hanni and others (2012). All transects were surveyed between one half-hour before and five hours after sunrise. Up to 15 five-minute point counts were conducted at 250-m intervals along each transect. At each point, all birds detected during the five-minute point count were recorded.

For every bird detected, observers recorded species, sex, horizontal distance from the observer, minute, type of detection (e.g., call, song, visual), whether the bird was thought to be a migrant, and whether the observer was able to visually identify the individual.

Observers measured horizontal distances to each bird using laser rangefinders. When it was not possible to measure the distance to a bird, observers estimated distance by measuring to some nearby object. Observers also recorded birds flying over, but not using the immediate surrounding landscape.

For distribution mapping purposes, observers recorded the presence of all rare or difficult-to-detect species encountered while traveling between points (e.g., woodpeckers, owls, raptors). All non-independent detec-

tions of birds were considered as part of a cluster rather than as separate, independent observations (i.e., flocks or pairs of conspecific birds in close proximity to each other). Observers recorded the number of birds detected within each cluster, along with a letter code to distinguish between multiple clusters.

At the start and end of each transect, observers recorded time, temperature, percent cloud cover, precipitation type, and estimated wind speed using the Beaufort scale. They navigated between points using handheld Global Positioning System (GPS) units. All GPS data were recorded using Universal Transverse Mercator coordinates projected in North American Datum 1983. At each point, observers recorded GPS accuracy, start time, and habitat information (within a 50-m radius of the point), including structural stage as well as the types, relative abundance, percent coverage, and mean height of trees, shrubs, and ground cover. Additionally, they recorded the number of snags and the presence or absence of a midstory, cliff/rock, prairie dog towns, prairie dogs, tamarisk, and tamarisk beetle. These data were recorded prior to beginning each point count.

For more detailed information about survey methods and vegetation data collection protocols, refer to the Bird Conservancy's NCPN point transect protocol on the Rocky Mountain Avian Data Center website, <http://rmbo.org/v3/avian/DataCollection.aspx>. Links to past and current protocols and data-sheets are also available.

At Pipe Spring NM, the point-count surveys used the methods described above. Additionally, three diurnal area searches we conducted, along with one nocturnal area search, beginning at dusk. During area searches, the observer continuously walked throughout the monument, tallying all individual birds heard or seen and recording information about any breeding or flocking behavior. Each diurnal area search has a specific start location and covers one of the following areas within the park: visitor center, riparian corridors, or horse corrals. The nocturnal area search is intended to cover the entire park.

2.5 Data analysis

Distance sampling theory was developed to account for the decreasing probability of detecting an object of interest (e.g., a bird) with increasing distance from the observer to the object (Buckland et al. 2001). Distance analysis relies on three critical assumptions: (1) All birds at and near the sampling location (distance = 0) are detected, (2) distances to birds are measured accurately, and (3) birds do not move in response to the observer's presence. These assumptions are reasonably well met following the protocol (Hanni et al. 2012).

The analysis software, Distance 6.2 (Thomas et al. 2010), was used to estimate detection probabilities using point-count data. Analysis of distance data is accomplished by fitting a detection function to the distribution of recorded distances. The distribution of distances can be a function of characteristics of the object being recorded (e.g., a bird's size, color, movement, volume or frequency of song), the sampling landscape (e.g., density of vegetation), and observer ability.

Bird Conservancy staff estimated densities of species for which at least 80 independent

detections were obtained within a habitat across all years. Birds flying over and not using the immediate surrounding landscape, migrant birds, juvenile birds, and birds detected between points from analyses were excluded. Staff fit a half normal key function, uniform function, hazard rate key function with cosine series expansions, and a hazard rate key function with simple polynomial series expansion to the distribution of distances for each species (Buckland et al. 2001). They used Akaike's Information Criterion (AIC) corrected for small sample size (AICc) and model selection theory to select the most parsimonious detection function for each species (Burnham and Anderson 2002). Variance was estimated in the program Distance using bootstrapping of transects within strata rather than empirical estimates. Empirical methods tend to underestimate variance from small sample sizes.

Unless otherwise specified, all bird species names listed in this report are from the American Ornithologists' Union Check-list of North American Birds, Seventh Edition (2007).

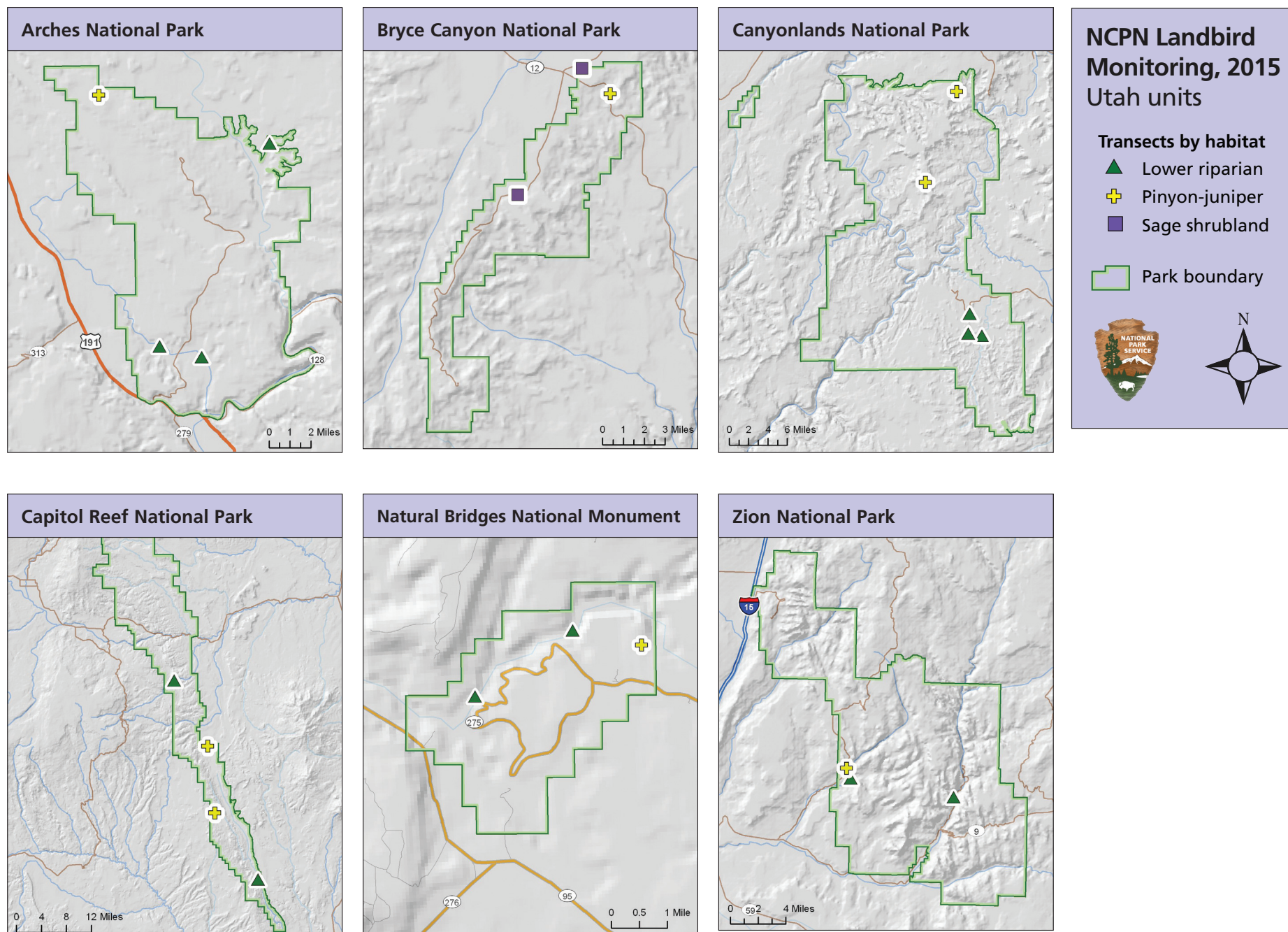


Figure 2-1. Transect locations by habitat, Utah units.

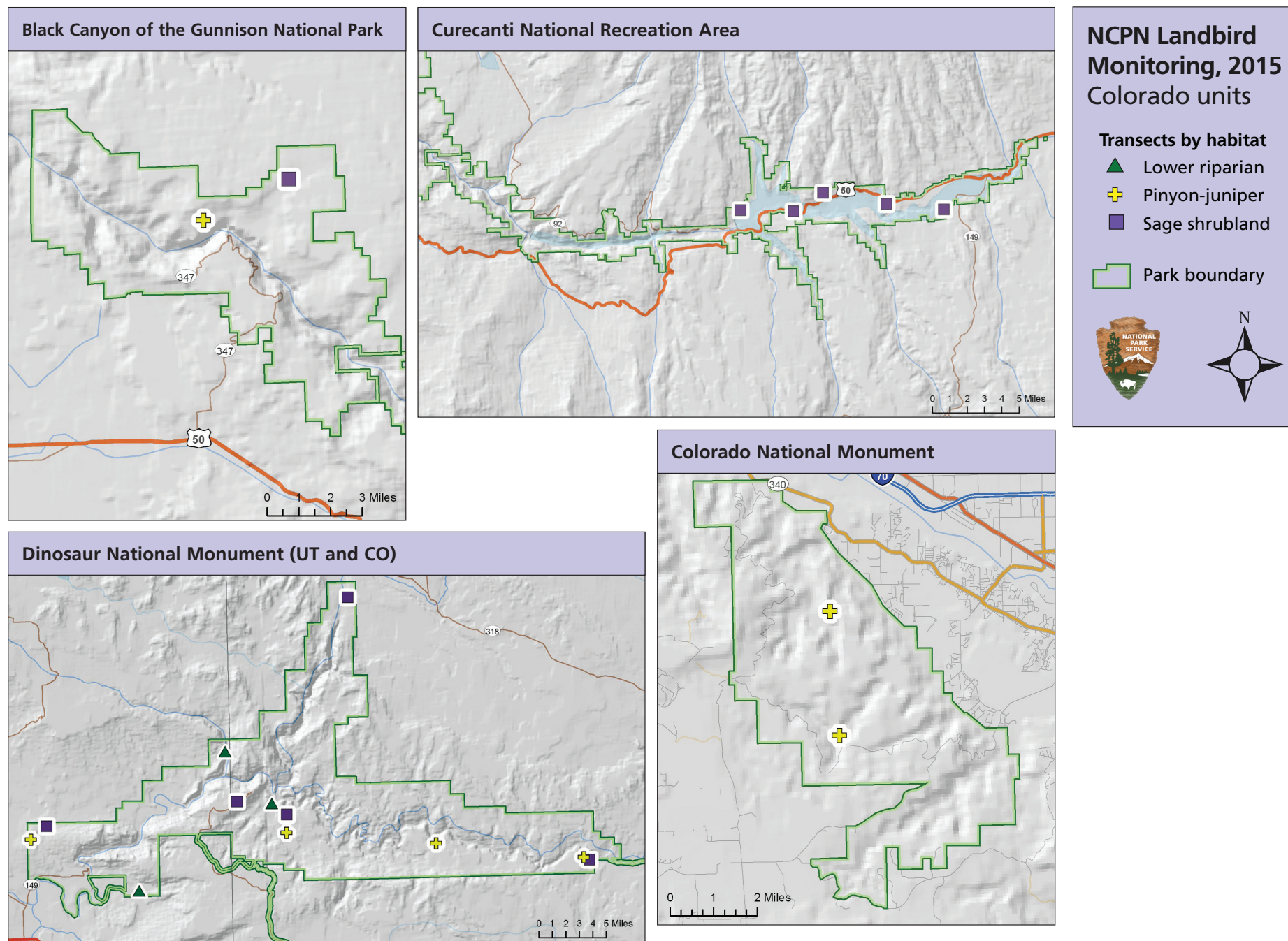


Figure 2-2. Transect locations by habitat, Colorado units.

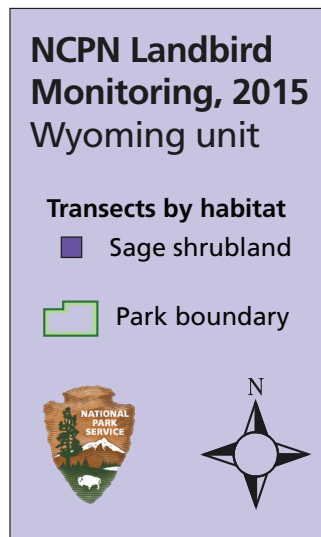
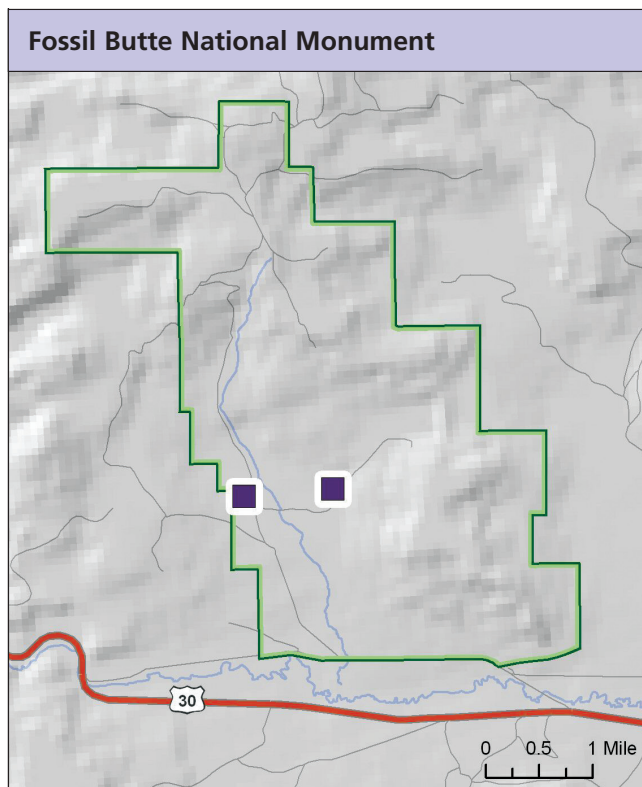


Figure 2-3. Transect locations, Fossil Butte National Monument.

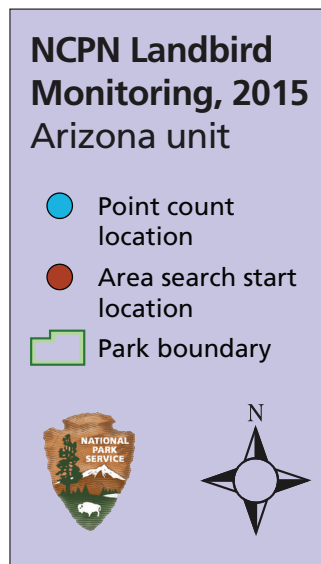


Figure 2-4. Point-count and area-search locations, Pipe Spring National Monument.

3 Results

In 2015, the eleventh year of landbird monitoring in the NCPN, observers conducted 507 point counts along 45 transects in three habitat types between May 11 and June 24 (Table 3-1). Seventy-five percent of all point-count locations (507 out of 675) were surveyed in 2015.* Reasons why points were not surveyed included unsuitable weather (101 points), inability to safely navigate to the point due to terrain, vegetation, or a prescribed fire (29 points), inability to cross a river to get to the point (5), inability to hear well enough to detect birds due to background noise (3 points), and poor GPS reception (1 point). An additional 29 points were not surveyed due to other reasons.

Observers recorded 4,298 birds of 113 species during habitat-based point counts (Table 3-2, Appendix A). They detected 1,340 birds of 77 species in low-elevation riparian, 1,076 birds of 64 species in pinyon-juniper, and 1,882 birds of 81 species in sage shrubland habitat. In 2015, two species were detected that had not been recorded by the Bird Conservancy during habitat-based surveys in previous years. Common grackle was recorded in Curecanti National Recreation Area, and Lewis's woodpecker was recorded in Capitol Reef National Park. Both species are classified as rare in these parks.

In 2015, Bird Conservancy staff estimated densities of 63 species in at least one habitat. These 63 species represent 55% of species

Table 3-1. Bird sampling periods and effort by habitat in the Northern Colorado Plateau Network, 2015.

Habitat	Dates sampled	# transects	# point counts
Low-elevation riparian	5/11/2015–6/13/2015	15	158
Pinyon juniper	5/13/2015–6/23/2015	15	153
Sage shrubland	5/27/2015–6/24/2015	15	196
All habitats	5/11/2015–6/24/2015	45	507

Table 3-2. Bird totals and averages by habitat in the Northern Colorado Plateau Network, 2015.

Habitat	Birds		Species	
	# detected	Avg. # per transect	# detected	Avg. # per transect
Low-elevation riparian	1,340	89	66	23
Pinyon-juniper	1,076	72	68	19
Sage shrubland	1,882	124	78	21
All habitats	4,298	95	109	21

detected on transects in the NCPN during 2015 and 92% of birds observed on transects during 2015. The habitat-stratified data yielded robust density estimates (CV <50%) for 38 species in at least one habitat in 2015.

In 2015, Bird Conservancy staff recorded 45 species that are of conservation and management concern (priority species) throughout the NCPN (Appendix B). Densities were estimated for 28 of these priority species.

*In 2014, the survey effort was reduced from that of previous years. Each location was surveyed once, rather than twice. This change in protocol resulted in a decreased number of points available for sampling in 2015, when compared to years prior to 2014.

3.1 Density estimates

3.1.1 Low-elevation riparian

All 15 low-elevation riparian transects were surveyed one time in 2015. Densities of 42 species were estimated, 14 of which are priority species, from 2005 to 2015. The data yielded robust density estimates (CV <50%) for 21 species and a moderately robust estimate (CV = 50–75%) for 16 additional species (Table 3-3) in 2015. These 37 species represent 48% of all species detected and 90% of all individuals detected in LR habitat.

The following 10 species had the highest estimated densities in LR in 2015 (listed in order from highest to lowest density):

1. Violet-green swallow*
2. Yellow warbler
3. Blue-gray gnatcatcher
4. Spotted towhee
5. Lazuli bunting*
6. Black-chinned hummingbird
7. Broad-tailed hummingbird*
8. Lesser goldfinch
9. Bushtit
10. House wren

The following 31 species had higher estimated densities in LR than in the other two habitats sampled in 2015 (listed in order from highest to lowest density):

1. Violet-green swallow*
2. Yellow warbler
3. Spotted towhee
4. Lazuli bunting*
5. Black-chinned hummingbird
6. Broad-tailed hummingbird*
7. Lesser goldfinch
8. House wren
9. House finch
10. Ash-throated flycatcher
11. White-throated swift
12. Warbling vireo*
13. Plumbeous vireo*
14. Black-headed grosbeak
15. Mourning dove
16. Song sparrow
17. Virginia's warbler*
18. Western tanager
19. Yellow-breasted chat
20. Black phoebe
21. Lucy's warbler
22. American robin
23. Rock wren
24. Common raven
25. Bullock's oriole
26. Say's phoebe*
27. Canyon wren
28. Common yellowthroat
29. Western wood-pewee
30. Northern flicker*
31. Blue grosbeak

*Priority species

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015.

Species	Year	D	LCL	UCL	%CV	n
American robin	2005	4.56	1.63	8.21	45	16
	2006	7.15	2.74	12.79	43	25
	2007	7.26	2.80	13.08	44	26
	2008	8.50	3.24	14.86	42	31
	2009	1.71	0.32	3.56	60	5
	2010	5.45	0.65	11.61	62	17
	2011	4.40	1.27	8.06	48	14
	2012	4.09	1.06	8.83	59	12
	2013	7.49	2.39	13.88	47	20
	2014	10.14	2.40	21.08	57	12
	2015	4.66	0.68	10.35	65	6
Ash-throated flycatcher	2005	14.32	9.54	19.13	20	152
	2006	22.04	15.92	28.49	17	235
	2007	19.03	13.95	24.97	18	205
	2008	17.53	12.23	23.16	19	191
	2009	15.26	10.87	19.83	18	133
	2010	20.45	13.97	26.87	20	187
	2011	20.36	13.92	26.87	19	200
	2012	19.53	14.12	25.43	17	166
	2013	19.01	14.51	23.57	15	145
	2014	21.90	17.39	26.71	13	82
	2015	14.83	10.57	19.92	20	57
Bewick's wren*	2005	6.87	2.69	11.63	39	46
	2006	15.45	7.31	24.02	34	104
	2007	8.54	3.44	14.75	41	57
	2008	9.21	3.89	15.10	37	62
	2009	15.30	7.38	24.78	35	88
	2010	3.51	1.31	6.06	42	20
	2011	2.40	1.01	4.03	38	15
	2012	10.14	4.36	16.75	37	56
	2013	4.20	1.93	6.68	35	20
	2014	5.44	1.75	10.07	47	13
	2015	4.57	1.93	7.52	38	11
Black phoebe	2005	4.62	1.01	21.13	106	10
	2006	3.82	1.12	12.99	79	10
	2007	7.53	2.47	23.02	71	19
	2008	3.76	1.19	11.92	74	9
	2009	8.88	2.70	29.19	76	20
	2010	0.87	0.29	2.61	69	2
	2011	0.83	0.21	3.26	91	2
	2012	4.56	1.78	11.68	58	10
	2013	4.67	1.12	19.41	96	9

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Black phoebe, cont.</i>	2014	7.74	2.62	22.85	68	7
	2015	6.42	1.76	23.50	85	6
Black-chinned hummingbird	2005	109.08	61.11	172.74	32	28
	2006	136.99	68.78	227.92	36	35
	2007	84.59	45.18	133.08	33	22
	2008	87.24	46.58	137.65	32	23
	2009	104.63	54.59	172.55	35	23
	2010	62.35	34.43	99.76	32	14
	2011	75.59	41.89	120.60	32	18
	2012	105.50	50.27	175.45	35	23
	2013	114.67	58.47	179.00	33	22
	2014	78.35	30.12	140.98	46	7
Black-headed grosbeak	2015	41.92	7.26	88.05	62	4
	2005	3.42	0.48	8.37	74	11
	2006	6.61	3.30	10.47	34	22
	2007	3.69	1.29	6.85	46	12
	2008	5.08	2.13	8.42	39	17
	2009	6.10	1.01	12.52	58	17
	2010	3.20	0.63	6.76	62	9
	2011	4.02	1.55	6.92	42	12
	2012	5.81	2.97	8.94	32	16
	2013	4.17	1.06	9.07	60	10
Black-throated gray warbler*	2014	10.18	3.72	18.29	44	11
	2015	9.53	4.54	15.58	34	11
	2005	6.97	3.09	11.63	38	38
	2006	14.55	8.50	21.43	28	82
	2007	9.90	6.26	14.25	25	55
	2008	20.90	10.30	33.92	37	117
	2009	10.58	3.48	20.17	51	48
	2010	11.44	6.40	17.19	29	55
	2011	15.85	8.63	24.99	33	77
	2012	11.07	5.28	17.48	35	51
Black-throated sparrow	2013	6.32	2.05	11.28	45	25
	2014	10.04	2.16	22.55	65	19
	2015	11.73	5.94	18.51	33	23
	2005	5.97	1.42	11.07	49	46
	2006	6.59	2.68	11.44	40	51
	2007	8.00	1.87	17.33	60	61
	2008	8.45	2.81	14.58	44	67
	2009	20.43	7.61	38.19	47	134
	2010	8.51	3.15	14.77	41	56
	2011	12.68	5.20	21.64	40	91
	2012	12.20	4.86	20.00	38	77

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Black-throated sparrow, cont.</i>	2013	7.83	3.70	12.86	35	43
	2014	1.10	0.00	2.51	70	3
	2015	5.81	0.36	12.43	64	16
Blue grosbeak	2005	4.20	1.06	8.41	55	12
	2006	7.98	2.42	14.72	48	23
	2007	1.04	0.00	2.51	76	3
	2008	1.45	0.25	3.36	67	4
	2009	4.85	1.54	8.97	48	12
	2010	0.79	0.00	1.69	66	2
	2011	1.84	0.32	4.04	64	5
	2012	2.95	0.35	6.81	70	7
	2013	9.07	2.15	18.55	57	18
	2014	13.57	3.19	27.75	58	13
	2015	0.99	0.00	2.78	103	1
Blue-gray gnatcatcher	2005	49.33	36.64	66.42	17	103
	2006	65.49	44.81	95.73	22	140
	2007	49.61	35.36	69.61	20	109
	2008	57.66	37.88	87.79	24	126
	2009	130.31	97.25	174.61	17	222
	2010	84.56	64.64	110.62	16	160
	2011	90.14	69.10	117.59	15	178
	2012	53.42	38.03	75.03	20	90
	2013	78.97	57.18	109.07	19	122
	2014	94.81	72.89	123.34	15	69
	2015	80.17	58.84	109.25	18	60
Broad-tailed hummingbird*	2005	26.40	12.16	46.67	42	25
	2006	2.12	0.00	4.74	71	2
	2007	2.98	0.00	6.90	78	3
	2008	9.37	2.27	18.74	55	9
	2009	5.33	0.00	14.20	88	4
	2010	28.32	13.34	48.21	40	24
	2011	5.38	0.98	11.64	64	4
	2012	7.42	1.19	15.97	63	6
	2013	8.27	1.45	17.86	63	6
	2014	77.16	25.45	170.67	62	24
	2015	40.51	12.56	79.76	51	14
Brown-headed cowbird	2005	3.38	1.09	6.49	51	7
	2006	10.85	5.24	18.79	38	23
	2007	7.44	2.46	13.61	48	16
	2008	6.56	2.61	11.79	44	14
	2009	7.39	2.16	15.48	56	13
	2010	2.72	0.49	5.53	57	5
	2011	8.97	2.60	17.44	52	18

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Brown-headed cowbird, cont.</i>	2012	13.39	1.50	30.27	70	24
	2013	7.13	2.09	13.29	51	11
	2014	2.66	0.00	6.08	69	2
	2015	2.73	0.00	6.31	73	2
Bullock's oriole	2005	1.19	0.33	2.33	55	3
	2006	8.76	4.77	13.25	29	22
	2007	6.07	1.87	11.82	50	16
	2008	3.62	0.84	7.46	55	9
	2009	5.61	0.82	13.08	70	12
	2010	3.98	1.17	6.71	43	9
	2011	3.90	0.76	8.17	60	9
	2012	3.80	1.18	7.39	51	8
	2013	0.60	0.00	1.73	97	1
	2014	2.26	0.00	4.99	66	2
	2015	3.55	0.89	7.22	58	3
Bushtit	2005	20.74	11.52	31.82	30	17
	2006	63.20	38.64	89.64	24	53
	2007	13.11	4.30	23.15	44	11
	2008	5.98	1.17	11.70	55	5
	2009	19.67	8.52	33.24	39	14
	2010	0.00	0.00	0.00	0	0
	2011	0.00	0.00	0.00	0	0
	2012	2.91	0.00	6.44	69	2
	2013	10.13	0.00	26.93	83	6
	2014	0.00	0.00	0.00	0	0
	2015	24.03	3.54	49.09	57	7
Canyon wren	2005	1.57	0.80	2.52	34	31
	2006	3.24	1.79	4.96	30	65
	2007	1.85	0.82	3.13	38	38
	2008	1.33	0.38	2.71	53	27
	2009	1.38	0.50	2.50	44	24
	2010	0.06	0.00	0.17	100	1
	2011	0.49	0.18	0.88	45	9
	2012	0.77	0.29	1.40	46	13
	2013	0.88	0.18	1.81	58	13
	2014	1.16	0.27	2.31	52	8
	2015	2.18	0.99	3.43	35	16
Chipping sparrow*	2005	3.22	0.52	6.45	58	5
	2006	3.80	0.77	7.81	56	6
	2007	17.12	7.54	29.55	40	27
	2008	16.63	7.07	29.22	41	26
	2009	16.22	4.88	31.47	50	22
	2010	19.71	7.89	34.77	42	27

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Chipping sparrow, cont.*	2011	10.81	4.17	18.69	41	16
	2012	13.91	5.74	24.16	41	18
	2013	3.33	0.00	8.24	79	4
	2014	3.84	0.00	8.97	70	2
	2015	3.76	0.00	8.78	72	2
Common raven	2005	4.54	1.23	15.95	151	16
	2006	3.35	0.50	12.94	189	11
	2007	3.85	0.93	12.85	158	14
	2008	11.61	2.41	39.97	185	36
	2009	2.41	0.39	8.24	179	7
	2010	8.07	1.50	24.70	162	25
	2011	4.04	1.13	14.31	155	13
	2012	2.14	0.25	7.82	179	6
	2013	6.60	1.64	27.76	159	17
	2014	5.08	0.86	17.35	170	6
	2015	4.03	0.53	14.92	167	5
Common yellowthroat	2005	6.88	2.07	13.45	50	9
	2006	14.55	3.58	30.48	58	19
	2007	15.07	0.65	34.88	71	19
	2008	2.84	0.00	8.21	105	4
	2009	16.59	2.51	37.32	68	18
	2010	8.40	0.00	20.77	76	10
	2011	7.20	0.75	14.57	58	9
	2012	7.81	0.76	18.18	71	9
	2013	8.02	0.00	22.50	93	7
	2014	8.58	0.00	21.10	75	4
	2015	2.11	0.00	5.81	97	1
Gray vireo*	2005	0.94	0.41	1.54	37	17
	2006	1.97	0.80	3.51	41	35
	2007	0.94	0.28	1.77	51	17
	2008	1.15	0.47	1.93	38	21
	2009	2.12	0.90	3.47	37	33
	2010	0.25	0.05	0.51	58	4
	2011	0.48	0.13	0.82	43	8
	2012	0.59	0.20	1.06	43	9
	2013	1.42	0.53	2.54	43	19
	2014	0.00	0.00	0.00	0	0
	2015	1.21	0.46	2.10	43	8
House finch	2005	20.43	12.86	28.21	22	104
	2006	29.87	20.28	38.89	19	174
	2007	31.04	21.01	43.14	22	185
	2008	31.52	21.76	42.20	19	185
	2009	34.63	17.62	55.36	33	161

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>House finch, cont.</i>	2010	20.09	12.89	27.96	23	104
	2011	23.61	16.63	30.67	19	117
	2012	17.57	11.13	24.49	23	77
	2013	18.83	12.41	26.71	24	74
	2014	32.85	20.84	47.16	25	49
	2015	21.21	13.96	29.26	22	38
House wren	2005	9.48	2.85	18.43	51	41
	2006	9.62	0.84	19.92	60	43
	2007	7.02	1.01	14.44	57	30
	2008	10.67	1.22	21.31	57	47
	2009	9.70	1.19	19.45	57	38
	2010	6.96	0.00	20.78	96	27
	2011	11.76	1.46	24.61	58	46
	2012	9.03	2.23	17.91	55	35
	2013	11.29	1.31	25.07	63	35
	2014	11.70	2.36	25.36	65	18
	2015	21.51	5.16	40.89	50	34
Juniper titmouse*	2005	7.93	3.19	13.56	39	27
	2006	6.88	3.22	11.41	36	24
	2007	10.71	5.85	16.10	29	38
	2008	10.77	5.32	17.28	34	39
	2009	8.99	2.57	16.85	50	28
	2010	5.53	1.94	9.98	45	17
	2011	5.86	2.56	9.65	38	19
	2012	2.98	1.46	4.78	35	9
	2013	4.28	1.50	7.37	44	11
	2014	5.75	0.00	15.97	91	7
	2015	2.96	0.80	5.62	50	4
Lazuli bunting*	2005	55.24	28.37	107.56	39	154
	2006	49.20	22.31	108.51	47	138
	2007	39.64	20.56	76.40	40	165
	2008	54.17	25.51	115.00	45	153
	2009	58.87	23.76	145.89	55	155
	2010	54.76	27.94	107.33	40	148
	2011	14.11	8.26	24.08	31	108
	2012	28.48	14.14	57.37	42	94
	2013	41.04	19.58	86.03	44	86
	2014	121.47	66.51	221.84	36	77
	2015	44.72	19.30	103.64	54	65
Lesser goldfinch	2005	11.54	4.11	21.38	46	22
	2006	23.01	12.86	35.00	30	45
	2007	41.97	23.06	63.60	30	88
	2008	27.80	11.23	54.03	48	49

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Lesser goldfinch, cont.</i>	2009	39.09	16.74	63.46	37	70
	2010	15.59	6.05	26.23	41	30
	2011	16.88	9.06	25.95	31	30
	2012	19.80	7.60	35.81	44	33
	2013	19.62	10.59	30.07	30	33
	2014	49.12	25.55	76.96	33	18
	2015	26.81	13.28	44.23	37	16
Lucy's warbler	2005	0.30	0.00	0.87	94	1
	2006	0.00	0.00	0.00	0	0
	2007	2.50	0.00	6.24	81	8
	2008	4.38	1.04	8.37	52	15
	2009	8.00	2.22	15.84	53	22
	2010	1.05	0.00	2.48	71	3
	2011	3.84	1.46	6.31	39	12
	2012	7.68	2.71	14.17	45	21
	2013	8.89	1.98	17.48	54	22
	2014	5.21	0.85	10.40	55	6
	2015	5.09	1.84	8.81	42	6
Mourning dove	2005	10.13	5.46	15.65	31	86
	2006	15.63	10.04	22.06	23	123
	2007	18.09	11.53	26.05	25	153
	2008	10.95	5.39	17.55	34	98
	2009	5.54	3.19	8.05	28	41
	2010	14.36	8.47	20.96	27	103
	2011	11.20	6.36	16.97	29	84
	2012	7.52	4.59	10.93	26	48
	2013	11.42	5.02	18.30	35	60
	2014	22.78	11.26	37.10	35	57
	2015	9.41	5.62	13.69	26	26
Northern flicker*	2005	0.60	0.27	1.08	41	9
	2006	0.92	0.33	1.63	44	14
	2007	1.44	0.59	2.64	45	22
	2008	0.52	0.06	1.20	69	8
	2009	0.32	0.06	0.73	68	4
	2010	0.38	0.06	0.85	64	5
	2011	0.55	0.21	0.97	43	8
	2012	0.56	0.18	1.19	55	7
	2013	0.46	0.08	0.95	60	5
	2014	2.16	0.98	3.54	38	11
	2015	1.47	0.46	2.85	51	8
Plumbeous vireo*	2005	10.06	6.58	13.85	22	52
	2006	16.01	9.76	22.88	25	85
	2007	12.26	7.74	17.63	25	66

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Plumbeous vireo, cont.*</i>	2008	8.98	6.28	11.92	19	48
	2009	14.87	9.13	21.30	25	67
	2010	16.08	9.85	23.75	26	75
	2011	8.12	5.37	11.04	21	39
	2012	7.88	4.35	11.81	29	35
	2013	9.41	4.17	15.84	40	36
	2014	7.71	3.37	12.95	39	13
	2015	10.56	4.82	17.81	37	20
Rock wren*	2005	4.68	2.72	7.05	28	78
	2006	6.32	3.97	9.30	26	106
	2007	8.18	5.49	11.11	21	140
	2008	4.79	2.61	7.63	34	82
	2009	7.01	4.58	9.87	23	100
	2010	4.30	2.58	6.29	27	63
	2011	6.62	4.20	9.64	25	104
	2012	2.96	1.21	5.05	40	41
	2013	4.59	2.47	7.08	30	53
	2014	4.92	2.90	7.44	28	28
	2015	4.28	2.56	6.39	27	25
Say's phoebe*	2005	3.29	2.11	4.67	24	41
	2006	4.85	2.78	7.56	30	61
	2007	2.95	1.84	4.14	24	37
	2008	4.02	2.00	6.38	34	51
	2009	4.85	2.13	8.35	40	51
	2010	2.35	1.11	4.00	38	25
	2011	5.47	2.75	8.57	32	64
	2012	2.73	1.54	4.19	30	26
	2013	3.44	1.79	5.29	30	32
	2014	3.13	1.37	5.21	38	13
	2015	2.91	1.72	4.20	26	13
Song sparrow	2005	17.63	3.74	37.02	61	44
	2006	20.20	5.99	38.48	48	53
	2007	16.81	3.44	30.78	48	45
	2008	13.12	4.35	23.02	45	36
	2009	11.29	0.80	25.17	65	25
	2010	2.95	0.00	8.58	99	7
	2011	10.39	2.21	19.89	54	25
	2012	10.19	2.23	20.87	57	22
	2013	6.81	1.01	13.70	60	13
	2014	22.37	6.52	44.02	52	20
	2015	8.92	1.04	19.30	64	8
Spotted towhee	2005	43.31	31.97	58.69	18	214
	2006	107.72	81.85	141.77	16	404

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Spotted towhee, cont.	2007	57.01	40.70	79.85	20	265
	2008	43.45	32.05	58.91	18	200
	2009	87.60	64.65	118.71	18	293
	2010	67.28	47.08	96.15	22	278
	2011	50.37	34.03	74.55	24	292
	2012	92.35	69.72	122.33	16	289
	2013	90.45	61.72	132.56	23	330
	2014	86.74	66.09	113.82	16	135
	2015	73.47	45.78	117.89	29	135
Violet-green swallow*	2005	54.94	38.51	72.22	19	68
	2006	174.12	106.67	250.87	25	156
	2007	99.64	63.07	147.09	26	93
	2008	132.45	81.94	193.72	26	86
	2009	118.95	76.60	162.61	23	112
	2010	56.75	36.61	77.35	22	63
	2011	34.80	20.58	50.96	27	33
	2012	122.23	70.22	187.80	30	87
	2013	113.67	71.03	161.22	24	81
	2014	181.59	78.79	303.79	38	37
	2015	112.37	51.80	174.70	33	32
Virginia's warbler*	2005	7.58	3.58	12.24	34	29
	2006	11.25	2.97	22.93	56	41
	2007	8.51	3.93	13.40	35	33
	2008	17.11	9.70	25.48	28	66
	2009	0.62	0.00	1.77	97	2
	2010	7.85	3.41	12.93	37	26
	2011	3.98	1.70	6.84	41	14
	2012	10.73	1.63	22.29	57	34
	2013	5.12	1.54	9.54	48	15
	2014	5.97	2.02	10.46	44	8
	2015	8.45	2.91	15.10	45	11
Warbling vireo*	2005	4.88	1.54	9.12	47	19
	2006	10.08	4.25	17.38	41	40
	2007	6.55	2.47	12.11	46	27
	2008	7.80	4.86	11.05	25	31
	2009	5.62	2.19	9.93	45	19
	2010	5.63	0.00	15.18	91	21
	2011	3.90	1.37	7.48	47	14
	2012	5.66	1.38	10.83	50	19
	2013	7.02	2.52	12.76	44	20
	2014	14.63	7.05	25.13	39	20
	2015	13.99	6.61	24.19	39	19

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Western scrub-jay	2005	3.25	1.64	5.39	34	19
	2006	4.98	2.34	8.69	39	30
	2007	3.84	1.74	6.33	37	23
	2008	4.41	1.07	9.42	61	26
	2009	3.19	1.02	5.79	46	17
	2010	3.19	1.17	5.73	46	16
	2011	5.40	2.80	8.51	32	30
	2012	3.28	1.76	5.62	37	16
	2013	4.51	2.01	7.36	36	20
	2014	6.80	2.91	11.87	40	14
	2015	3.77	1.39	7.19	46	8
Western tanager	2005	1.97	0.39	4.21	61	7
	2006	5.30	2.90	8.44	35	19
	2007	1.91	0.24	4.10	65	7
	2008	3.02	0.83	5.81	52	11
	2009	1.01	0.26	1.96	58	3
	2010	4.29	1.77	8.00	48	13
	2011	2.39	0.74	4.55	51	8
	2012	3.31	1.64	5.58	37	10
	2013	1.13	0.00	2.68	73	3
	2014	1.74	0.00	4.80	99	2
	2015	7.39	2.36	15.33	57	9
Western wood-pewee	2005	4.08	1.76	6.82	38	27
	2006	4.93	1.74	9.19	46	33
	2007	5.07	1.60	9.60	49	34
	2008	4.76	1.13	9.80	60	31
	2009	4.78	1.59	9.08	49	28
	2010	2.26	0.41	4.62	57	13
	2011	2.59	1.01	4.42	41	16
	2012	3.48	1.33	6.53	47	19
	2013	4.61	1.62	9.22	49	22
	2014	6.97	3.50	11.38	35	16
	2015	1.90	0.38	3.76	55	4
White-throated swift	2005	32.66	18.56	47.83	28	107
	2006	53.36	29.68	81.80	29	131
	2007	64.68	35.45	94.63	28	191
	2008	38.97	19.71	62.42	34	89
	2009	17.34	8.96	26.90	33	79
	2010	12.38	5.01	21.68	42	53
	2011	18.18	7.98	29.27	36	50
	2012	15.75	6.34	26.87	41	47
	2013	18.76	5.99	33.85	46	35

Table 3-3. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in low-elevation riparian habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>White-throated swift, cont.</i>	2014	18.63	7.02	29.60	36	19
	2015	14.15	3.83	28.61	52	21
Yellow-breasted chat	2005	6.05	0.92	15.65	78	37
	2006	8.10	1.59	17.74	65	51
	2007	6.21	0.95	14.70	72	42
	2008	4.77	1.48	8.88	48	32
	2009	7.70	3.36	13.13	40	43
	2010	8.82	3.46	15.88	44	50
	2011	7.44	1.94	14.65	55	45
	2012	10.04	2.48	20.94	60	56
	2013	11.07	2.82	22.31	56	55
	2014	7.34	0.86	16.24	65	16
	2015	7.38	2.65	12.98	44	17
Yellow-rumped warbler	2005	1.22	.41	3.64	69	2
	2006	1.21	.41	3.58	69	2
	2007	1.79	.55	5.81	76	3
	2008	4.75	1.45	15.63	77	8
	2009	1.40	.33	5.98	99	2
	2010	28.18	15.89	49.98	34	41
	2011	16.38	7.54	35.61	47	25
	2012	7.93	3.00	20.92	60	11
	2013	0.82	0.23	2.99	85	1
	2014	5.24	1.66	16.57	73	3
	2015	-	-	-	-	0
Yellow warbler	2005	65.29	32.48	131.22	41	131
	2006	79.31	37.38	168.29	45	135
	2007	45.32	20.96	97.99	46	113
	2008	86.00	42.41	174.42	42	142
	2009	142.16	72.04	280.56	40	220
	2010	66.70	34.41	129.29	40	179
	2011	47.74	22.57	100.97	45	127
	2012	83.73	42.66	164.35	40	172
	2013	82.82	42.51	161.36	39	130
	2014	141.12	83.51	238.49	31	81
	2015	108.36	61.66	190.42	33	73

*Priority species

3.1.2 Pinyon-juniper

All 15 pinyon-juniper transects were surveyed one time in 2015. Densities of 44 species were estimated, 20 of which are priority species, from 2005 to 2015. The 2015 data yielded robust density estimates (CV <50%) for 20 species and a moderately robust estimate (CV = 50–75%) for 9 additional species (Table 3-4). These 29 species represent 45% of all species and 85% of all individuals detected in PJ habitat.

The following 10 species had the highest estimated densities in PJ in 2015 (listed in order from highest to lowest density):

1. Blue-gray gnatcatcher
2. Black-throated gray warbler*
3. Black-chinned hummingbird
4. Bushtit
5. Juniper titmouse*
6. Chipping sparrow*
7. Gray flycatcher
8. Spotted towhee
9. Western scrub-jay
10. House finch

The following 19 species had higher estimated densities in PJ compared to the other two habitats sampled in 2015 (listed in order from highest to lowest density):

1. Blue-gray gnatcatcher
2. Black-throated gray warbler*
3. Bushtit
4. Juniper titmouse*
5. Chipping sparrow*
6. Gray flycatcher
7. Western scrub-jay
8. Gray vireo*
9. Bewick's wren*
10. Black-throated sparrow
11. Brown-headed cowbird
12. Yellow-rumped warbler
13. Pinyon jay*
14. Mountain chickadee*
15. White-breasted nuthatch
16. Dark-eyed junco
17. Grace's warbler*
18. Clark's nutcracker*
19. Hermit thrush

*Priority species

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015.

Species	Year	D	LCL	UCL	%CV	n
American robin	2005	1.98	0.86	3.17	36	27
	2006	2.80	1.07	5.38	49	37
	2007	2.81	0.57	6.88	72	36
	2008	1.99	0.25	4.83	73	25
	2009	1.10	0.00	2.67	76	14
	2010	0.92	0.07	1.98	67	12
	2011	2.78	1.12	4.85	41	33
	2012	0.99	0.32	1.82	47	13
	2013	1.67	0.38	3.34	57	17
	2014	3.18	1.25	5.60	43	16
	2015	0.65	0.00	1.68	80	3
Ash-throated flycatcher	2005	9.09	6.79	11.79	17	122
	2006	9.89	6.62	13.79	22	130
	2007	9.26	6.01	12.90	23	125
	2008	9.87	6.19	13.69	23	120
	2009	9.52	6.49	12.64	19	109
	2010	6.68	4.65	8.92	20	87
	2011	7.59	5.72	9.75	17	89
	2012	6.29	4.27	8.50	20	76
	2013	8.53	5.61	11.91	22	86
	2014	12.36	8.63	16.91	21	62
	2015	11.49	8.35	15.00	18	52
Black-chinned hummingbird	2005	31.03	9.57	60.46	52	9
	2006	42.03	9.37	89.43	58	12
	2007	45.27	11.00	93.13	56	13
	2008	10.70	0.00	26.00	75	3
	2009	59.37	32.10	101.95	38	16
	2010	46.19	10.82	92.60	58	13
	2011	15.58	5.72	29.46	47	4
	2012	37.01	13.35	72.72	52	10
	2013	22.01	6.25	41.35	49	5
	2014	9.67	0.00	28.02	104	1
	2015	41.40	7.47	90.74	65	4
Bewick's wren*	2005	18.23	13.18	25.21	19	136
	2006	18.25	11.40	29.22	28	134
	2007	15.59	9.14	26.60	31	115
	2008	14.83	8.02	27.40	36	102
	2009	11.65	7.60	17.87	25	79
	2010	3.07	1.54	6.14	41	22
	2011	4.02	2.18	7.41	36	26
	2012	7.86	4.53	13.64	32	55
	2013	3.40	1.74	6.66	40	19

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Bewick's wren, cont. *</i>	2014	4.33	1.56	12.02	63	12
	2015	7.94	4.18	15.09	38	20
Blue-gray gnatcatcher	2005	70.48	47.76	97.55	21	127
	2006	52.63	30.89	79.06	28	93
	2007	71.80	50.63	97.40	20	127
	2008	60.86	37.44	87.90	26	99
	2009	143.08	114.43	176.37	14	217
	2010	81.13	57.53	107.13	19	139
	2011	90.46	69.68	112.22	14	140
	2012	80.72	60.00	103.66	17	130
	2013	83.03	55.73	118.45	23	113
	2014	142.64	108.79	182.07	16	91
	2015	103.02	72.66	135.03	19	59
Brown-headed cowbird	2005	4.67	1.78	8.08	42	15
	2006	3.83	1.17	7.55	51	12
	2007	4.83	1.42	9.70	54	15
	2008	3.40	0.71	6.80	56	10
	2009	5.75	2.40	9.97	40	17
	2010	2.36	0.00	6.07	85	7
	2011	2.44	0.62	4.79	53	7
	2012	6.06	2.74	10.70	40	18
	2013	4.93	1.15	10.45	60	12
	2014	1.79	0.00	4.97	96	2
	2015	4.49	0.76	9.36	59	5
Black-headed grosbeak	2005	0.38	0.00	0.95	81	4
	2006	1.13	0.00	2.68	77	12
	2007	1.29	0.00	3.30	86	15
	2008	0.65	0.00	1.70	87	7
	2009	1.14	0.10	2.72	75	12
	2010	0.68	0.00	1.83	96	7
	2011	1.54	0.63	2.47	38	15
	2012	1.24	0.08	2.74	65	13
	2013	1.60	0.10	3.48	64	13
	2014	1.43	0.00	3.65	86	6
	2015	0.85	0.00	2.21	82	3
Black-throated sparrow	2005	5.44	2.83	10.46	39	40
	2006	9.53	4.76	19.11	41	66
	2007	12.79	6.06	26.99	45	93
	2008	10.18	3.82	27.14	60	69
	2009	12.27	6.79	22.18	35	76
	2010	8.78	5.10	15.12	32	62
	2011	9.57	5.05	18.15	38	59
	2012	12.62	7.82	20.35	28	85

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Black-throated sparrow, cont.</i>	2013	10.72	5.63	20.40	38	57
	2014	5.86	2.74	12.56	46	14
	2015	6.44	2.94	14.12	47	16
Black-throated gray warbler*	2005	103.28	53.92	197.81	41	264
	2006	82.14	58.91	114.54	20	346
	2007	87.11	60.35	125.74	22	319
	2008	56.66	41.47	77.42	18	338
	2009	100.23	69.82	143.88	22	348
	2010	49.21	35.36	68.47	20	259
	2011	41.03	31.00	54.30	16	294
	2012	60.66	42.12	87.38	22	269
	2013	38.87	24.03	62.86	29	117
	2014	42.65	26.06	69.82	30	89
	2015	59.19	39.84	87.95	24	109
Bushtit	2005	82.24	41.50	133.51	34	33
	2006	67.17	41.24	98.68	27	26
	2007	36.01	14.69	63.55	40	14
	2008	19.41	4.57	41.01	59	7
	2009	98.04	54.48	151.14	29	36
	2010	-	-	-	-	0
	2011	2.87	0.00	8.60	104	1
	2012	21.25	7.96	36.72	43	8
	2013	16.82	6.57	29.70	41	5
	2014	27.18	5.46	55.56	58	4
	2015	30.66	6.24	63.90	60	4
Canyon wren	2005	0.41	0.14	0.86	57	15
	2006	0.63	0.12	1.32	61	22
	2007	0.67	0.11	1.56	69	24
	2008	0.13	0.00	0.34	83	5
	2009	0.40	0.02	0.89	68	15
	2010	0.09	0.02	0.19	63	3
	2011	0.20	0.00	0.50	82	6
	2012	0.11	0.00	0.33	102	4
	2013	0.13	0.00	0.42	108	4
	2014	0.37	0.00	0.96	85	5
	2015	0.26	0.00	0.86	119	3
Chipping sparrow*	2005	20.02	11.97	30.32	29	70
	2006	15.40	9.58	22.25	26	53
	2007	22.83	12.56	34.63	31	75
	2008	27.38	16.22	40.67	27	88
	2009	49.25	21.23	81.62	38	134
	2010	29.10	16.17	46.13	31	92
	2011	33.81	22.69	46.65	21	102

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Chipping sparrow, cont.*</i>	2012	30.62	15.47	48.06	33	94
	2013	13.78	4.93	23.69	40	34
	2014	26.43	12.94	41.56	33	32
	2015	24.11	16.05	34.20	23	29
Clark's nutcracker*	2005	0.09	0.00	0.22	81	4
	2006	0.32	0.00	0.80	81	13
	2007	0.38	0.06	0.85	68	15
	2008	0.13	0.04	0.27	58	5
	2009	0.15	0.00	0.36	82	6
	2010	0.09	0.00	0.26	104	4
	2011	0.16	0.02	0.38	66	6
	2012	0.27	0.06	0.61	63	11
	2013	0.42	0.10	0.89	59	13
	2014	0.20	0.00	0.53	85	3
	2015	0.29	0.00	0.73	87	4
Common raven	2005	0.63	0.35	0.94	29	35
	2006	0.27	0.13	0.44	34	19
	2007	0.96	0.56	1.44	27	68
	2008	0.58	0.34	0.89	30	38
	2009	0.34	0.13	0.61	44	27
	2010	0.97	0.56	1.47	29	66
	2011	1.01	0.61	1.51	27	59
	2012	0.32	0.16	0.51	33	20
	2013	0.78	0.28	1.50	47	35
	2014	1.09	0.58	1.79	35	28
	2015	1.25	0.75	1.87	27	30
Dark-eyed junco	2005	2.62	0.00	7.09	105	18
	2006	1.43	0.24	3.11	65	10
	2007	2.90	0.50	5.80	56	20
	2008	2.81	0.61	5.37	53	18
	2009	0.16	0.00	0.45	100	1
	2010	0.30	0.00	0.67	69	2
	2011	0.16	0.00	0.46	97	1
	2012	0.30	0.00	0.93	102	2
	2013	0.57	0.00	1.51	89	3
	2014	1.70	0.00	4.26	78	4
	2015	1.38	0.00	4.34	107	3
Dusky flycatcher*	2005	2.48	0.76	8.11	76	12
	2006	7.34	3.03	17.77	54	35
	2007	5.84	2.12	16.11	63	28
	2008	8.95	3.15	25.42	65	40
	2009	3.18	1.06	9.57	69	14
	2010	3.44	1.07	11.10	75	16

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Dusky flycatcher, cont.*</i>	2011	3.10	1.14	8.41	62	13
	2012	5.72	2.45	13.38	51	26
	2013	6.89	2.27	20.94	70	25
	2014	6.67	2.19	20.37	70	12
	2015	3.05	0.82	11.42	87	5
	2005	22.44	16.57	28.81	17	116
Gray flycatcher	2006	17.31	11.00	24.67	24	86
	2007	16.58	8.32	25.51	31	85
	2008	20.92	11.02	32.04	31	100
	2009	38.17	24.76	54.59	24	179
	2010	24.39	18.52	31.53	16	123
	2011	24.85	16.90	34.00	22	113
	2012	20.64	12.34	30.01	25	101
	2013	12.90	8.19	18.30	24	49
	2014	24.07	15.24	33.76	23	47
	2015	23.65	16.37	31.47	19	42
Gray vireo*	2005	7.31	4.41	10.45	26	76
	2006	6.21	2.84	10.33	37	64
	2007	7.11	3.82	10.98	30	74
	2008	9.31	5.21	14.28	30	91
	2009	14.18	10.19	17.93	16	137
	2010	10.98	7.33	15.07	22	112
	2011	9.90	5.59	14.79	28	92
	2012	11.04	7.11	15.42	23	109
	2013	16.74	9.54	24.71	28	128
	2014	12.68	7.05	18.73	28	49
	2015	10.55	4.95	16.37	33	38
Grace's warbler*	2005	0.66	0.00	2.00	102	6
	2006	1.44	0.00	4.08	97	12
	2007	2.30	0.00	6.84	100	19
	2008	1.09	0.00	3.44	106	8
	2009	2.45	0.00	7.66	102	17
	2010	1.38	0.00	4.09	100	11
	2011	2.13	0.00	5.54	90	17
	2012	1.54	0.00	4.16	88	11
	2013	0.44	0.00	1.27	101	3
	2014	0.61	0.00	1.91	108	2
	2015	0.65	0.00	2.02	105	2
Green-tailed towhee*	2005	2.06	0.62	3.61	45	15
	2006	0.88	0.00	2.16	74	6
	2007	4.00	0.00	10.33	84	26
	2008	1.72	0.26	3.78	66	11
	2009	0.84	0.00	2.19	84	5

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Green-tailed towhee, cont.*	2010	0.46	0.12	0.96	60	3
	2011	2.48	0.25	6.00	76	15
	2012	1.36	0.12	3.27	73	8
	2013	1.34	0.19	2.93	62	7
	2014	0.76	0.00	2.12	96	2
	2015	1.00	0.00	3.12	113	2
Hermit thrush	2005	0.47	0.00	1.33	96	7
	2006	0.78	0.00	2.37	113	11
	2007	0.07	0.00	0.21	106	1
	2008	0.00	0.00	0.00	0	0
	2009	0.54	0.00	1.55	102	8
	2010	0.95	0.08	2.47	89	12
	2011	2.39	0.00	6.21	91	36
	2012	2.12	0.00	5.92	98	27
	2013	0.10	0.00	0.31	110	1
	2014	1.72	0.00	4.74	97	9
	2015	0.23	0.00	0.75	128	1
House finch	2005	16.33	10.24	23.50	25	94
	2006	9.87	5.02	16.33	34	69
	2007	20.97	12.44	29.88	26	146
	2008	18.74	10.87	27.59	27	128
	2009	21.46	11.50	32.90	30	136
	2010	14.68	9.29	20.95	24	101
	2011	24.75	16.77	33.72	21	148
	2012	19.58	12.34	28.10	25	113
	2013	21.34	11.75	31.74	27	108
	2014	27.82	15.31	43.72	32	59
	2015	13.77	9.40	18.61	20	29
Juniper titmouse*	2005	18.51	12.36	25.51	22	74
	2006	16.19	9.69	23.55	26	68
	2007	17.24	8.80	28.12	34	75
	2008	20.40	11.74	29.95	28	85
	2009	46.76	31.58	63.08	21	186
	2010	32.76	21.68	44.30	21	138
	2011	26.05	15.86	38.61	27	99
	2012	21.73	14.97	28.69	19	86
	2013	25.84	15.80	37.29	26	78
	2014	31.25	18.85	44.95	25	40
	2015	25.61	16.42	36.05	24	39
Lark sparrow	2005	2.52	0.70	4.81	53	20
	2006	2.35	0.15	6.58	96	17
	2007	2.25	0.12	5.26	68	16
	2008	1.74	0.26	3.72	61	13

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Lark sparrow, cont.</i>	2009	2.38	0.57	4.71	55	17
	2010	2.19	0.19	5.78	82	17
	2011	3.93	0.79	7.95	56	27
	2012	2.51	0.55	5.27	58	19
	2013	3.92	0.70	8.71	64	24
	2014	4.01	0.00	9.27	71	12
	2015	2.73	0.34	5.96	63	7
Lazuli bunting*	2005	0.72	0.00	2.47	118	3
	2006	0.27	0.00	0.81	106	1
	2007	3.81	0.00	11.26	101	14
	2008	3.97	0.00	9.74	84	14
	2009	4.80	0.00	10.99	69	18
	2010	0.79	0.00	1.84	76	3
	2011	1.94	0.00	5.83	101	6
	2012	2.42	0.22	5.85	75	8
	2013	1.19	0.00	2.82	80	3
	2014	9.79	0.00	28.44	100	14
	2015	9.07	0.00	26.92	98	11
Lesser goldfinch	2005	3.67	0.42	8.50	74	9
	2006	0.88	0.00	1.99	69	2
	2007	0.45	0.00	1.40	109	1
	2008	3.68	0.00	9.33	85	8
	2009	11.01	2.05	22.24	57	23
	2010	5.74	0.00	14.15	78	12
	2011	1.07	0.00	2.48	72	2
	2012	2.94	0.00	7.95	89	6
	2013	2.30	0.49	4.91	61	4
	2014	10.35	1.06	25.09	73	9
	2015	6.74	1.77	13.89	56	5
Mountain bluebird*	2005	9.40	2.39	19.55	59	61
	2006	5.29	0.83	12.46	72	31
	2007	5.81	1.20	12.35	62	36
	2008	5.65	1.29	11.67	57	33
	2009	5.63	0.80	13.08	71	32
	2010	6.95	1.70	14.49	62	39
	2011	4.54	0.72	10.05	66	25
	2012	5.00	1.25	9.37	51	29
	2013	7.82	0.83	19.86	81	37
	2014	4.54	0.00	12.30	90	10
	2015	3.82	1.25	7.52	50	8
Mountain chickadee*	2005	4.84	0.79	10.01	62	19
	2006	2.38	0.70	4.40	49	9
	2007	2.55	0.70	5.04	52	10

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Mountain chickadee, cont.*</i>	2008	2.52	0.25	5.88	72	9
	2009	3.83	0.25	8.06	64	13
	2010	1.04	0.00	2.92	97	4
	2011	7.78	0.94	17.58	69	26
	2012	4.45	0.47	10.08	71	16
	2013	4.46	0.00	9.38	66	13
	2014	9.01	0.64	19.69	66	13
	2015	2.36	0.00	5.74	76	3
Mourning dove	2005	11.84	6.89	17.56	27	141
	2006	12.81	7.67	18.76	26	154
	2007	14.16	7.45	23.03	34	171
	2008	14.16	9.11	19.66	22	162
	2009	8.61	4.77	12.92	29	98
	2010	13.18	8.19	19.10	25	156
	2011	10.79	6.51	15.40	24	116
	2012	7.36	4.12	11.24	29	79
	2013	15.19	9.89	20.82	22	125
	2014	13.78	9.16	19.01	22	62
	2015	8.61	4.38	13.98	34	34
Northern flicker*	2005	0.33	0.11	0.64	56	11
	2006	0.32	0.12	0.59	49	11
	2007	0.50	0.08	1.13	64	17
	2008	0.06	0.00	0.15	73	2
	2009	0.29	0.03	0.69	72	9
	2010	0.63	0.25	1.10	45	21
	2011	0.55	0.20	1.09	49	17
	2012	0.37	0.09	0.77	60	12
	2013	0.58	0.03	1.60	95	14
	2014	0.55	0.19	1.02	52	7
	2015	0.55	0.12	1.15	64	6
Pinyon jay*	2005	2.60	1.02	4.73	44	46
	2006	4.47	2.21	7.30	35	79
	2007	5.85	3.05	9.08	31	103
	2008	1.52	0.64	2.64	41	25
	2009	3.24	1.84	4.91	29	54
	2010	6.95	3.25	11.50	36	118
	2011	2.66	1.04	4.64	42	41
	2012	2.18	1.23	3.32	30	36
	2013	3.16	1.19	5.81	46	42
	2014	3.15	1.46	5.06	36	21
	2015	3.39	1.27	5.96	43	21
Plumbeous vireo*	2005	7.36	3.67	12.02	36	63
	2006	5.50	2.25	9.70	42	47

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Plumbeous vireo, cont.*</i>	2007	5.62	2.62	9.41	37	48
	2008	5.58	2.47	9.17	36	43
	2009	5.38	1.14	11.01	55	42
	2010	10.10	4.71	16.15	34	85
	2011	10.34	6.21	14.53	24	78
	2012	3.98	0.54	8.14	59	32
	2013	3.43	1.08	6.11	45	22
	2014	5.70	1.57	10.84	49	19
	2015	4.20	1.80	7.27	40	12
Rock wren*	2005	4.81	2.93	7.02	26	85
	2006	4.87	2.78	7.65	31	86
	2007	4.88	2.83	7.35	27	87
	2008	6.23	3.16	10.03	33	102
	2009	6.33	3.44	9.97	32	99
	2010	2.72	1.43	4.32	33	46
	2011	5.56	3.40	8.08	25	88
	2012	1.55	0.79	2.44	33	26
	2013	4.51	2.36	7.12	33	59
	2014	2.70	1.54	4.13	28	17
	2015	4.02	1.60	6.82	40	23
Say's phoebe*	2005	1.83	1.17	2.88	26	28
	2006	0.58	0.25	1.34	51	9
	2007	0.51	0.17	1.58	71	8
	2008	0.75	0.42	1.34	34	11
	2009	0.97	0.57	1.66	31	14
	2010	1.25	0.57	2.75	47	19
	2011	1.24	0.62	2.47	41	17
	2012	0.40	0.19	0.87	46	6
	2013	0.76	0.30	1.93	57	9
	2014	0.51	0.17	1.50	68	3
	2015	-	-	-	-	0
Spotted towhee	2005	15.27	8.65	22.31	27	82
	2006	13.19	5.38	22.20	39	69
	2007	21.85	9.05	36.28	39	113
	2008	9.69	3.54	16.09	39	47
	2009	20.83	8.91	33.98	36	99
	2010	15.20	6.46	25.15	37	74
	2011	25.88	12.12	42.92	37	115
	2012	21.73	9.47	36.60	38	104
	2013	24.95	10.23	41.47	38	99
	2014	31.03	11.63	52.43	40	61
	2015	20.40	7.44	36.83	45	36

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Vesper sparrow*	2005	0.58	0.00	1.57	86	9
	2006	0.99	0.00	2.35	76	15
	2007	0.95	0.00	2.35	80	15
	2008	0.41	0.00	1.07	87	6
	2009	0.96	0.06	2.56	89	13
	2010	1.29	0.00	3.17	77	20
	2011	1.76	0.00	5.10	98	25
	2012	1.53	0.00	3.59	75	23
	2013	2.07	0.00	5.26	88	26
	2014	0.99	0.00	2.74	97	6
	2015	1.93	0.00	5.63	103	10
Violet-green swallow*	2005	11.98	5.16	20.38	39	33
	2006	17.51	5.16	33.37	49	49
	2007	21.80	5.20	44.96	56	59
	2008	16.26	6.58	29.03	42	42
	2009	12.60	6.59	19.45	31	32
	2010	10.99	4.23	20.62	46	29
	2011	9.15	5.07	14.05	31	22
	2012	17.23	9.47	27.07	31	46
	2013	12.08	5.23	20.46	39	25
	2014	15.95	5.65	30.23	49	16
	2015	4.28	1.36	7.95	48	4
Virginia's warbler*	2005	9.30	3.73	16.98	44	54
	2006	6.29	0.69	13.78	65	35
	2007	5.84	0.88	12.55	63	31
	2008	4.61	1.41	8.93	50	24
	2009	4.06	0.73	8.72	60	22
	2010	9.98	3.57	17.44	43	53
	2011	11.19	2.37	24.19	61	52
	2012	9.23	1.69	19.18	60	49
	2013	5.80	0.85	11.76	57	25
	2014	14.61	0.45	36.20	81	32
	2015	4.79	0.00	11.83	77	9
White-breasted nuthatch	2005	2.64	0.32	5.74	66	15
	2006	2.62	0.56	5.65	64	14
	2007	4.45	0.54	11.62	79	22
	2008	1.84	0.17	4.60	74	9
	2009	1.65	0.17	3.83	76	8
	2010	2.27	0.15	5.74	92	12
	2011	2.24	0.18	4.99	66	11
	2012	3.96	0.33	8.16	61	21
	2013	3.29	0.86	6.78	60	13

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
White-breasted nuthatch, cont.	2014	3.09	0.41	7.12	71	6
	2015	1.75	0.42	3.77	67	3
Western meadowlark	2005	2.31	0.70	7.60	76	42
	2006	1.23	0.29	5.24	99	22
	2007	1.17	0.32	4.28	85	21
	2008	0.83	0.21	3.32	92	14
	2009	1.39	0.27	7.25	119	22
	2010	0.29	0.11	0.77	61	5
	2011	2.22	0.73	6.72	70	35
	2012	0.53	0.16	1.78	78	9
	2013	0.59	0.09	3.69	141	8
	2014	0.44	0.08	2.46	125	3
	2015	0.81	0.19	3.56	101	5
Western scrub-jay	2005	7.55	3.79	12.39	35	25
	2006	8.22	3.32	15.28	45	26
	2007	8.01	3.77	13.57	39	26
	2008	10.19	4.35	17.39	40	31
	2009	4.42	1.46	8.72	52	13
	2010	8.07	3.90	13.53	39	25
	2011	6.25	3.37	9.98	32	18
	2012	1.97	0.63	3.82	50	6
	2013	6.10	2.31	11.03	47	15
	2014	6.78	2.58	12.61	46	8
	2015	14.08	6.07	25.78	42	15
Western tanager	2005	1.21	0.28	2.45	57	16
	2006	1.79	0.73	2.96	38	23
	2007	2.21	0.74	4.08	47	29
	2008	1.38	0.08	3.29	73	17
	2009	0.65	0.08	1.31	58	8
	2010	1.34	0.15	3.29	74	17
	2011	1.79	0.19	3.69	58	20
	2012	3.07	0.33	6.48	61	38
	2013	1.37	0.00	3.07	69	13
	2014	2.98	0.00	8.11	96	15
	2015	0.69	0.00	1.64	75	3
White-throated swift	2005	13.54	5.70	24.46	42	74
	2006	16.30	5.92	31.05	48	87
	2007	19.34	9.77	30.95	34	107
	2008	14.09	5.79	23.75	40	71
	2009	8.23	4.24	13.48	34	41
	2010	6.05	2.66	10.58	41	32
	2011	7.30	3.60	12.11	36	35

Table 3-4. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in pinyon-juniper habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>White-throated swift, cont.</i>	2012	10.40	5.22	16.53	33	55
	2013	7.14	2.35	13.80	50	29
	2014	9.04	0.42	20.49	66	19
	2015	3.27	1.22	6.02	45	6
Yellow-rumped warbler	2005	1.68	0.44	6.49	90	9
	2006	4.94	1.26	19.45	92	26
	2007	2.08	0.48	8.96	100	11
	2008	2.64	0.61	11.43	100	13
	2009	0.21	0.05	0.87	98	1
	2010	1.56	0.71	3.45	48	8
	2011	5.18	2.55	10.54	43	24
	2012	1.40	0.45	4.31	71	7
	2013	0.75	0.25	2.24	69	3
	2014	1.01	0.21	4.92	112	2
	2015	4.43	1.97	9.95	49	8

*Priority species

3.1.3 Sage shrubland

All 15 sage shrubland transects were surveyed once in 2015. Densities of 42 species were estimated, 22 of which are priority species, from 2005 to 2015. The 2015 data yielded robust density estimates (CV <50%) for 16 species and a moderately robust estimate (CV = 50–75%) for 21 additional species (Table 3-5). These 34 species represent 46% of all species and 81% of all individuals detected in SA habitat.

The following 10 species had the highest estimated densities in SA in 2015 (listed in order from highest to lowest density):

1. Brewer's sparrow*
2. Vesper sparrow*
3. Green-tailed towhee*
4. Broad-tailed hummingbird*
5. Blue-gray gnatcatcher
6. Violet-green swallow*
7. Lark sparrow
8. Mountain bluebird
9. Spotted towhee
10. Western meadowlark

The following 13 species had higher estimated densities in SA compared to the other two habitats sampled in 2015 (listed in order from highest to lowest density):

1. Brewer's sparrow*
2. Vesper sparrow*
3. Green-tailed towhee*
4. Lark sparrow
5. Mountain bluebird*
6. Western meadowlark
7. Brewer's blackbird
8. Dusky flycatcher*
9. Sage thrasher*
10. Cliff swallow
11. Horned lark*
12. Black-billed magpie*
13. Sagebrush sparrow*

*Priority species

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015.

Species	Year	D	LCL	UCL	%CV	n
American robin	2005	2.19	1.12	3.50	33	36
	2006	4.05	1.89	6.85	39	70
	2007	2.83	1.35	4.79	40	50
	2008	2.13	1.12	3.30	33	34
	2009	1.75	0.70	2.98	40	27
	2010	2.72	1.33	4.53	37	46
	2011	3.45	1.74	5.56	34	58
	2012	3.55	1.98	5.22	29	61
	2013	2.94	1.85	4.07	24	45
	2014	4.91	3.19	6.69	22	40
	2015	3.40	1.79	5.14	30	26
Ash-throated flycatcher	2005	0.72	0.19	1.41	54	12
	2006	0.54	0.11	1.13	58	9
	2007	0.88	0.15	2.12	76	14
	2008	0.63	0.12	1.35	62	10
	2009	0.14	0.00	0.41	107	2
	2010	0.64	0.15	1.35	58	11
	2011	0.61	0.15	1.34	61	10
	2012	0.58	0.08	1.21	59	10
	2013	0.96	0.06	2.04	66	15
	2014	1.06	0.08	2.38	69	8
	2015	0.64	0.00	1.43	70	5
Black-billed magpie*	2005	2.48	0.88	4.60	47	64
	2006	2.61	1.50	3.94	28	93
	2007	1.50	0.77	2.29	31	49
	2008	1.30	0.61	2.15	38	45
	2009	0.92	0.31	1.77	49	31
	2010	1.36	0.60	2.34	39	51
	2011	1.76	0.67	2.98	42	60
	2012	1.40	0.60	2.40	39	54
	2013	1.70	0.85	2.64	32	45
	2014	3.65	1.92	5.76	33	50
	2015	2.18	1.18	3.27	30	30
Black-throated gray warbler*	2005	2.89	0.73	5.67	53	25
	2006	1.49	0.25	3.07	57	13
	2007	1.47	0.10	3.47	69	13
	2008	2.06	0.36	4.37	61	18
	2009	4.13	0.98	7.98	53	33
	2010	1.63	0.43	3.27	53	15
	2011	2.45	0.43	4.93	55	22
	2012	1.18	0.22	2.37	61	10
	2013	0.13	0.00	0.39	98	1

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Black-throated gray warbler, cont.*</i>	2014	-	-	-	-	0
	2015	1.29	0.25	2.47	53	5
Black-throated sparrow	2005	0.76	0.14	1.67	67	9
	2006	2.31	0.67	4.17	46	29
	2007	1.46	0.24	2.79	53	18
	2008	0.27	0.00	0.64	75	3
	2009	2.02	0.00	5.49	91	23
	2010	0.58	0.08	1.17	59	7
	2011	0.59	0.15	1.15	55	7
	2012	2.59	0.16	5.78	70	31
	2013	1.64	0.33	3.37	56	18
	2014	1.64	0.32	3.42	59	9
	2015	2.25	0.00	5.38	75	12
Blue-gray gnatcatcher	2005	8.87	3.25	16.21	45	28
	2006	5.15	2.78	7.85	31	17
	2007	3.96	1.32	7.24	46	12
	2008	13.35	7.70	19.89	28	40
	2009	12.39	4.92	22.35	43	35
	2010	13.95	7.72	21.22	30	44
	2011	9.89	4.83	16.00	35	32
	2012	12.39	5.08	21.13	42	35
	2013	11.83	5.54	19.13	35	34
	2014	10.59	4.61	17.42	38	16
	2015	13.56	5.40	23.23	41	19
Brewer's blackbird	2005	0.77	0.15	1.54	57	5
	2006	6.05	2.80	10.14	38	40
	2007	2.48	0.83	4.42	44	17
	2008	1.23	0.00	3.32	96	8
	2009	4.50	0.16	10.45	72	26
	2010	3.02	1.23	5.07	38	20
	2011	3.36	0.81	7.28	62	22
	2012	2.93	0.20	7.19	75	19
	2013	5.42	0.98	12.94	73	32
	2014	0.96	0.20	1.85	56	3
	2015	4.78	0.00	10.53	68	15
Brewer's sparrow*	2005	76.59	49.16	107.83	20	483
	2006	79.83	52.80	112.40	19	516
	2007	69.31	47.29	91.24	17	457
	2008	63.10	44.87	83.26	16	384
	2009	98.94	60.03	146.11	23	572
	2010	88.16	61.15	117.96	17	564
	2011	94.31	64.27	129.40	18	581

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Brewer's sparrow, cont. *</i>	2012	68.78	48.64	88.93	15	415
	2013	85.26	53.99	116.08	19	479
	2014	99.19	56.83	144.40	22	298
	2015	82.51	57.19	107.03	15	221
Broad-tailed hummingbird*	2005	8.55	1.57	17.75	58	22
	2006	7.82	1.75	15.68	55	21
	2007	9.40	1.59	20.99	68	24
	2008	14.86	4.19	30.14	54	36
	2009	5.74	0.69	13.91	70	13
	2010	4.48	1.77	7.86	42	11
	2011	2.90	1.22	5.02	41	7
	2012	5.01	2.33	8.12	35	13
	2013	17.16	4.11	32.81	52	40
	2014	25.21	5.97	50.59	56	30
	2015	22.22	7.43	43.28	53	24
Brown-headed cowbird	2005	0.80	0.27	1.50	48	5
	2006	4.16	1.99	7.11	37	26
	2007	1.87	0.63	3.37	45	12
	2008	2.55	1.12	4.23	38	15
	2009	1.45	0.34	3.09	60	8
	2010	0.98	0.16	2.05	61	6
	2011	2.10	0.91	3.43	37	13
	2012	3.07	1.29	5.39	42	19
	2013	2.45	0.31	5.84	73	14
	2014	5.69	2.12	9.90	44	16
	2015	1.12	0.29	2.25	56	3
Chipping sparrow*	2005	4.78	2.35	7.71	36	31
	2006	7.91	3.85	12.62	35	54
	2007	7.24	2.43	13.31	47	48
	2008	6.71	1.14	13.12	56	44
	2009	6.64	2.36	11.85	44	42
	2010	15.05	7.75	24.19	34	96
	2011	8.68	3.97	14.15	36	56
	2012	12.72	5.83	20.85	36	75
	2013	7.26	2.83	13.02	42	44
	2014	9.27	4.30	14.86	35	27
	2015	5.13	1.77	9.18	45	16
Cliff swallow	2005	10.70	4.58	25.03	52	19
	2006	13.25	6.35	27.64	44	24
	2007	4.42	1.78	10.97	56	8
	2008	1.77	0.56	5.63	73	3
	2009	-	-	-	-	0
	2010	1.69	0.70	4.07	54	3

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Cliff swallow, cont.</i>	2011	6.28	2.89	13.67	47	11
	2012	3.92	1.60	9.61	55	7
	2013	12.48	4.54	34.30	63	20
	2014	15.68	6.50	37.80	54	13
	2015	3.82	1.22	11.94	72	3
Common raven	2005	0.24	0.05	0.51	60	4
	2006	0.60	0.25	0.99	37	10
	2007	1.56	0.84	2.45	31	26
	2008	0.77	0.36	1.25	35	12
	2009	-	-	-	-	0
	2010	0.92	0.41	1.54	37	15
	2011	1.74	0.93	2.70	31	28
	2012	0.78	0.23	1.49	51	13
	2013	0.41	0.13	0.76	46	6
	2014	0.77	0.23	1.46	50	6
	2015	0.28	0.00	0.60	64	2
Dusky flycatcher*	2005	2.98	0.63	6.57	65	30
	2006	5.10	1.39	9.72	51	53
	2007	5.57	1.38	11.07	53	55
	2008	7.19	2.28	13.69	48	68
	2009	8.27	1.66	16.75	57	74
	2010	6.76	2.21	12.06	45	67
	2011	6.64	2.88	10.89	37	67
	2012	5.44	2.17	9.19	40	55
	2013	11.22	3.11	21.65	53	100
	2014	10.70	3.07	20.29	51	51
	2015	4.53	1.29	9.03	50	20
Grace's warbler*	2005	0.52	0.00	1.19	70	6
	2006	0.97	0.00	2.28	73	12
	2007	1.19	0.00	2.67	70	14
	2008	1.04	0.00	2.48	74	12
	2009	0.44	0.00	1.24	94	5
	2010	0.51	0.00	1.40	88	6
	2011	1.29	0.00	2.95	70	15
	2012	0.64	0.00	1.38	66	8
	2013	0.57	0.00	1.32	74	6
	2014	0.53	0.00	1.17	69	3
	2015	0.58	0.00	1.34	72	3
Gray flycatcher	2005	1.97	0.87	3.24	37	23
	2006	0.66	0.08	1.42	61	8
	2007	0.54	0.00	1.43	84	7
	2008	1.12	0.00	2.96	86	12
	2009	2.30	0.61	4.66	55	23

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Gray flycatcher, cont.	2010	1.86	0.55	3.47	47	23
	2011	1.79	0.50	3.35	50	21
	2012	0.63	0.08	1.33	63	7
	2013	0.28	0.00	0.67	74	3
	2014	1.09	0.18	2.26	58	6
	2015	1.79	0.38	3.56	54	9
Green-tailed towhee*	2005	28.07	17.47	45.11	28	281
	2006	39.48	22.34	69.76	33	408
	2007	28.67	16.52	49.73	32	297
	2008	25.13	15.22	41.48	29	243
	2009	28.59	16.18	50.55	33	264
	2010	19.01	11.60	31.14	29	193
	2011	30.05	17.23	52.43	33	296
	2012	46.86	27.58	79.60	31	476
	2013	42.23	24.95	71.48	31	383
	2014	53.34	31.51	90.31	31	253
	2015	33.63	20.43	55.36	29	151
Horned lark*	2005	2.92	0.85	5.35	49	27
	2006	3.15	1.29	5.50	41	31
	2007	3.96	1.35	6.94	43	38
	2008	2.09	0.32	4.70	72	18
	2009	4.97	1.66	9.02	46	42
	2010	3.04	0.94	5.58	46	29
	2011	3.07	1.00	5.52	47	28
	2012	2.26	0.46	4.44	56	22
	2013	1.49	0.00	3.69	81	13
	2014	3.79	0.75	8.14	61	16
	2015	3.67	1.05	7.01	50	15
House finch	2005	0.32	0.09	0.62	53	3
	2006	5.36	3.07	8.02	28	52
	2007	3.07	1.00	6.15	51	29
	2008	3.43	1.78	5.27	32	31
	2009	5.02	0.78	10.95	65	44
	2010	2.04	1.05	3.16	31	19
	2011	1.96	0.84	3.08	35	18
	2012	3.69	2.17	5.56	28	35
	2013	2.49	1.09	4.04	36	21
	2014	3.83	1.43	6.53	41	17
	2015	3.35	1.45	5.68	38	14
House wren	2005	0.76	0.00	1.69	72	12
	2006	0.49	0.06	1.02	59	8
	2007	-	-	-	-	0
	2008	0.25	0.07	0.45	46	4

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>House wren, cont.</i>	2009	0.60	0.12	1.25	58	9
	2010	0.68	0.00	1.52	67	11
	2011	1.24	0.35	2.27	47	19
	2012	0.67	0.00	1.45	65	11
	2013	1.99	0.47	4.18	60	29
	2014	1.05	0.27	2.00	53	8
	2015	1.16	0.24	2.31	59	8
Lark sparrow	2005	10.32	3.35	19.03	47	84
	2006	11.30	4.36	19.62	41	91
	2007	7.50	2.24	14.28	50	61
	2008	3.20	0.78	6.11	52	24
	2009	15.84	3.27	30.68	53	113
	2010	9.17	3.67	15.52	41	72
	2011	12.36	4.18	21.42	44	98
	2012	13.90	6.10	23.03	38	110
	2013	14.58	3.42	28.13	51	103
	2014	15.79	5.03	28.34	46	59
	2015	10.56	2.70	20.36	50	37
Lazuli bunting*	2005	0.86	0.11	1.92	66	7
	2006	0.56	0.11	1.11	55	5
	2007	0.45	0.00	1.13	78	4
	2008	-	-	-	-	0
	2009	8.98	0.79	19.75	68	73
	2010	4.40	1.42	8.00	46	38
	2011	2.34	0.39	4.79	58	20
	2012	2.83	0.86	6.05	55	24
	2013	1.15	0.25	2.37	56	9
	2014	0.49	0.00	1.42	101	2
	2015	1.58	0.25	3.34	62	6
Mountain bluebird*	2005	5.89	3.21	8.86	30	60
	2006	7.25	4.82	9.91	22	79
	2007	7.41	4.09	11.36	30	81
	2008	6.71	4.42	9.03	21	65
	2009	6.70	2.88	11.47	40	53
	2010	7.04	4.76	9.67	22	75
	2011	7.64	4.34	11.63	29	62
	2012	6.39	3.43	10.09	32	68
	2013	7.01	3.74	10.57	30	66
	2014	10.46	6.64	15.25	24	45
	2015	9.81	6.53	13.63	22	43
Mourning dove	2005	2.39	1.14	3.70	33	55
	2006	4.25	2.79	5.90	22	101
	2007	2.58	1.16	4.33	38	63

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
<i>Mourning dove, cont.</i>	2008	3.16	1.22	5.62	42	69
	2009	3.03	1.31	5.05	38	61
	2010	3.76	1.48	6.26	38	89
	2011	2.36	1.39	3.44	27	56
	2012	1.72	0.78	2.68	34	41
	2013	5.47	3.53	7.47	22	104
	2014	4.18	2.20	6.64	34	45
	2015	2.94	1.60	4.65	32	31
Northern flicker*	2005	0.90	0.46	1.42	34	14
	2006	1.56	0.76	2.50	34	24
	2007	0.89	0.39	1.57	41	14
	2008	0.39	0.12	0.75	48	6
	2009	1.17	0.40	2.24	49	16
	2010	1.55	0.94	2.37	28	24
	2011	1.66	0.89	2.62	32	25
	2012	1.94	0.93	3.23	36	31
	2013	1.22	0.62	1.99	34	17
	2014	0.85	0.12	1.78	59	6
	2015	1.46	0.61	2.45	39	10
Pinyon jay*	2005	0.19	0.05	0.68	85	12
	2006	0.14	0.05	0.43	74	9
	2007	0.09	0.02	0.36	93	6
	2008	0.22	0.06	0.78	86	13
	2009	0.07	0.01	0.36	119	4
	2010	0.30	0.10	0.89	71	19
	2011	0.11	0.03	0.50	104	7
	2012	0.38	0.11	1.27	81	24
	2013	0.11	0.03	0.36	82	6
	2014	0.07	0.02	0.21	74	2
	2015	0.83	0.28	2.42	70	23
Plumbeous vireo*	2005	0.78	0.14	1.64	59	11
	2006	0.61	0.20	1.09	44	9
	2007	0.43	0.06	0.98	70	6
	2008	0.15	0.00	0.34	71	2
	2009	1.25	0.13	2.86	69	16
	2010	1.46	0.34	3.23	62	20
	2011	0.56	0.21	1.05	48	8
	2012	0.62	0.15	1.19	53	9
	2013	1.40	0.43	2.63	49	18
	2014	1.49	0.48	2.92	50	10
	2015	0.32	0.00	0.99	108	2
Rock wren*	2005	3.34	1.94	4.97	28	83
	2006	6.21	3.59	9.31	29	156

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Rock wren, cont.*	2007	2.87	1.20	5.28	44	73
	2008	3.60	1.83	5.81	34	86
	2009	3.02	1.29	4.88	35	69
	2010	2.59	1.34	4.12	33	62
	2011	5.18	2.66	8.01	32	126
	2012	2.21	1.17	3.47	32	54
	2013	5.00	1.84	8.93	42	108
	2014	4.84	2.28	8.17	38	55
	2015	2.86	1.71	4.18	26	31
Sagebrush sparrow*	2005	3.65	0.31	8.44	69	36
	2006	2.61	0.10	6.13	74	25
	2007	3.34	0.00	7.56	69	31
	2008	2.18	0.00	6.48	98	20
	2009	3.08	0.23	6.85	66	27
	2010	0.41	0.00	0.86	67	4
	2011	1.87	0.22	3.91	63	18
	2012	0.92	0.20	1.82	55	9
	2013	0.47	0.10	0.94	57	4
	2014	2.26	0.00	5.64	78	10
	2015	1.42	0.00	3.04	65	6
Sage thrasher*	2005	2.61	0.99	4.71	44	79
	2006	2.38	0.77	4.21	44	75
	2007	2.28	0.84	4.06	43	74
	2008	4.81	1.89	8.84	44	144
	2009	4.04	1.32	7.49	47	116
	2010	4.50	1.56	8.50	48	140
	2011	4.03	1.34	7.08	44	126
	2012	1.83	0.57	3.33	48	58
	2013	3.03	1.35	5.15	40	86
	2014	2.26	0.90	3.83	41	33
	2015	4.05	2.10	6.38	32	56
Say's phoebe*	2005	0.67	0.24	1.19	44	10
	2006	0.92	0.48	1.45	33	14
	2007	0.46	0.16	0.81	46	7
	2008	1.03	0.19	2.23	66	15
	2009	1.13	0.24	2.34	59	15
	2010	1.26	0.35	2.55	54	19
	2011	2.05	0.92	3.32	36	31
	2012	0.74	0.24	1.44	51	11
	2013	1.30	0.54	2.38	42	18
	2014	1.01	0.24	2.01	54	7
	2015	0.61	0.12	1.28	59	4

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Spotted towhee	2005	5.19	2.52	10.66	43	55
	2006	5.54	3.06	10.03	35	61
	2007	4.54	2.47	8.34	36	50
	2008	6.62	3.56	12.30	36	68
	2009	4.18	1.97	8.88	45	41
	2010	7.04	3.79	13.07	37	75
	2011	8.85	4.68	16.73	38	95
	2012	6.53	3.76	11.37	33	70
	2013	9.55	4.97	18.33	39	93
	2014	10.91	4.99	23.87	47	55
	2015	9.22	4.71	18.03	40	44
Vesper sparrow*	2005	27.70	19.15	40.08	22	264
	2006	23.37	16.31	33.47	21	352
	2007	40.13	26.68	60.35	25	402
	2008	45.46	28.55	72.39	28	365
	2009	49.50	31.28	78.35	27	410
	2010	47.37	33.72	66.56	20	477
	2011	34.49	25.43	46.79	18	498
	2012	42.85	30.65	59.90	19	492
	2013	38.45	27.33	54.09	20	357
	2014	38.38	26.95	54.66	21	188
	2015	43.77	30.98	61.85	20	220
Violet-green swallow*	2005	5.11	2.20	9.55	56	14
	2006	9.59	3.08	21.01	68	26
	2007	4.49	1.69	8.56	51	13
	2008	4.86	1.88	9.00	56	13
	2009	7.65	2.24	14.70	68	19
	2010	5.42	2.36	9.61	52	15
	2011	8.33	3.67	15.52	66	22
	2012	12.94	5.07	26.22	68	35
	2013	15.36	6.50	27.16	54	39
	2014	12.88	4.59	24.32	65	17
	2015	11.36	5.35	20.17	52	14
Virginia's warbler*	2005	1.34	0.31	2.58	53	23
	2006	1.76	0.50	3.25	48	30
	2007	1.07	0.00	2.87	92	17
	2008	2.60	0.25	5.61	65	40
	2009	1.44	0.26	3.02	62	21
	2010	1.53	0.19	3.18	61	25
	2011	1.27	0.33	2.49	53	21
	2012	0.71	0.06	1.59	65	12
	2013	1.71	0.52	3.00	44	25

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Virginia's warbler, cont. *	2014	2.31	0.25	4.87	62	18
	2015	1.91	0.43	3.85	55	14
Warbling vireo*	2005	1.32	0.21	2.92	66	17
	2006	0.74	0.16	1.43	53	10
	2007	1.56	0.07	3.42	66	22
	2008	0.15	0.00	0.46	104	2
	2009	0.25	0.00	0.56	69	3
	2010	0.68	0.14	1.34	54	9
	2011	1.23	0.21	2.55	58	16
	2012	0.91	0.18	1.92	59	12
	2013	0.77	0.15	1.72	62	9
	2014	1.68	0.61	2.78	41	11
	2015	0.85	0.16	1.79	59	5
Western meadowlark	2005	5.14	2.68	9.86	39	128
	2006	5.93	3.53	9.95	30	153
	2007	4.92	2.54	9.51	39	127
	2008	6.97	3.49	13.94	41	168
	2009	8.35	4.12	16.91	42	189
	2010	5.45	3.06	9.73	34	138
	2011	8.90	4.92	16.09	35	222
	2012	7.22	4.49	11.62	28	180
	2013	5.04	2.41	10.51	44	110
	2014	4.91	2.31	10.43	45	57
	2015	5.27	3.03	9.19	33	57
Western tanager	2005	0.57	0.04	1.17	156	13
	2006	0.87	0.03	1.98	305	15
	2007	0.94	0.08	2.13	110	23
	2008	1.06	0.00	2.56	275	19
	2009	0.78	0.09	1.66	82	18
	2010	0.56	0.07	1.31	108	13
	2011	0.19	0.03	0.35	202	4
	2012	0.38	0.00	0.77	280	8
	2013	0.90	0.04	1.93	123	19
	2014	0.20	0.00	0.42	192	2
	2015	0.41	0.00	0.90	159	4
Western wood-pewee	2005	0.18	0.06	0.60	76	4
	2006	0.27	0.07	0.97	84	6
	2007	0.93	0.40	2.19	52	21
	2008	0.14	0.03	0.63	100	3
	2009	0.55	0.16	1.92	81	11
	2010	0.41	0.16	1.06	59	9
	2011	0.23	0.05	0.97	98	5

Table 3-5. Estimated densities per km² (D), lower and upper 95% confidence limits on D (LCL, UCL), percent coefficient of variation of estimates (% CV), and number of independent detections used in analyses (n) of breeding birds in sage shrubland habitat, Northern Colorado Plateau Network, 2005–2015, cont.

Species	Year	D	LCL	UCL	%CV	n
Western wood-pewee, cont.	2012	0.18	0.05	0.60	77	4
	2013	0.40	0.19	0.84	44	8
	2014	0.87	0.40	1.93	48	9
	2015	0.51	0.21	1.25	54	5
White-throated swift	2005	1.39	0.00	4.09	104	4
	2006	3.62	1.09	8.80	68	11
	2007	3.85	1.10	8.29	59	12
	2008	5.86	0.54	19.65	108	14
	2009	2.11	0.25	5.07	75	6
	2010	3.61	1.21	8.14	61	11
	2011	-	-	-	-	0
	2012	6.21	1.61	13.15	59	20
	2013	1.81	0.26	4.28	73	5
	2014	1.38	0.00	4.33	115	2
	2015	0.79	0.00	2.67	119	1
Yellow warbler	2005	0.62	0.00	1.57	82	7
	2006	0.84	0.28	1.60	51	9
	2007	0.19	0.00	0.44	75	2
	2008	0.10	0.00	0.29	104	1
	2009	0.52	0.00	1.75	135	4
	2010	0.73	0.07	1.64	66	8
	2011	0.83	0.16	1.74	60	9
	2012	1.27	0.47	2.61	56	13
	2013	1.66	0.28	3.50	60	16
	2014	2.57	0.53	5.71	65	13
	2015	1.27	0.29	2.63	61	6
Yellow-rumped warbler	2005	1.11	0.12	2.39	63	9
	2006	2.33	0.00	5.17	66	19
	2007	1.52	0.20	3.12	60	12
	2008	1.42	0.25	2.91	58	11
	2009	0.99	0.13	2.15	66	7
	2010	0.37	0.00	1.11	98	3
	2011	1.62	0.24	3.43	62	13
	2012	1.68	0.00	3.91	73	13
	2013	2.39	0.85	4.37	45	17
	2014	0.19	0.00	0.68	128	1
	2015	-	-	-	-	0

*Priority species

Dashes indicate the sample size was insufficient for estimating density.

3.2 Pipe Spring National Monument

Observers detected 231 birds of 35 species during surveys at Pipe Spring NM in 2015 (Appendix A). They detected 51 birds of 18 species during point counts and 180 birds and 17 additional species during the nocturnal and diurnal area searches of the monument. Since 2009, Bird Conservancy staff have detected 1,693 birds of 70 species at the monument (Table 3-6).

In 2015, six species were detected that had not been recorded by the Bird Conservancy in previous years at Pipe Spring NM. Cedar waxwing, western wood-pewee, and yellow-breasted chat were already classified as present in the monument. Prairie falcon was classified as unconfirmed in the monument. Orange-crowned warbler and yellow-headed blackbird were not known to occur in the monument and should be added to the park species list.

Table 3-6. Number of individuals observed by survey method and year, Pipe Spring National Monument, 2009–2015.

Species	Number of individuals observed, 2009–2014 ¹		Number of individuals observed, 2015		Total
	Point count	Area search	Point count	Area search	
American kestrel*	4	9	1	2	16
American robin	3	-	-	-	3
Ash-throated flycatcher	24	14	1	4	43
Barn swallow	2	-	-	-	2
Bewick's wren*	11	23	1	2	37
Black phoebe	6	15	-	3	24
Black-chinned hummingbird*	2	-	-	-	2
Black-crowned night-heron	1	11	-	-	12
Black-headed grosbeak	6	4	-	2	12
Black-throated gray warbler*	4	1	-	-	5
Black-throated sparrow	85	37	2	4	128
Blue grosbeak	4	4	-	1	9
Blue-gray gnatcatcher	4	1	-	-	5
Brewer's sparrow*	2	-	-	-	2
Broad-tailed hummingbird*	-	2	-	2	4
Brown-headed cowbird	14	16	-	-	30
Bullock's oriole	24	20	-	5	49
Canyon wren	2	-	-	-	2
Cassin's kingbird	52	33	2	2	89
Cedar waxwing	-	-	-	1	1
Cliff swallow	-	1	-	-	1
Common poorwill*	-	3	-	-	3
Common raven	34	16	3	8	61
Cooper's hawk*	1	1	-	-	2
Downy woodpecker	1	-	-	-	1
Eurasian collared-dove	43	74	5	8	130
European starling	21	73	1	11	106
Gambel's quail	38	29	4	5	76
Gray flycatcher	1	1	-	-	2
Gray vireo*	3	-	-	-	3
Great horned owl	-	1	-	-	1

Table 3-6. Number of individuals observed by survey method and year, Pipe Spring National Monument, 2009–2015, cont.

Species	Number of individuals observed, 2009–2014 ¹		Number of individuals observed, 2015		Total
	Point count	Area search	Point count	Area search	
Green-tailed towhee*	1	-	-	3	4
Hairy woodpecker	-	1	-	-	1
House finch	87	72	11	17	187
House sparrow	8	52	-	1	61
House wren	1	-	-	-	1
Juniper titmouse*	6	1	-	-	7
Lark sparrow	1	21	-	-	22
Lazuli bunting*	-	6	-	-	6
Lesser goldfinch	10	8	-	1	19
MacGillivray's warbler*	1	-	-	-	1
Mallard	-	1	-	-	1
Mallard (domestic)	-	10	-	-	10
Mourning dove	17	7	3	30	57
Northern mockingbird	27	4	-	-	31
Northern rough-winged swallow	9	3	-	1	13
Orange-crowned warbler	-	-	-	1	1
Peregrine falcon*	5	-	-	-	5
Pine siskin*	2	24	-	5	31
Pinyon jay*	1	-	-	-	1
Prairie falcon*	-	-	1	-	1
Red-tailed hawk	-	1	-	-	1
Red-winged blackbird	1	-	-	-	1
Rock wren*	18	1	1	-	20
Sage thrasher*	1	-	-	-	1
Say's phoebe*	19	15	4	9	47
Spotted towhee	6	-	-	-	6
Summer tanager	1	-	-	-	1
Violet-green swallow*	13	43	-	10	66
Warbling vireo*	-	3	-	1	4
Western kingbird	31	22	5	12	70
Western scrub-jay	2	6	-	-	8
Western tanager	2	4	-	2	8
Western wood-pewee	-	-	3	7	10
White-crowned sparrow	10	27	2	9	48
White-throated swift	20	3	-	-	23
Yellow warbler	10	33	-	9	52
Yellow-breasted chat	-	-	-	1	1
Yellow-headed blackbird	-	-	1	1	2
Yellow-rumped warbler	1	2	-	-	3

¹RMBO did not begin conducting area searches in PISP until 2011.

*Priority species

4 Discussion

The objective of this project is to determine the population status and trends of breeding landbird species in low-elevation riparian, pinyon-juniper, and sage shrubland habitats. In this report, statistically rigorous density estimates are provided for 2005–2015. For most species, each year of additional data will improve our ability to accurately estimate densities of the species that occupy NCPN units. This year, density estimates are presented for the first time for Clark’s nutcracker, dark-eyed junco, and lesser goldfinch in pinyon-juniper habitat and western wood-pewee in sage shrubland habitat. With each year of additional data, the Bird Conservancy is able to provide density estimates for more species in each habitat. The density estimates presented in this report replace the estimates provided in the 2005–2014 reports.

It should be noted that while NCPN surveys are located within low-elevation riparian, pinyon-juniper, and sage shrubland habitats, each habitat includes components of other habitat types found within the NCPN. For example, the sage shrubland stratum includes components of cliff-rock, pinyon-juniper, Gambel oak, and other semidesert habitats. This accounts for the detection of some species that may seem out of place in a given habitat.

Density estimates are also provided for all species with over 80 detections in a stratum regardless of in which habitat they were recorded. For example, density estimates are presented for Grace’s warbler in sage shrubland even though this species does not regularly occur in this habitat. All of the Grace’s warblers detected during surveys in SA were recorded on two surveys located within thin strips of sagebrush surrounded by ponderosa pine forests. The Grace’s warblers detected on these surveys were most likely located in the surrounding ponderosa pine habitat and not within the narrow strips of SA. However, these estimates are presented because it is useful for park managers to have this information regardless of the habitat in which the species was detected.

From 2005 through 2013, Bird Conservancy staff surveyed each transect location twice to increase sample size. In 2014, the protocol was changed and each site was surveyed only once. This resulted in a decrease in the number of possible surveys from 92 to 46, and a decrease in the total number of individual points from 1,358 to 679. Densities were estimated for species with at least 80 independent detections within a habitat across all years. Therefore, the decrease in survey effort will not have an impact on the number of species for which density estimates are produced. However, a decrease in the number of detections for a species in a given year due to decreased effort may impact the %CV for that species.

For the third year in a row, trend analyses were not conducted. Trend analyses were conducted from 2010 to 2012 for species of conservation or management concern for which densities were estimated. Separate analyses were performed for each habitat. Bird Conservancy staff recommends conducting trend analyses again in 2017. As additional years of data accumulate, trend analysis will become less sensitive to short-term fluctuations in population density and long-term trends underlying annual fluctuations will be revealed. Long-term monitoring will continue to be necessary for interpreting population status and trends for avian species of the NCPN.

From 1998 to 2007, the Bird Conservancy (formerly the Rocky Mountain Bird Observatory), in conjunction with its partners, conducted landbird monitoring using a sampling design based on vegetation strata. The program, Monitoring Colorado’s Birds, was one of the first attempts in the nation to develop and implement a statewide all-bird monitoring plan. The current monitoring effort in the NCPN was developed in 2005 and used the same sampling design as Monitoring Colorado’s Birds, focusing on three primary habitats.

In 2008, the Bird Conservancy and its partners designed a broad-scale monitoring program called Integrated Monitoring in Bird Conservation Regions (IMBCR) (Blakesley

and Hanni 2009). The Bird Conservancy developed this monitoring program to better address the recommendations of the North American Bird Conservation Initiative (NABCI) monitoring subcommittee. The IMBCR program continues to grow, adding new partners and expanding its geographic range. The NCPN may want to evaluate the feasibility and benefits of switching to the IMBCR design in future years, particularly as more surveys are completed within Utah using the IMBCR design. In 2016, IMBCR surveys will be conducted within the area covered by several Bureau of Land Management offices. In 2017, the Bird Conservancy will implement statewide monitoring as part of the IMBCR program.

The IMBCR design better meets the goals of the NABCI monitoring subcommittee and provides several benefits when compared to the habitat-based sampling design:

1. The spatially balanced study design is more statistically rigorous;
2. Data are analyzed at a variety of spatial scales which allows local population trends to be directly compared to regional trends; and
3. Strata are based on fixed attributes which allows the relation of changes in bird populations to changes on the landscape through time.

In 2015, the Bird Conservancy surveyed three transects within the NCPN as part of the IMBCR program. In larger parks, such as Dinosaur National Monument and Canyonlands National Park, the NCPN could adopt this design in SA and PJ ecotypes. Low-elevation riparian would require special consideration, as a 16-point grid may not adequately sample this habitat.

In 2013, the Bird Conservancy used a modified design to monitor bird populations along the Colorado and Dolores rivers in eastern Utah. In 2016, they will survey the same locations, as well as areas along the Dolores and Colorado rivers in Colorado, using the same design. This modified design partitioned the 1-km² grid cells into four 0.25-km² quadrants containing four points each. All grid cells that contained a minimum of two points within riparian vegetation in at least one quadrant were selected (Birek et al. 2014). The NCPN may be able to use a similar design to sample riparian areas within national park units.

In smaller parks, or parks with substantial amounts of inaccessible terrain, comparable alternative designs will be required. Transitioning NCPN monitoring to a grid-based design would allow the network to compare density estimates of species on their lands to those on surrounding landscapes surveyed by the Bird Conservancy and its partners. While the National Park Service has considered this approach, to date the NPS has not switched to the new design due to questions as to whether this would meet the park's objectives, continuity of a long-term data set with new methods, and the costs to re-design the monitoring locations.

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Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
American crow	-	-	-	-	12	1	2	4	2	2	-	-	4	-	-	27
American dipper*	-	-	-	-	1	1	1	2	1	-	-	3	-	1	-	10
American goldfinch	1	-	-	-	14	5	9	7	9	35	13	18	4	-	1	115
American kestrel*	1	3	7	1	10	10	11	9	10	13	20	19	14	12	12	140
American pipit	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
American robin	8	4	31	-	104	156	144	131	68	101	143	102	121	78	43	1,191
American wigeon	-	-	2	-	-	-	-	-	-	-	-	4	3	-	2	9
Ash-throated flycatcher	78	63	15	1	302	415	360	358	468	390	380	384	340	166	157	3,720
Bank swallow*	-	-	-	-	-	-	2	1	-	1	-	-	-	-	-	4
Barn swallow	-	-	7	-	1	2	3	1	2	-	6	6	11	10	7	49
Belted kingfisher*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Bewick's wren	14	25	12	1	240	307	197	205	227	51	50	138	50	37	52	1,554
Black phoebe	8	-	-	-	12	16	30	13	35	9	7	28	13	11	8	182
Black-billed magpie*	-	2	54	-	109	122	63	54	54	74	105	75	112	78	56	902
Black-capped chickadee	-	-	-	-	1	5	4	-	2	1	4	4	-	4	-	25
Black-chinned hummingbird	6	6	1	-	51	68	53	53	105	53	71	68	34	9	13	578
Black-chinned sparrow*	1	-	-	-	9	6	4	-	14	4	3	-	1	-	1	42
Black-crowned night heron	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Black-headed grosbeak	11	4	6	-	27	54	37	37	46	38	42	59	29	28	21	418
Black-throated gray warbler*	29	125	5	-	397	552	458	567	647	425	511	435	185	132	159	4,468
Black-throated sparrow	22	25	12	2	114	178	194	151	367	190	238	250	161	59	61	1,963
Blue grosbeak	5	-	3	-	14	32	6	6	35	3	8	28	43	14	8	197
Blue-gray gnatcatcher	68	68	20	-	347	307	296	337	557	428	441	303	330	193	156	3,695
Blue-winged teal	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Bobolink*	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Brewer's blackbird	-	-	24	-	10	56	29	10	38	42	41	31	49	8	24	338
Brewer's sparrow*	2	1	265	-	599	641	600	538	722	664	687	476	540	338	268	6,073
Broad-tailed hummingbird*	14	12	25	-	68	30	48	76	29	78	25	31	53	70	51	559
Brown creeper	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1

Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015, cont.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Brown-headed cowbird	2	7	3	-	55	83	51	47	69	31	96	99	55	32	12	630
Bullock's oriole	10	-	2	-	7	35	19	13	22	34	27	25	9	6	12	209
Bushtit	12	27	-	-	190	140	53	30	95	11	1	29	70	15	39	673
California gull	-	-	-	-	13	3	-	-	-	-	-	1	-	-	-	17
Canada goose	-	-	32	-	36	26	149	117	75	54	59	38	24	2	32	612
Canyon wren	25	4	1	-	52	105	70	37	59	7	18	26	17	17	30	438
Cassin's finch*	-	2	-	-	4	39	14	14	2	4	18	12	16	5	2	130
Cassin's kingbird	1	1	-	2	-	2	-	-	25	-	6	13	17	9	4	76
Cedar waxwing	-	-	-	-	-	-	3	1	1	-	-	-	-	-	-	5
Chipping sparrow*	3	43	16	-	156	155	196	218	287	286	289	252	110	106	62	2,117
Chukar	-	-	-	-	-	5	7	-	2	3	-	3	1	8	-	29
Clark's nutcracker*	-	4	7	-	65	29	26	17	34	7	10	17	118	4	11	338
Cliff swallow	-	-	12	-	189	66	49	87	-	7	104	18	55	54	12	641
Common grackle	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	3
Common loon	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Common merganser	-	-	1	-	6	6	10	4	1	-	-	6	5	2	1	41
Common nighthawk*	-	-	1	-	2	2	1	2	6	17	3	10	5	-	1	49
Common poorwill*	-	-	-	-	1	1	1	-	-	2	-	1	-	-	-	6
Common raven	30	42	50	3	141	158	199	171	155	202	215	118	162	101	125	1,747
Common yellowthroat	2	-	-	-	13	30	29	9	34	17	23	30	21	8	2	216
Cooper's hawk*	2	1	-	-	17	17	14	5	8	15	10	14	7	5	3	115
Cordilleran flycatcher*	-	-	1	-	4	1	2	3	3	3	1	2	-	-	1	20
Dark-eyed junco	-	4	-	-	40	19	47	35	4	3	8	2	6	5	4	173
Downy woodpecker	-	-	-	-	5	11	3	8	15	1	8	3	-	-	-	54
Dusky flycatcher*	4	8	21	-	51	111	99	136	108	98	100	91	130	71	33	1,028
Dusky grouse*	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	2
Eared grebe	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Eastern kingbird	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Eurasian collared-dove	-	-	1	5	-	-	1	-	-	19	4	8	12	2	6	52
European starling	-	-	145	1	15	21	11	17	-	37	22	20	1	-	146	290

Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015, cont.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Evening grosbeak*	-	-	-	-	-	-	1	-	-	-	2	2	2	-	-	7
Ferruginous hawk*	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Gadwall	-	-	-	-	2	1	4	-	-	-	3	-	3	4	-	17
Gambel's quail	-	4	2	4	9	15	-	1	7	15	8	7	12	6	10	90
Golden eagle*	-	1	-	-	8	10	4	6	1	-	-	7	-	4	1	41
Grace's warbler*	-	2	3	-	15	31	40	31	26	19	33	23	11	6	5	240
Gray catbird	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
Gray flycatcher	2	45	11	-	160	116	108	142	265	227	158	127	60	63	58	1,484
Gray vireo*	9	45	-	-	137	128	104	150	254	163	121	155	182	53	54	1,501
Great blue heron	-	-	1	-	10	3	3	3	1	6	3	2	1	-	1	33
Great horned owl	-	-	-	-	3	-	-	1	-	1	-	1	-	1	-	7
Greater roadrunner	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Greater sage-grouse*	-	-	-	-	19	2	1	-	-	-	-	5	-	4	-	31
Green-tailed towhee	1	2	156	-	350	463	364	302	330	220	385	526	414	265	159	3,778
Green-winged teal	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	3
Hairy woodpecker	8	1	-	-	13	21	22	17	28	21	20	30	23	2	9	206
Hammond's flycatcher*	-	-	-	-	-	-	9	9	21	-	1	-	-	-	-	40
Hermit thrush	-	4	-	-	15	21	2	-	24	14	46	28	5	9	4	168
Horned lark*	-	-	16	-	31	41	43	23	50	32	29	23	17	19	16	324
House finch	57	37	17	11	286	363	446	429	577	376	407	378	317	196	122	3,897
House sparrow	-	-	-	-	-	-	-	-	-	1	2	3	5	-	-	11
House wren	38	-	8	-	59	62	39	55	61	48	88	67	81	32	46	638
Indigo bunting	1	-	-	-	-	1	-	-	6	-	-	6	5	-	1	19
Juniper titmouse*	5	44	2	-	147	120	138	159	277	198	154	125	129	64	51	1,562
Killdeer	-	-	1	-	4	3	2	3	5	1	-	2	5	1	1	27
Lark bunting*	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Lark sparrow	6	9	43	-	140	157	104	51	181	151	159	159	187	97	58	1,444
Lazuli bunting*	79	11	8	-	183	157	226	190	284	253	190	156	128	108	98	1,973
Lesser goldfinch	24	13	-	-	47	77	120	87	191	50	68	55	50	72	37	854
Lesser scaup	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2

Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015, cont.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Lewis's woodpecker*	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Lincoln's sparrow	-	-	-	-	1	-	-	2	1	-	-	-	1	-	-	5
Loggerhead shrike*	-	-	-	-	3	1	-	1	-	5	-	2	3	-	-	15
Long-eared owl	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2
Lucy's warbler	8	-	-	-	1	-	11	20	46	7	24	42	32	6	8	197
MacGillivray's warbler*	-	-	-	-	3	9	3	4	7	11	-	3	2	6	-	48
Mallard	2	-	2	-	2	16	3	17	5	4	9	5	13	4	4	82
Marsh wren	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Mountain bluebird*	-	13	49	-	160	138	179	116	145	151	156	131	142	96	62	1,476
Mountain chickadee*	-	4	1	-	34	22	25	14	26	8	36	25	18	20	5	233
Mourning dove	31	45	32	3	426	573	520	402	283	441	344	219	513	217	111	4,049
Northern flicker*	9	6	21	-	50	57	58	22	50	73	64	63	59	32	36	564
Northern goshawk*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Northern harrier*	1	-	-	-	2	4	5	6	2	9	2	7	-	1	1	39
Northern mockingbird	-	5	-	-	-	25	11	17	38	32	23	34	15	4	5	204
Northern pintail	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	4
Northern rough-winged swallow	6	-	1	-	7	7	6	8	26	7	12	7	8	16	7	111
Northern shoveler	2	-	-	-	-	-	4	-	-	-	-	-	-	3	2	9
Olive-sided flycatcher*	-	-	-	-	16	4	4	2	18	-	2	-	-	-	-	46
Orange-crowned warbler	5	2	-	-	2	2	2	2	-	2	3	3	3	6	7	32
Osprey	-	-	1	-	1	-	-	1	-	-	1	-	-	-	1	4
Peregrine falcon*	2	-	-	-	5	5	7	10	3	8	5	2	12	4	2	63
Phainopepla	1	-	-	-	-	-	-	-	3	-	-	5	3	4	1	16
Pine siskin*	11	7	9	-	4	22	4	17	16	18	71	12	34	3	27	228
Pinyon jay*	1	33	30	-	122	177	229	74	97	327	112	153	144	57	64	1,556
Plumbeous vireo*	23	13	3	-	147	165	139	131	150	216	158	84	88	48	39	1,365
Prairie falcon*	-	-	1	1	2	-	-	2	1	1	3	-	1	3	2	15
Pygmy nuthatch*	-	2	4	-	13	10	23	7	10	9	26	12	13	14	6	143
Red crossbill	-	-	-	-	1	23	11	-	23	6	3	9	11	-	-	87
Red-breasted nuthatch*	-	2	-	-	11	5	7	1	2	1	5	-	9	-	2	43

Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015, cont.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Red-naped sapsucker*	-	-	-	-	-	2	-	1	2	-	-	1	-	-	-	6
Red-tailed hawk	1	-	3	-	12	17	11	9	12	5	8	10	8	4	4	100
Red-winged blackbird	-	-	1	-	-	4	1	2	1	2	8	11	17	1	1	48
Ring-billed gull	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
Rock pigeon	-	-	-	-	2	5	3	-	-	3	3	6	-	-	-	22
Rock wren*	32	38	52	1	315	403	349	303	425	257	369	163	259	125	123	3,091
Ruby-crowned kinglet*	1	2	-	-	4	4	3	9	11	10	7	8	2	3	3	64
Ruddy duck	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Sagebrush sparrow*	-	-	7	-	43	33	31	21	41	10	18	12	9	10	7	235
Sage thrasher*	-	-	68	-	93	95	88	156	128	150	132	60	100	38	68	1,108
Sandhill crane*	-	-	-	-	-	1	-	2	1	-	-	1	-	-	-	5
Savannah sparrow	-	-	-	-	-	1	1	-	-	-	-	2	-	-	-	4
Say's phoebe*	15	1	5	4	102	98	63	94	124	91	129	68	73	29	25	896
Scott's oriole	1	1	-	-	-	-	1	5	6	-	-	8	6	4	2	32
Sharp-shinned hawk	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	4
Short-eared owl*	-	-	-	-	-	4	-	-	1	-	-	-	-	-	-	5
Song sparrow	12	-	3	-	62	76	69	62	39	10	45	29	20	31	15	458
Spotted sandpiper	2	-	1	-	1	2	7	-	3	8	-	-	2	4	3	30
Spotted towhee	168	48	47	-	432	610	500	405	541	548	624	537	626	323	263	5,409
Steller's jay	-	-	4	-	5	5	16	9	5	9	3	2	14	9	4	81
Summer tanager	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Swainson's thrush*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Townsend's solitaire*	-	-	-	-	5	6	13	6	19	12	12	12	9	2	-	96
Tree swallow*	-	-	-	-	3	40	28	102	5	2	88	1	4	4	-	277
Turkey vulture	-	-	1	-	25	30	29	9	19	24	22	31	12	11	1	213
Veery*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Vesper sparrow*	-	10	243	-	381	495	489	472	483	609	675	571	446	237	253	5,111
Violet-green swallow*	125	9	22	-	283	514	546	429	415	299	368	471	371	294	156	4,146
Virginia's warbler*	16	10	15	-	122	109	102	161	46	123	100	110	72	62	41	1,048
Warbling vireo*	21	3	6	-	44	58	67	51	39	32	35	45	43	48	30	492

Appendix A. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2015, and yearly species totals, 2005–2015, cont.

Species	# of individuals observed per habitat, 2015				# of individuals observed per year and total (all pointcount surveys)											
	LR	PJ	SA	PISP ¹	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Western bluebird	1	-	5	-	17	19	20	18	29	9	22	17	31	8	6	196
Western grebe	-	-	2	-	-	1	-	-	-	-	2	-	10	2	2	17
Western kingbird	4	2	3	5	2	5	2	6	28	23	12	20	23	10	14	145
Western meadowlark	9	30	144	-	229	239	182	213	282	227	312	267	184	66	183	2,384
Western screech-owl	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Western scrub-jay	11	25	12	-	117	90	80	85	59	88	78	58	81	46	48	830
Western tanager	13	3	4	-	45	69	72	59	45	58	41	61	40	20	20	530
Western wood-pewee	11	-	5	3	40	44	64	44	56	28	25	30	37	26	19	413
White-breasted nuthatch	1	3	1	-	27	28	30	17	23	27	24	34	28	11	5	254
White-crowned sparrow	1	-	-	2	-	6	4	16	2	3	13	13	5	-	3	65
Whitefaced ibis*	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
White-throated sparrow	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
White-throated swift	79	49	5	-	573	676	815	514	363	295	389	380	225	170	133	4,533
Wild turkey	6	-	-	-	6	14	2	7	17	10	11	13	4	15	6	105
Williamson's sapsucker*	-	-	-	-	1	-	1	1	-	-	-	2	1	-	-	6
Willow flycatcher*	1	-	-	-	1	3	3	-	1	-	-	3	-	-	1	12
Wilson's warbler*	1	-	-	-	-	4	-	3	3	6	1	2	-	4	1	24
Yellow warbler	87	-	11	-	158	175	155	182	292	259	193	283	191	132	98	2,118
Yellow-billed cuckoo*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Yellow-breasted chat	26	1	5	-	52	58	54	49	72	89	63	100	101	31	-	669
Yellow-headed blackbird	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1
Yellow-rumped warbler	2	10	-	-	26	66	32	51	15	75	102	46	22	8	12	455

*Priority species

¹PISP species numbers include point-count data only.

LR=low-elevation riparian; PJ=pinyon-juniper; SA=sage shrubland; PISP=Pipe Spring National Monument.

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
American crow	1	1	3	3	-	7	8	2	-	1	-	1	27
American dipper	-	-	-	-	-	-	-	4	-	-	-	6	10
American goldfinch	23	3	1	11	5	1	2	63	1	1	-	4	115
American kestrel*	11	2	33	6	1	3	35	36	8	-	5	-	140
American pipit	-	-	-	-	-	-	1	-	-	-	-	-	1
American robin	17	78	187	4	57	26	208	491	43	8	3	69	1,191
American wigeon	-	-	-	-	-	-	-	-	9	-	-	-	9
Ash-throated flycatcher	716	7	45	897	393	250	5	629	-	504	25	249	3,720
Bank swallow*	-	-	-	-	-	-	2	1	-	-	-	1	4
Barn swallow	2	-	3	1	-	-	26	7	7	-	2	1	49
Belted kingfisher	-	-	-	-	-	-	-	-	-	-	-	1	1
Bewick's wren*	149	20	3	465	292	184	3	171	-	171	12	84	1,554
Black phoebe	2	-	-	-	-	-	-	-	-	43	6	131	182
Black-billed magpie*	-	204	8	-	1	-	279	218	192	-	-	-	902
Black-capped chickadee	10	4	5	-	-	-	-	-	-	4	-	2	25
Black-chinned hummingbird	64	6	8	152	53	71	8	74	-	54	2	86	578
Black-chinned sparrow*	-	-	1	-	-	-	-	-	-	1	-	40	42
Black-crowned night-heron	-	-	-	-	-	-	-	-	-	-	1	-	1
Black-headed grosbeak	26	115	15	20	24	10	45	60	-	22	6	75	418
Black-throated gray warbler*	144	302	82	580	631	370	-	1,720	-	499	4	136	4,468
Black-throated sparrow	342	-	-	480	564	47	9	335	-	14	87	85	1,963
Blue grosbeak	99	1	-	40	17	1	-	14	-	3	4	18	197
Blue-gray gnatcatcher	507	148	109	760	357	271	73	848	1	357	4	260	3,695
Blue-winged teal	-	-	-	-	-	-	-	-	1	-	-	-	1
Bobolink*	-	-	-	-	-	-	-	1	-	-	-	-	1
Brewer's blackbird	1	-	14	-	-	4	84	27	204	-	-	4	338
Brewer's sparrow*	10	627	183	20	37	3	2,436	1,497	1,256	-	2	2	6,073
Broad-tailed hummingbird*	18	48	13	29	53	42	215	84	1	26	-	30	559
Brown creeper	-	-	1	-	-	-	-	-	-	-	-	-	1
Brown-headed cowbird	11	49	57	82	33	25	111	217	1	-	14	30	630

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015, cont.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
Bullock's oriole	67	-	1	22	5	-	16	61	-	5	24	8	209
Bushtit	94	29	2	208	81	75	-	84	-	67	-	33	673
California gull	-	-	-	-	-	-	17	-	-	-	-	-	17
Canada goose	-	-	17	-	1	-	137	455	-	-	-	2	612
Canyon wren	34	3	1	40	37	57	-	55	-	119	2	90	438
Cassin's finch*	1	29	48	11	1	2	9	26	-	1	-	2	130
Cassin's kingbird	-	-	-	3	1	-	-	-	-	-	54	18	76
Cedar waxwing	-	-	3	1	-	-	-	1	-	-	-	-	5
Chipping sparrow*	45	109	283	64	161	129	80	1,067	1	30	-	148	2,117
Chukar	-	-	-	2	3	8	-	10	-	-	-	6	29
Clark's nutcracker*	-	24	140	32	18	2	1	106	12	3	-	-	338
Cliff swallow	32	-	21	14	-	4	476	50	35	7	-	2	641
Common grackle	-	-	-	-	-	-	3	-	-	-	-	-	3
Common loon	-	-	-	-	-	-	1	-	-	-	-	-	1
Common merganser	-	-	-	-	-	-	23	4	-	-	-	14	41
Common nighthawk*	1	1	-	1	18	2	4	20	-	2	-	-	49
Common poorwill*	1	1	1	1	-	-	-	2	-	-	-	-	6
Common raven	193	41	67	131	92	126	212	627	33	150	37	38	1,747
Common yellowthroat	5	-	1	172	-	-	-	29	-	6	-	3	216
Cooper's hawk*	33	7	1	15	8	7	3	38	-	1	1	1	115
Cordilleran flycatcher*	1	2	1	7	2	-	-	2	-	4	-	1	20
Dark-eyed junco	1	6	112	4	30	3	-	2	-	8	-	7	173
Downy woodpecker	-	-	7	8	3	-	-	6	-	3	1	26	54
Dusky flycatcher*	14	145	148	11	17	8	650	20	-	10	-	5	1,028
Dusky grouse*	-	-	1	-	-	-	-	1	-	-	-	-	2
Eared grebe	-	-	-	-	-	-	1	-	-	-	-	-	1
Eastern kingbird	-	-	-	-	-	-	-	2	-	-	-	-	2
Eurasian collared-dove	-	-	-	-	2	1	-	1	-	-	48	-	52
European starling	30	-	-	-	-	-	15	221	2	-	22	-	290
Evening grosbeak*	1	5	1	-	-	-	-	-	-	-	-	-	7
Ferruginous hawk*	-	-	-	-	-	-	-	-	1	-	-	-	1
Gadwall	-	-	-	-	-	-	7	4	6	-	-	-	17

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015, cont.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
Gambel's quail	-	-	2	1	-	1	-	2	-	2	42	40	90
Golden eagle*	2	3	1	1	6	6	12	7	1	-	-	2	41
Grace's warbler*	-	-	236	-	-	1	-	-	-	3	-	-	240
Gray catbird	1	-	-	1	-	-	-	-	-	-	-	-	2
Gray flycatcher	40	102	31	109	234	119	18	721	-	83	1	26	1,484
Gray vireo*	190	-	3	251	244	274	3	301	-	103	3	129	1,501
Great blue heron	1	-	-	-	-	-	27	4	-	-	-	1	33
Great horned owl	-	-	-	3	1	-	1	2	-	-	-	-	7
Greater roadrunner	-	-	-	-	-	-	-	-	-	-	-	1	1
Greater sagegrouse*	-	-	-	-	-	-	-	4	27	-	-	-	31
Green-tailed towhee*	6	896	182	16	3	5	1,962	545	159	2	1	1	3,778
Green-winged teal	-	-	-	-	-	-	-	-	3	-	-	-	3
Hairy woodpecker	3	12	31	53	12	3	-	42	-	32	-	18	206
Hammond's flycatcher*	-	-	18	1	14	-	-	7	-	-	-	-	40
Hermit thrush	1	140	16	4	1	1	1	2	-	2	-	-	168
Horned lark*	6	10	15	-	-	-	93	24	176	-	-	-	324
House finch	500	21	104	883	542	584	145	575	5	278	98	162	3,897
House sparrow	-	-	-	-	-	-	3	-	-	-	8	-	11
House wren	10	42	3	2	3	1	99	225	3	15	1	234	638
Indigo bunting	4	-	-	1	2	-	1	1	-	-	-	10	19
Juniper titmouse*	83	8	8	421	293	194	1	284	-	204	6	60	1,562
Killdeer	-	-	-	1	-	-	3	-	23	-	-	-	27
Lark bunting*	-	-	-	-	-	-	-	2	-	-	-	-	2
Lark sparrow	30	1	8	42	15	-	24	1,291	4	-	1	28	1,444
Lazuli bunting*	278	-	-	42	68	77	12	1,332	-	13	-	151	1,973
Lesser goldfinch	134	-	15	81	74	51	1	131	-	70	10	287	854
Lesser scaup	-	-	-	-	-	-	2	-	-	-	-	-	2
Lewis's woodpecker	-	-	-	-	1	-	-	-	-	-	-	-	1
Lincoln's sparrow	-	-	-	-	-	2	-	3	-	-	-	-	5
Loggerhead shrike*	3	-	-	-	1	-	2	7	2	-	-	-	15
Long-eared owl	1	-	-	1	-	-	-	-	-	-	-	-	2
Lucy's warbler	30	-	-	118	41	-	-	-	-	1	-	7	197

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015, cont.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
MacGillivray's warbler*	6	4	-	9	-	4	17	1	-	6	1	-	48
Mallard	6	2	1	-	-	-	25	21	7	1	-	19	82
Marsh wren	-	-	-	-	-	-	1	-	-	-	-	-	1
Mountain bluebird*	14	97	294	10	28	9	291	682	42	8	-	1	1,476
Mountain chickadee*	1	72	99	-	5	3	-	43	-	10	-	-	233
Mourning dove	603	120	120	364	347	463	177	1,513	51	90	20	181	4,049
Northern flicker*	24	49	112	14	23	15	106	140	56	16	-	9	564
Northern goshawk*	-	-	1	-	-	-	-	-	-	-	-	-	1
Northern harrier*	1	-	1	-	-	-	5	15	17	-	-	-	39
Northern mockingbird	42	3	7	4	32	-	27	13	-	-	27	49	204
Northern pintail	-	-	-	-	-	-	-	-	4	-	-	-	4
Northern rough-winged swallow	4	-	-	-	6	1	8	20	-	-	9	63	111
Northern shoveler	-	-	-	-	-	-	2	5	-	-	-	2	9
Olive-sided flycatcher*	-	4	36	-	4	1	-	-	-	-	-	1	46
Orange-crowned warbler	6	2	3	2	1	2	6	2	-	3	-	5	32
Osprey	-	-	-	-	-	1	2	1	-	-	-	-	4
Peregrine falcon*	1	-	1	1	2	16	6	7	-	23	5	1	63
Phainopepla	-	-	-	-	-	-	-	-	-	-	-	16	16
Pine siskin*	34	28	72	38	13	1	5	20	1	7	2	7	228
Pinyon jay*	56	2	76	288	275	269	-	551	1	32	1	5	1,556
Plumbeous vireo*	55	159	206	133	101	100	53	255	-	183	-	120	1,365
Prairie falcon*	2	-	1	2	-	-	6	-	3	-	1	-	15
Pygmy nuthatch*	-	-	143	-	-	-	-	-	-	-	-	-	143
Red crossbill	-	6	78	-	-	-	-	-	-	2	-	1	87
Red-breasted nuthatch*	2	9	22	2	1	3	-	4	-	-	-	-	43
Red-naped sapsucker*	-	1	-	3	-	-	-	1	-	-	-	1	6
Red-tailed hawk	9	4	15	7	1	9	15	31	4	3	-	2	100
Red-winged blackbird	-	-	-	-	-	-	6	30	11	-	1	-	48
Ring-billed gull	-	-	-	-	-	-	2	-	-	-	-	-	2
Rock pigeon	-	-	-	-	-	21	-	1	-	-	-	-	22
Rock wren*	274	6	23	282	299	176	624	1,034	76	192	19	86	3,091
Ruby-crowned kinglet*	4	31	11	2	1	7	-	3	-	5	-	-	64

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015, cont.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
Ruddy duck	-	-	-	-	-	-	2	-	-	-	-	-	2
Sage thrasher*	1	10	41	-	-	-	587	61	407	-	1	-	1,108
Sagebrush sparrow*	-	-	-	1	-	-	13	221	-	-	-	-	235
Sandhill crane*	-	-	-	-	-	-	-	-	5	-	-	-	5
Savannah sparrow	-	-	-	-	-	-	-	1	3	-	-	-	4
Say's phoebe*	176	15	19	124	107	27	76	261	5	44	23	19	896
Scott's oriole	5	-	-	-	14	-	-	1	-	-	-	12	32
Sharp-shinned hawk	-	-	-	-	1	-	2	1	-	-	-	-	4
Short-eared owl*	-	-	-	-	-	-	-	4	1	-	-	-	5
Song sparrow	11	-	-	15	8	4	18	233	4	-	-	165	458
Spotted sandpiper	-	-	-	5	4	-	1	13	-	-	-	7	30
Spotted towhee	547	323	191	885	245	263	107	1,795	-	700	6	347	5,409
Steller's jay	-	2	69	-	-	-	8	1	-	-	-	1	81
Summer tanager	-	-	-	-	-	-	-	-	-	-	1	-	1
Swainson's thrush*	-	1	-	-	-	-	-	-	-	-	-	-	1
Townsend's solitaire*	-	7	64	-	5	-	8	9	-	3	-	-	96
Tree swallow*	49	2	12	31	8	4	105	20	15	4	-	27	277
Turkey vulture	11	5	5	20	-	44	21	51	-	48	-	8	213
Veery*	-	-	1	-	-	-	-	-	-	-	-	-	1
Vesper sparrow*	1	709	863	1	1	-	882	1,417	1,237	-	-	-	5,111
Violet-green swallow*	983	58	148	701	200	203	363	649	37	514	13	277	4,146
Virginia's warbler*	34	245	95	86	22	112	214	67	-	155	-	18	1,048
Warbling vireo*	50	6	26	25	12	30	102	105	-	6	-	130	492
Western bluebird	1	2	126	32	-	1	-	13	2	1	-	18	196
Western grebe	-	-	-	-	-	-	15	2	-	-	-	-	17
Western kingbird	15	-	9	6	12	-	7	24	-	-	36	36	145
Western meadowlark	36	20	335	-	-	-	127	1,222	618	-	-	26	2,384
Western screech-owl	-	-	-	1	-	-	-	-	-	-	-	-	1
Western scrub-jay	78	76	9	192	66	75	18	161	1	86	2	66	830
Western tanager	29	81	230	23	29	4	4	58	-	35	2	35	530
Western wood-pewee	18	3	80	70	19	1	23	11	-	25	3	160	413
White-breasted nuthatch	-	47	133	2	1	9	1	44	-	12	-	5	254

Appendix B. All bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by park unit, 2005–2015, cont.

Species	ARCH	BLCA	BRCA	CANY	CARE	COLM	CURE	DINO	FOBU	NABR	PISP	ZION	Total
White-crowned sparrow	13	1	-	16	-	-	16	5	2	-	12	-	65
White-faced ibis*	-	-	-	-	-	-	1	-	-	-	-	-	1
White-throated sparrow	1	-	-	-	-	-	-	-	-	-	-	-	1
White-throated swift	1,111	302	27	389	262	658	111	441	-	795	20	417	4,533
Wild turkey	5	3	2	-	2	-	-	8	-	-	-	85	105
Williamson's sapsucker*	-	-	6	-	-	-	-	-	-	-	-	-	6
Willow flycatcher*	1	-	-	9	1	1	-	-	-	-	-	-	12
Wilson's warbler*	9	-	-	7	1	-	-	5	-	1	-	1	24
Yellow warbler	54	-	1	104	23	3	77	1,216	-	82	10	548	2,118
Yellow-billed cuckoo*	1	-	-	-	-	-	-	-	-	-	-	-	1
Yellow-breasted chat	57	-	-	65	18	-	-	524	-	1	-	36	701
Yellow-headed blackbird	-	-	-	-	-	-	-	-	-	-	1	-	1
Yellow-rumped warbler	52	11	203	51	42	4	10	47	-	10	1	24	455
Grand total	8,522	5,780	6,317	10,351	6,795	5,602	11,918	27,989	4,827	6,035	754	5,913	100,803

ARCH=Arches National Park, BLCA=Black Canyon of the Gunnison National Park, BRCA=Bryce Canyon National Park, CANY=Canyonlands National Park, CARE=Capitol Reef National Park, COLM=Colorado National Monument, CURE=Curecanti National Recreation Area, DINO=Dinosaur National Monument, FOBU=Fossil Butte National Monument, NABR=Natural Bridges National Monument, PISP=Pipe Spring National Monument, ZION=Zion National Park

*Priority species

Appendix C. Priority species observed on transects in the Northern Colorado Plateau Network, with conservation and management designations and species totals per habitat, 2005–2015.

Common name	Management designations							Total number of individual observed per habitat, 2005–2015 ⁵			
	State agencies		USFWS ³			Partners in Flight ⁴					
	CPW ¹	UDWR ²	BCR10	BCR16	Reg 6	PIF BCR10	PIF BCR16	LR	PJ	SA	PISP ⁶
American dipper	-	-	-	-	-	UCS, RS	-	10	-	-	-
American kestrel	-	-	-	-	-	RC	-	20	15	100	14
Bank swallow	-	-	-	-	-	CBSD	CBSD	1	1	2	-
Belted kingfisher	-	-	-	-	-	CBSD	CBSD	1	-	-	-
Bewick’s wren	-	-	-	-	BCC	-	-	586	913	43	35
Black-billed magpie	-	-	-	-	-	-	UCS	7	23	862	-
Black-chinned hummingbird	-	-	-	-	-	-	-	389	163	24	2
Black-chinned sparrow	-	-	-	-	-	-	UCC, CBSD	20	21	1	-
Black-throated gray warbler	-	-	-	-	-	-	RC	712	3,528	224	5
Bobolink	T2	WSC	-	-	-	UCC, CBSD	-	1	-	-	-
Brewer’s sparrow	T2	-	BCC	BCC	-	RC, CBSD	RC, CBSD	38	84	5,949	2
Broad-tailed hummingbird	-	-	-	-	-	-	UCS, RS	149	140	270	2
Cassin’s finch	T2	-	BCC	BCC	BCC	UCS, UCC, RC, RS, CBSD	UCC, RC, CBSD	8	75	47	-
Chipping sparrow	-	-	-	-	-	UCS, RC, RS	-	298	1,157	662	-
Clark’s nutcracker	-	-	-	-	-	UCS, RS	UCS, RC, RS	46	135	157	-
Common nighthawk	-	-	-	-	-	CBSD	RC, CBSD	2	36	11	-
Common poorwill	-	-	-	-	-	-	RC	1	3	2	3
Cooper’s hawk	-	-	-	-	-	-	UCS, RS	78	26	10	2
Cordilleran flycatcher	-	-	-	-	-	-	UCS, RS	15	4	1	-
Dusky flycatcher	-	-	-	-	-	UCS	-	39	269	720	-
Dusky grouse	-	-	-	-	-	UCS, RS	UCS, RS	-	-	2	-
Evening grosbeak	-	-	-	-	-	RC	-	1	2	4	-
Ferruginous hawk	T2, SSC	WSC	BCC	BCC	BCC	RC	RC	1	2	4	-
Golden eagle	T1	-	-	BCC	BCC	-	RC	4	17	20	-
Grace’s warbler	T2	-	-	BCC	-	-	UCS, RS	3	131	106	-
Gray vireo	T2	-	-	BCC	BCC	-	UCC, UCS, RC, RS	214	1,217	67	3

Appendix C. Priority species observed on transects in the Northern Colorado Plateau Network, with conservation and management designations and species totals per habitat, 2005–2015, cont.

Common name	Management designations						Total number of individual observed per habitat, 2005–2015 ⁵				
	State agencies		USFWS ³			Partners in Flight ⁴					
	CPW ¹	UDWR ²	BCR10	BCR16	Reg 6	PIF BCR10	PIF BCR16	LR	PJ	SA	PISP ⁶
Greater sage-grouse	T1, SSC	FCS	-	-	-	UCC, UCS, TNC, RC, RS	TNC, UCC, RC	-	-	31	-
Green-tailed towhee	-	-	-	-	-		UCS, RS	29	112	3,636	1
Hammond’s flycatcher	-	-	-	-	-	UCS	-	1	34	5	-
Horned lark	-	-	-	-	-	CBSD	CBSD	-	6	318	-
Juniper titmouse	T2	-	-	BCC	-	-	UCS, RS	283	1,220	53	8
Lark bunting	T2	-	-	-	-	CBSD	-	2	-	-	-
Lazuli bunting	T2	-	-	-	-	UCS	UCS, RC, RS	1,621	112	240	6
Lewis’s woodpecker	T2	WSC	BCC	BCC	BCC	RC	RC, RS, UCS	1	-	-	-
Loggerhead shrike	T2	-	BCC	-	BCC	CBSD	RC, CBSD	1	6	8	-
MacGillivray’s warbler	-	-	-	-	-	UCS	-	21	8	18	1
Mountain bluebird	-	-	-	-	-	UCS	UCS, RC, RS	59	503	914	-
Mountain chickadee	-	-	-	-	-	UCS	-	15	175	43	-
Northern flicker	-	-	-	-	-	UCS, CBSD	UCS, RS, CBSD	106	138	320	-
Northern goshawk	T2	CAS	-	-	-	UCS, RS	-	-	-	1	-
Northern harrier	T2	-	-	-	-	-	-	11	1	27	-
Olive-sided flycatcher	T2	-	BCC	-	-	TNC, UCC, RC	TNC, UCC, RC	1	10	35	-
Peregrine falcon	T2, SSC	-	BCC	BCC	BCC	-	-	31	19	8	5
Pine siskin	-	-	-	-	-	UCS, RS, CBSD	UCS, RS, CBSD	69	76	81	25
Pinyon jay	-	-	-	BCC	BCC	TNC, UCC, RC	TNC, UCC, RC, UCS, RS	71	1,138	346	1
Plumbeous vireo	-	-	-	-	-	-	UCS, RS	638	588	139	-
Prairie falcon	T2	-	-	BCC	BCC	-	RC	4	-	10	1
Pygmy nuthatch	-	-	-	-	-	-	UCS, RS	-	74	69	-
Red-breasted nuthatch	-	-	-	-	-	UCS	-	1	24	22	-
Red-naped sapsucker	-	-	-	-	-	UCS, RC	-	5	-	1	-
Rock wren	-	-	-	-	-	CBSD	UCS, RS, CBSD	1,030	964	1,078	20
Ruby-crowned kinglet	-	-	-	-	-	UCS	-	12	42	10	-
Sagebrush sparrow	T2	-	BCC	-	BCC	RC	RC	3		232	-

Appendix C. Priority species observed on transects in the Northern Colorado Plateau Network, with conservation and management designations and species totals per habitat, 2005–2015, cont.

Common name	Management designations						Total number of individual observed per habitat, 2005–2015 ⁵				
	State agencies		USFWS ³			Partners in Flight ⁴					
	CPW ¹	UDWR ²	BCR10	BCR16	Reg 6	PIF BCR10	PIF BCR16	LR	PJ	SA	PISP ⁶
Sage thrasher	-	-	BCC	-	BCC	-	-	-	2	1,105	-
Sandhill crane	T1, SSC	-	-	-	-	-	-	-	-	5	-
Say’s phoebe	-	-	-	-	-	-	UCS	513	169	191	39
Short-eared owl	T2	WSC	-	-	BCC	RC, CBSD	-	-	-	5	-
Swainson’s Hawk	T2	-	BCC	-	-	-	-	-	-	1	-
Swainson’s thrush	-	-	-	-	-	UCS	-	-	1	-	-
Townsend’s solitaire	-	-	-	-	-	UCS, RS	-	5	57	34	-
Tree swallow	-	-	-	-	-	UCS	-	121	23	133	-
Veery	T2	-	-	BCC	-	-	-	-	-	1	-
Vesper sparrow	-	-	-	-	-	RC	-	7	204	4,904	-
Violet-green swallow	-	-	-	-	-	-	UCS	2,918	674	551	56
Virginia’s warbler	T2	-	-	-	-	-	UCC, UCS, RS	345	438	265	-
Warbling vireo	-	-	-	-	-	UCS	UCS	308	54	130	3
White-faced ibis	T2	-	-	-	-	-	-	-	-	1	-
Williamson’s sapsucker	-	-	BCC	-	-	UCS, RS	UCS, RS	-	1	5	-
Willow flycatcher	T1, FE, SE	FE	BCC	BCC	BCC	UCS, RS	-	11	1	-	-
Wilson’s warbler	-	-	-	-	-	CBSD	CBSD	24	-	-	-
Yellow-billed cuckoo	T1, SSC, FT	FCS	BCC	BCC	-	-	-	1	-	-	-

¹ CPW=Colorado Parks and Wildlife; FC=Federal Candidate species, FT=Federally Threatened species, FE=Federally Endangered species, SE=State Endangered Species, ST=State Threatened species, T1=Tier 1 species, T2=Tier 2 species, SSC=State Special Concern species (CPW 2015).

² UDWR=Utah Division of Wildlife Resources; FCS=Federal Candidate Species, FTS=Federally Threatened Species, FES=Federally Endangered Species, CAS=Conservation Agreement Species, WSC=Wildlife Species of Concern (UDWR 2011).

³ USFWS=U.S. Fish and Wildlife Service; BCR10=Bird Conservation Region 10 (Northern Rockies), BCR16=Bird Conservation Region 16 (Southern Rockies/Colorado Plateau) FES=Federally Endangered Species, BCC=Bird of Conservation Concern for Region 6 (Mountain-Prairie Region) (USFWS 2008).

⁴ Partners In Flight, BCR10=Bird Conservation Region 10, BCR16=Bird Conservation Region 16, TNC=Tri-National Concern Species, UCC=U.S.-Canada Concern Species, RC=Regional Concern Species, CBSD=Common Bird in Steep Decline, UCS=U.S.-Canada Stewardship Species, RS=Regional Stewardship Species (PIFSC 2012).

⁵ LR=low-elevation riparian, PJ=pinyon-juniper, SA=sage shrubland

⁶ PISP=Pipe Spring National Monument. Numbers for PISP include point-count data only.

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