Monitoring Birds of the National Park Service, Northern Colorado Plateau Network (NCPN): 2009 Field Season Report

March 2010

ROCKY MOUNTAIN BIRD OBSERVATORY

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***Mission**: To conserve birds and their habitats*

***Vision**: Native bird populations are sustained in healthy ecosystems*

***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.*

RMBO accomplishes its mission by:
- ***Monitoring** long-term bird population trends to provide a scientific foundation for conservation action.*
- ***Researching** bird ecology and population response to anthropogenic and natural processes to evaluate and adjust management and conservation strategies using the best available science.*
- ***Educating** people of all ages through active, experiential programs that create an awareness and appreciation for birds.*
- ***Fostering** good stewardship on private and public lands through voluntary, cooperative partnerships that create win-win situations for wildlife and people.*
- ***Partnering** with state and federal natural resource agencies, private citizens, schools, universities, and other non-governmental organizations to build synergy and consensus for bird conservation.*
- ***Sharing** the latest information on bird populations, land management and conservation practices to create informed publics.*
- ***Delivering** bird conservation at biologically relevant scales by working across political and jurisdictional boundaries in western North America.*

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EXECUTIVE SUMMARY

In 2009, the Rocky Mountain Bird Observatory, in cooperation with its partner, the National Park Service, completed its fifth year of a habitat-based landbird monitoring program. This program is designed to provide rigorous population trend data on most diurnal, regularly occurring breeding landbird species throughout the Northern Colorado Plateau Inventory and Monitoring Network. This information is useful for land managers and supports the National Park Service's goal of developing long-term monitoring of all biological resources in all park units. The program, *Monitoring Birds of the National Park Service, Northern Colorado Plateau Network,* is consistent with goals emphasized by the U.S. North American Bird Conservation Initiative Committee (U.S. NABCI Monitoring Subcommittee, 2007).

We survey 45 transects within 11 National Park units. We place 15 transects in each of the three habitats of interest: Low-Elevation Riparian, Pinyon-Juniper, and Sage Shrubland. To increase sample size, we survey all transects twice during the breeding season. In 2009, we conducted an inventory on Pipe Springs National Monument.

This year we surveyed 100% of the assigned transects with 90 transect visits completed. We recorded 11,640 birds of 121 species. We detected 3,903 birds of 83 species in Low-Elevation Riparian, 3,986 birds of 83 species in Pinyon-Juniper, 3,566 birds of 86 species in Sage Shrubland. We detected a total of and 39 species in Pipe Springs National Monument.

We pooled the 2005-2009 data and used program DISTANCE 6.0 (Thomas et al. 2010) to generate density estimates for species with sufficient data. This year we calculated density estimates for 56 species in at least one habitat. The data yielded robust density estimates (Coefficient of Variation, CV < 50%) for 55 species in 2009. We should be able to reach our target of detecting a population change of at least 3% within 30 years for these 55 species. In Low-elevation Riparian, the following five species had the highest densities: Black-chinned Hummingbird, Violet-green Swallow, Blue-gray Gnatcatcher, Yellow Warbler, and Spotted Towhee. In Pinyon-Juniper habitat, the following five species had the highest densities: Blue-gray Gnatcatcher, Black-throated Gray Warbler, Bushtit, Juniper Titmouse, and Chipping Sparrow. In Sage Shrubland, the following five species had the highest densities: Brewer's Sparrow, Vesper Sparrow, Green-tailed Towhee, Blue-gray Gnatcatcher, and Lark Sparrow.

RMBO recorded 46 bird species that are of conservation and management concern throughout NCPN. We calculated density estimates for 24 of these species.

ACKNOWLEDGEMENTS

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We thank Steve Garman and Dustin Perkins of the National Park Service for logistical assistance before, during, and after the field season. We thank the superintendents, resource managers, and biologists in the individual parks for providing us with research permits, allowing us access into the backcountry of the parks, and assisting with logistics. Thank you to our crew of field biologists: Kathy Brodhead, Glenn Giroir, Matt Gracey, Carl Ingwell, who spent many weeks in the field, sometimes under difficult conditions, conducting transects and collecting data. We thank Chandman Sambuu for his work on the RMBO database and data entry and management system, Jennifer Blakesley for providing her expertise in statistical analysis and RMBO staff for their careful review of this report.

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INTRODUCTION

Program History

In 2009, Rocky Mountain Bird Observatory (RMBO), in cooperation with its partner, the National Park Service (NPS), completed its fifth year of a habitat-based landbird monitoring program. We designed this program to provide rigorous population trend data on most diurnal, regularly occurring breeding landbird species in 11 National Parks representing three states (CO, WY, UT) in the Northern Colorado Plateau Inventory and Monitoring Network (NCPN). This year we added one new transect in Pipe Spring National Monument (PISP) for inventory purposes. In addition to monitoring landbird populations, this program generates information useful for managing birds such as annual density estimates, habitat associations and spatial distribution. It also supports the NCPN's efforts to develop long-term natural resource monitoring plans for its park units. Modeled after our Colorado habitat-based monitoring program (Leukering et al. 2000), *Monitoring Birds of the National Park Service, Northern Colorado Plateau Network,* is consistent with goals emphasized by the U.S. North American Bird Conservation Initiative (NABCI) Committee (U.S. NABCI Monitoring Subcommittee 2007).

Reasons for Monitoring

Birds can be excellent indicators of biological integrity and ecosystem health (Morrison 1986, Croonquist and Brooks 1991, Bureau of Land Management 1998, Hutto 1998, O'Connell et al. 2000, Rich 2002, U.S. EPA 2002, Birdlife International 2003). Because they comprise a diverse group of niche specialists, occupy a broad range of habitats, are sensitive to both physical and chemical impacts on the environment, and often reflect the abundance and diversity of other organisms with which they coexist, birds can be useful barometers of environmental change and in measuring the sustainability of human activities on ecosystems. Because birds are generally abundant, conspicuous, and relatively easy to identify, they offer many logistical and economic advantages over other taxonomic groups for monitoring.

Population monitoring forms the backbone of avian conservation. Given the declines of many species of North American breeding birds, there is an urgent need for monitoring programs that serve as an "early-warning" system to identify at-risk species and the causes of their declines so that natural resource managers can proactively reverse or prevent further declines. Without current monitoring data, conservation efforts may be misguided and inefficient. For these reasons, monitoring is mandated by legislation such as the National Environmental Policy Act (1969), Endangered Species Act (1973), and the Forest Management Act (1976), as well as by various state laws, Forest plans, preserve management plans, and other long-range plans (Manley et al. 1993, Sauer 1993). RMBO designed its monitoring programs to be comparable, repeatable, data rich, long-term, multi-scale, and accessible so that managers can make informed decisions to effectively conserve birds and their habitats.

Monitoring Objectives

This program uses the Partners in Flight (PIF) Plan (Rich et. al. 2004) as a guideline 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 that could provide consistent scientific evaluations of conservation status across all bird species in North America and identify the most important focus areas for the conservation of each species. This process applies quantitative rule sets to complex biological data on the population size, distribution, population trend, threats, and regional abundance of individual bird species to generate simple numerical scores that rank each species in terms of its 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.

We designed our landbird monitoring programs to provide population status and trend information for regularly-occurring breeding landbird species within sagebrush, pinion-juniper, and low-elevation riparian habitats. Initially, we expect to collect data to provide "early-warning" information for all species we can monitor through a habitat-based approach. After establishing this monitoring framework, we anticipate that this data will lead to more questions and research areas to determine the possible reasons for any observed and to enable better informed management decisions. Herein we discuss the initial "early-warning" monitoring framework, and the monitoring goals and progress.

The specific objectives of NCPN's monitoring program are:

1. To determine the status and trends in breeding-bird species' density in sagebrush, pinyon-juniper, and riparian habitats;
2. To provide long-term status and trend estimates for landbirds in the above habitats, we have established a target of an 80% probability of detecting a minimum rate of population change of 3.0% per year in 30 years, with a Type I error rate of 10%;
3. To maintain a high-quality database that is accessible to all of our collaborators as well as the public on the web in the form of raw and summarized data;
4. To generate decision support tools such as population estimate models that help guide conservation efforts and provide a better measure of conservation success.

METHODS

Study Area

In 2005, the NPS selected three habitats in which to implement landbird monitoring in the NCPN – Low-Elevation Riparian (LR), Pinyon-Juniper (PJ), and Sage Shrubland (SA). A panel of NPS resource managers selected these habitats because they represent distinct avifaunal communities and because of the management questions associated with each. During the spring and summer of 2005, RMBO staff established 45 transects in these habitats (15 in each, see figures 1-3). In 2009, we also conducted an inventory effort on PISP that included opportunistic sampling throughout the park.

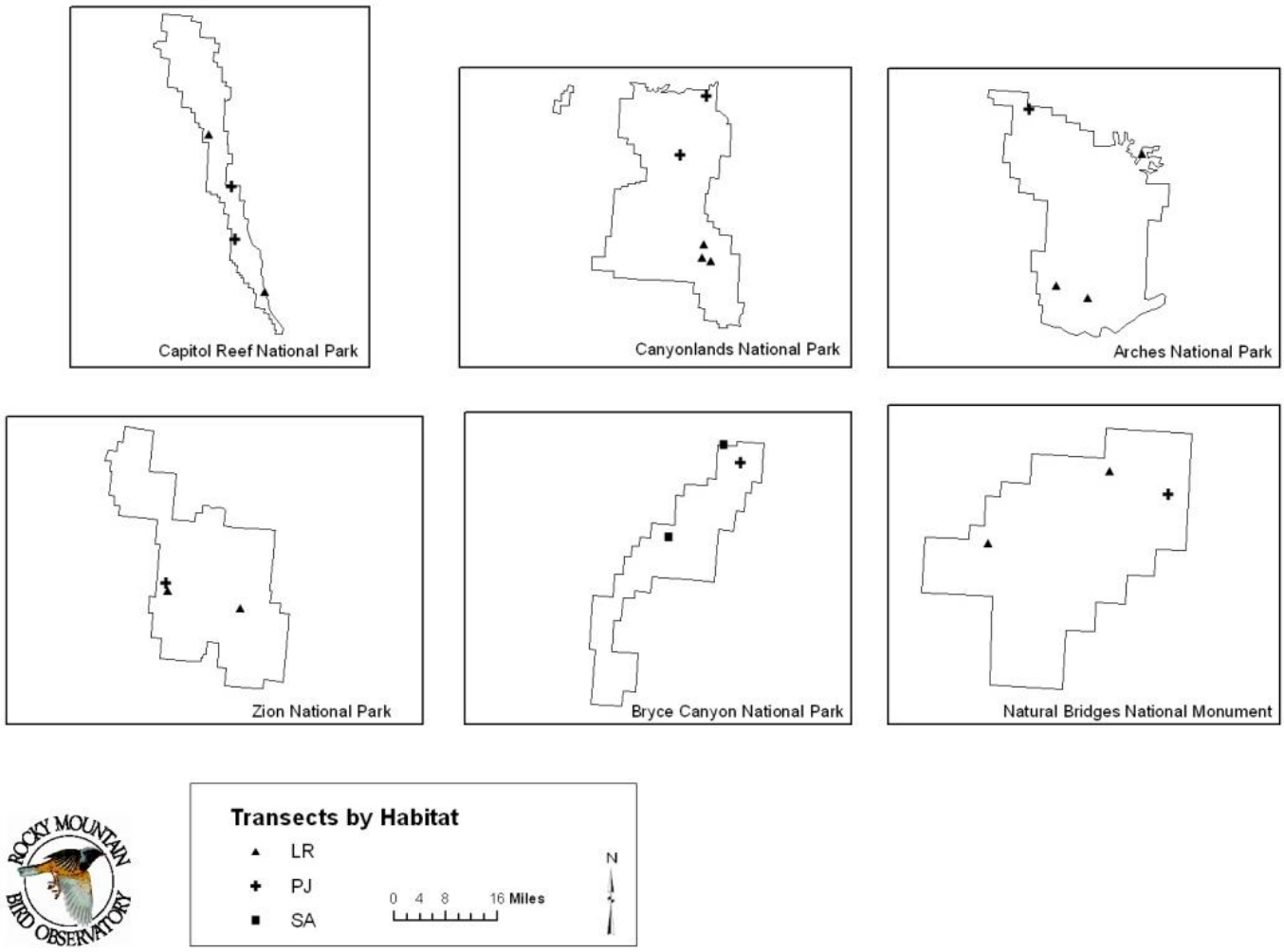

Figure 1. Utah transect locations by habitat within the Northern Colorado Plateau Network.

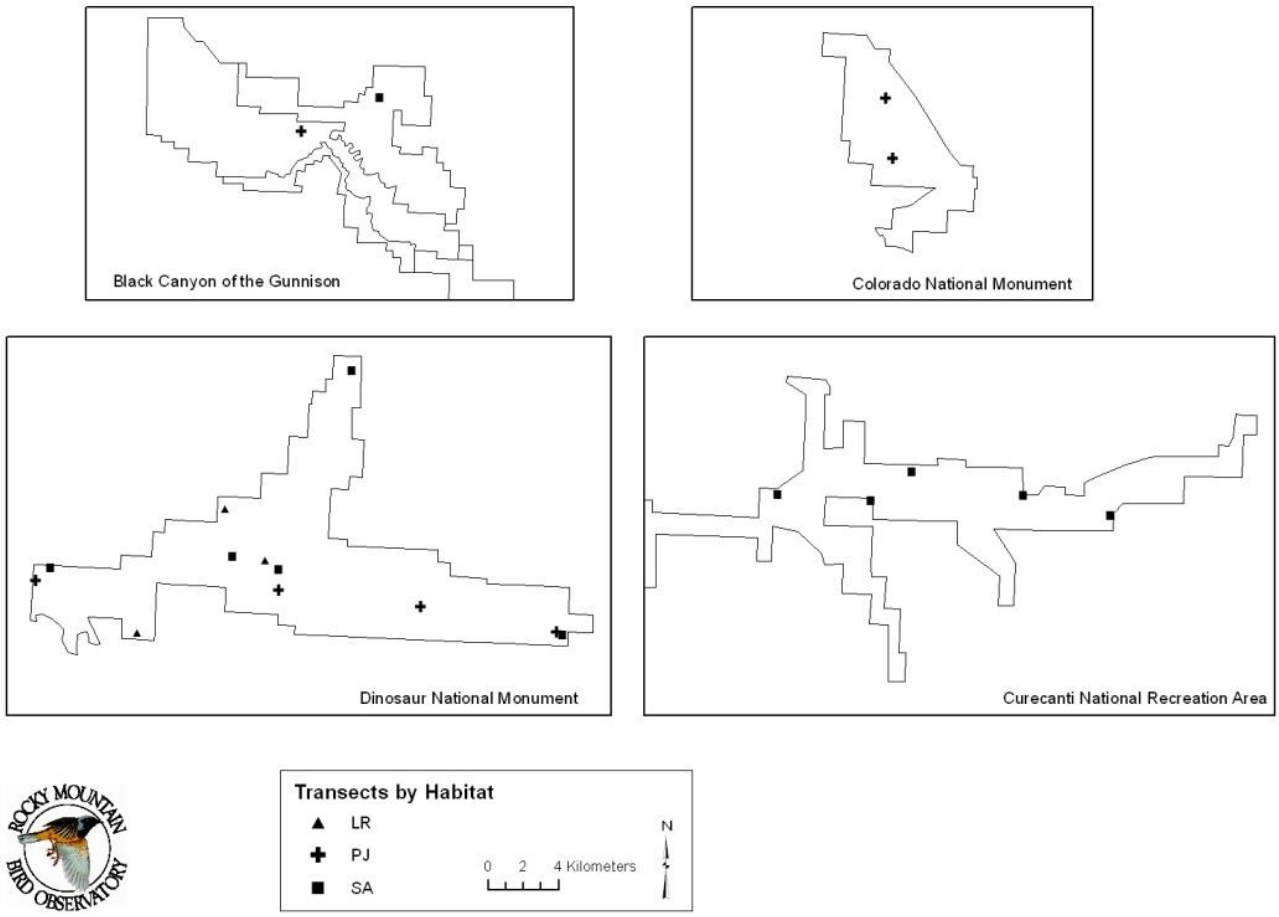

Figure 2. Colorado transect locations by habitat within the Northern Colorado Plateau Network.

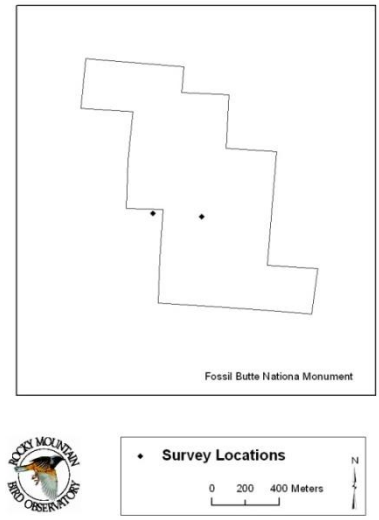

Figure 3. Wyoming sage shrubland transect locations on Fossil Butte (Wyoming) within the Northern Colorado Plateau Network.

Low-Elevation Riparian (LR)
This habitat is comprised mostly of scattered 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, is an exotic species that has invaded much of the low-elevation riparian habitat of the western United States. While the NPS is working to eradicate tamarisk in many of its park units, it is still fairly common in this habitat type.

Pinyon-Juniper (PJ)
Pinyon-Juniper typically lies just above semidesert Shrubland habitat in elevation. It covers most of the ridges and mesas and is the most extensive habitat in the NCPN. The two main components of this habitat – pinyon pine (*Pinus edulis*) and juniper (*Juniperus* spp.) – vary in composition.

Sage Shrubland (SA)
The sagebrush shrubland community occurs extensively on the Colorado Plateau. The stands of sage that we survey in the NCPN are generally narrow "fingers" of pure sage and our point-count stations are often near forests. The most common species of sagebrush in the NCPN are big sagebrush (*Artemisia tridentata*) and mountain sagebrush (*Artemisia frigida*).

Pipe Springs National Monument (PISP)
We conducted an initial inventory of PISP in 2009. The technician spent 2 days taking an inventory of species from opportunistic sampling throughout the park. We walked around PISP, looking, listening, and recording all bird species encountered. Surveys were not conducted according to the SOP. In 2010, we will reestablish the points and directly follow the SOP.

Field Personnel
The RMBO field staff in 2009 consisted of four experienced biologists with excellent aural and visual bird-identification skills. Each biologist completed a one-week training program at the beginning of the season to ensure full understanding of the field protocol.

Site Selection
The NPS and RMBO selected survey sites during the winter of 2005. For Pinyon-Juniper and Sage Shrubland habitat, we used GIS and the Southwest Regional Re-GAP Analysis Project (http://fws-nmcfwru.nmsu.edu/SWREGAP/factsheet.htm) to randomly select the sites from a pool of habitat "stands" that were large enough to accommodate transects consisting of 15 point-count stations spaced 250m apart. We excluded areas with >50% slope from the list of potential sites to ensure that selected stands could be accessed safely on foot. For Low-Elevation Riparian survey sites, we limited our options to wadeable streams, excluded the Colorado, Green, Gunnison, and Virgin rivers. Since there is a limited amount of riparian habitat, we manually selected survey location for this habitat. RMBO staff "ground-proofed" the selected stands during the early spring of 2005, and established transects during the field season. In the few cases where the originally-selected stands were unacceptable, we chose replacement stands in the same manner as the original stands. We established all transect locations during the 2005 field season and have surveyed these same locations every season.

Sampling Design
We sampled landbird populations in each habitat selected for monitoring following the protocol established by Leukering (2000) and modified by Hanni et al. (2009). We surveyed all transects between ½-hour before sunrise and 11 AM.

We conducted 15 five-minute point counts at stations located at 250-m intervals along each transect. In order to increase our sample size, we surveyed each of the 45 transects two times during the summer; each visit on a separate day. At each point, we recorded all birds detected during the five-minute survey. For every bird detected during the five minute period, we recorded species, sex, horizontal distance from the observer, the minute we detected each bird, and type of detection (e.g. call, song or visual). Observers measured radial distances to each bird using laser rangefinders. When it was not possible to measure distance to a bird, observers estimated distance by measuring to some nearby object. We recorded all Red Squirrels (*Tamiasciurus hudsonicus*) detected during point counts. Observers also recorded birds flying over but not using the immediate surrounding landscape. For distribution mapping purposes, observers recorded the presence of all low density species they detected when traveling between point-count locations. Low density species are those rare or difficult to detect species (e.g., woodpeckers, owls, raptors) which we generally record in low numbers.

We considered all non-independent detections of birds, i.e., flocks or pairs of conspecific birds together in close proximity, as part of a 'cluster' rather than as separate independent observations. Observers recorded clusters by recording the number of birds detected within the cluster along with a letter code to keep track of each distinct cluster.

At the start and end of each transect, we recorded time, temperature in degrees Fahrenheit, percent cloud cover, precipitation type, and wind speed using the Beaufort scale. We measured distances between points using hand-held Global Positioning System (GPS) units. We recorded all GPS data in Universal Transverse Mercator (UTM) North American Datum 1983 (NAD 83). At each point, we recorded UTM coordinates, vegetation data (within a 50 meter radius), and distance from a road (if within 100 meters). For vegetation data, we recorded the habitat's structural stage as well as types, relative abundance, percent coverage, and mean height of trees, shrubs, and groundcover. If there was a distinct tree sub-canopy present, we recorded the species of trees. We recorded these data prior to beginning each point count.

Data Analysis

We used the analysis software Distance 6.0 (Thomas et al. 2010) to generate density estimates (*D*) using data collected at point-count stations. In Distance analysis, a unique detection function is fit to each species' distribution of distances in a given habitat (Buckland et al. 1993). Because the detection function is unique to each species in each habitat, Distance analysis avoids some serious problems inherent in traditional analyses of point-count data (e.g., unquantifiable differences in detectability among habitats, species, and years). Distance analysis relies on three assumptions, all of which are reasonably well met by this program: 1) all birds at the point (distance=0) are detected, 2) distances of birds close to the point are measured accurately, and 3) birds do not move in response to the observer's presence.

We pooled 2005-2009 data to calculate detection probabilities for each species. Using this information, we estimated densities for each species by year within each habitat (Buckland et al. 1993). This allowed us to calculate density estimates for more low-density species than if we had used only the 2009 data. We can usually generate density estimates for species with at least 80 independent detections in a given habitat over time. We have to truncate data out to certain distance for each species in order to fit a detection curve to the data in program Distance, and after truncation we are sometimes left with too few individual detections to calculate density.

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

RESULTS

In 2009, our fifth year of landbird monitoring in the NCPN, we conducted 1,191 point counts along 45 transects (we surveyed all transects twice) in three habitats between 9 May and 4 July, 2009 (Table 1).

Table 1. Bird sampling periods and effort in each habitat in the Northern Colorado Plateau Network, summer 2009.

Habitat	Dates Sampled	# Transects*	# Point Counts
Low-Elevation Riparian	11 May – 30 June	15	381
Pinyon-Juniper	09 May – 04 July	15	409
Sage Shrubland	15 May – 04 July	15	401
All habitats	**09 May – 04 July**	**45**	**1,191**

* We surveyed all transects twice.

We recorded 11,640 birds of 121 species (Table 2, Appendix A). We detected 3,903 birds of 83 species in Low-Elevation Riparian, 3,986 birds of 83 species in Pinyon-Juniper, 3,566 birds of 86 species in Sage Shrubland, and 185 birds of 26 species at PISP.

This year we calculated density estimates for 56 species in at least one habitat. The habitat-stratified data yielded robust density estimates (CV < 50%) for 55 species. These 55 species represent 46% of species detected on transects in the NCPN during 2005-2009 and 93% of birds observed on transects.

In 2009, RMBO recorded 46 bird species that are of conservation and management concern throughout NCPN (Appendix B). We calculated density estimates for 24 of these species.

Table 2. Bird totals and averages by habitat in the Northern Colorado Plateau Network, summer 2009.

Habitat	# Birds Detected	Avg. # Birds per Transect	# Species Detected	Avg. # Species per Transect
Low-Elevation Riparian	3903	130	83	22
Pinyon-Juniper	3986	133	83	22
Sage Shrubland	3566	119	86	16
All habitats	**11,455**	**125**	**121**	**20**

Low-Elevation Riparian (LR)

We surveyed 15 transects in LR this year. We calculated density estimates for 34 species in LR, 13 of which are species of conservation and management concern. The pooled 2005-2009 data from LR yielded robust density estimates (Coefficient of Variation, CV < 50%) for 33 species (Table 3). We should be able to reach our target of detecting population changes of at least 3% within 30 years for these 33 species, which represent 40% of species detected in LR on or between point-count stations and 86% of individual birds detected in LR.

The following ten species had the highest estimated densities of species recorded in LR in 2009 (listed in order from highest to lowest density):

1. Black-chinned Hummingbird
2. Violet-green Swallow
3. Blue-gray Gnatcatcher
4. Yellow Warbler
5. Spotted Towhee
6. Lazuli Bunting
7. Lesser Goldfinch
8. White-throated Swift
9. House Finch
10. Chipping Sparrow

The following 26 species had higher estimated densities in LR compared to the other two habitats sampled in 2009 (listed in order from highest to lowest density):

1. Black-chinned Hummingbird
2. Violet-green Swallow
3. Yellow Warbler
4. Spotted Towhee
5. Lazuli Bunting
6. Lesser Goldfinch
7. White-throated Swift
8. House Finch
9. Black-throated Sparrow
10. Plumbeous Vireo
11. Common Yellowthroat
12. Ash-throated Flycatcher
13. Bewick's Wren
14. Song Sparrow
15. House Wren
16. Yellow-breasted Chat
17. Black Phoebe
18. Rock Wren
19. Brown-headed Cowbird
20. Warbling Vireo
21. Say's Phoebe
22. Western-Wood-Pewee
23. Bullock's Oriole
24. Black-headed Grosbeak
25. Blue Grosbeak
26. Canyon Wren

Table 3. Estimated densities of breeding birds in Low-Elevation Riparian habitat in the Northern Colorado Plateau Network, 2005-2009[1].

Species	Year	D	LCL	UCL	%CV	n
Mourning Dove	2005	25.3	10.9	58.8	54	91
	2006	10.4	8.5	12.8	12	126
	2007	17.1	12.0	24.4	22	155
	2008	14.5	10.8	19.4	18	100
	2009	3.9	2.3	6.4	31	44
White-throated Swift[2]	2005	53.9	30.1	96.5	36	131
	2006	50.3	36.9	68.6	19	162
	2007	69.3	50.5	95.0	19	199
	2008	33.5	21.1	53.0	28	94
	2009	30.8	8.9	106.7	87	97
Black-chinned Hummingbird	2005	248.5	164.3	376.1	25	18
	2006	272.2	180.2	411.3	25	20
	2007	153.5	102.3	230.3	25	12
	2008	140.4	93.6	210.6	25	11
	2009	211.0	140.6	316.6	25	14
Western Wood-Pewee	2005	4.3	3.6	5.0	9	26
	2006	5.3	4.6	6.2	9	33

Species	Year	D	LCL	UCL	%CV	n
Western Wood-Pewee (Cont.)	2007	5.3	4.5	6.2	9	33
	2008	5.1	4.3	6.1	10	30
	2009	4.9	4.2	5.7	9	26
Black Phoebe	2005	--	--	--	--	5
	2006	4.2	3.3	5.4	14	11
	2007	7.6	5.9	9.8	15	19
	2008	4.2	3.1	5.5	17	10
	2009	8.9	7.0	11.4	15	20
Say's Phoebe[2]	2005	3.4	3.2	3.6	4	40
	2006	5.2	4.9	5.7	5	61
	2007	3.2	3.0	3.4	4	38
	2008	4.3	4.0	4.6	4	52
	2009	5.5	5.1	6.0	5	55
Ash-throated Flycatcher	2005	21.1	14.9	29.8	21	148
	2006	17.7	15.3	20.4	9	224
	2007	17.3	15.0	19.9	9	197
	2008	28.0	22.1	35.5	14	190
	2009	18.7	10.3	34.0	37	127
Gray Vireo[2]	2005	0.9	0.7	1.2	15	16
	2006	2.0	1.6	2.6	15	36
	2007	1.0	0.8	1.3	15	18
	2008	1.5	1.2	1.9	15	27
	2009	2.3	1.8	2.9	15	35
Plumbeous Vireo[2]	2005	12.8	11.4	14.3	7	52
	2006	20.7	18.4	23.3	7	85
	2007	15.4	13.7	17.3	7	63
	2008	11.5	10.3	12.9	7	48
	2009	19.3	17.1	21.7	7	67
Warbling Vireo[2]	2005	4.6	4.1	5.2	7	19
	2006	9.9	8.8	11.1	7	41
	2007	6.6	5.9	7.5	7	28
	2008	7.3	6.6	8.2	7	31
	2009	5.9	5.1	6.7	8	20
Western Scrub-Jay	2005	3.7	2.2	6.2	31	18
	2006	3.9	2.6	5.9	25	28
	2007	3.9	2.4	6.2	29	23
	2008	3.5	2.3	5.2	24	26
	2009	2.2	1.5	3.3	24	14
Common Raven	2005	3.0	1.4	6.7	50	14
	2006	2.2	1.0	4.7	49	13
	2007	2.8	1.3	6.1	50	14
	2008	6.3	2.9	13.5	49	37

Species	Year	D	LCL	UCL	%CV	n
Common Raven (Cont.)	2009	--	--	--	--	7
Violet-green Swallow[2]	2005	61.3	52.7	71.4	9	88
	2006	211.8	174.9	256.3	12	213
	2007	118.1	99.6	140.2	10	127
	2008	168.4	133.1	213.0	14	115
	2009	153.0	129.5	180.6	10	148
Juniper Titmouse[2]	2005	8.0	6.8	9.4	10	28
	2006	7.0	5.9	8.3	10	24
	2007	10.1	9.1	11.1	6	41
	2008	10.0	8.8	11.4	8	39
	2009	9.8	8.3	11.6	10	28
Bushtit	2005	21.7	14.7	32.1	23	14
	2006	44.2	33.7	58.0	17	56
	2007	6.0	4.9	7.4	12	11
	2008	--	--	--	--	5
	2009	10.5	8.2	13.3	15	15
Rock Wren[2]	2005	6.2	5.3	7.1	9	75
	2006	9.6	8.8	10.5	5	106
	2007	8.3	5.9	11.7	21	140
	2008	10.4	8.4	13.0	13	82
	2009	8.4	7.2	9.9	10	102
Canyon Wren[2]	2005	1.3	1.1	1.5	8	28
	2006	3.1	2.7	3.6	9	66
	2007	1.7	1.5	2.0	8	38
	2008	1.3	1.1	1.5	8	28
	2009	1.3	1.1	1.5	8	24
Bewick's Wren[2]	2005	6.1	4.5	8.2	18	48
	2006	18.5	15.4	22.2	11	109
	2007	10.6	8.3	13.6	15	59
	2008	6.7	5.1	8.7	16	68
	2009	15.4	12.3	19.1	13	93
House Wren	2005	9.7	7.9	11.9	12	41
	2006	10.1	8.2	12.5	13	43
	2007	7.4	6.1	9.1	12	32
	2008	11.1	9.0	13.7	13	48
	2009	11.2	9.0	13.9	13	39
Blue-gray Gnatcatcher	2005	52.2	47.5	57.4	6	103
	2006	69.3	62.5	76.9	6	141
	2007	52.0	47.4	57.2	6	108
	2008	60.6	54.7	67.1	6	125
	2009	134.6	117.9	153.6	8	218
American Robin	2005	6.1	3.2	11.6	40	16

Species	Year	D	LCL	UCL	%CV	n
American Robin (Cont.)	2006	9.2	4.9	17.4	40	26
	2007	10.9	5.7	20.5	40	31
	2008	13.6	7.2	25.8	40	38
	2009	--	--	--	--	6
Virginia's Warbler[2]	2005	8.3	7.4	9.2	6	31
	2006	10.8	9.7	12.1	7	41
	2007	8.9	8.0	9.8	6	34
	2008	16.9	14.9	19.0	7	66
	2009	--	--	--	--	2
Yellow Warbler	2005	61.9	52.5	73.0	10	136
	2006	62.3	52.1	74.4	11	139
	2007	52.1	44.3	61.4	10	118
	2008	66.6	56.0	79.1	10	150
	2009	129.7	100.3	167.6	15	237
Black-throated Gray Warbler[2]	2005	8.7	5.4	13.8	29	38
	2006	18.5	11.6	29.6	29	82
	2007	12.2	7.7	19.5	29	55
	2008	26.4	16.5	42.5	29	119
	2009	13.6	8.5	21.8	29	51
Common Yellowthroat	2005	6.6	5.2	8.4	15	10
	2006	14.4	11.3	18.3	15	22
	2007	14.8	11.5	19.1	15	22
	2008	--	--	--	--	5
	2009	19.0	14.6	24.6	16	23
Yellow-breasted Chat	2005	7.0	5.7	8.6	12	37
	2006	9.4	7.6	11.7	13	49
	2007	7.8	6.3	9.7	13	42
	2008	5.9	4.9	7.2	12	32
	2009	9.4	7.7	11.5	12	42
Western Tanager	2005	--	--	--	--	9
	2006	3.6	2.3	5.8	29	22
	2007	1.6	1.0	2.6	29	10
	2008	2.9	1.8	4.7	29	18
	2009	--	--	--	--	3
Spotted Towhee	2005	42.5	36.1	49.9	10	228
	2006	93.9	71.3	123.7	17	417
	2007	56.3	48.0	65.9	10	279
	2008	42.2	36.1	49.3	10	212
	2009	90.8	76.0	108.5	11	312
Chipping Sparrow	2005	--	--	--	--	6
	2006	--	--	--	--	8
	2007	17.0	12.0	24.1	21	29

Species	Year	D	LCL	UCL	%CV	n
Chipping Sparrow (Cont.)	2008	15.9	11.2	22.4	21	28
	2009	20.7	14.0	30.5	24	25
Black-throated Sparrow[2]	2005	5.5	4.9	6.3	8	48
	2006	5.9	5.2	6.8	8	51
	2007	6.7	5.8	7.8	9	61
	2008	7.4	6.5	8.4	8	67
	2009	19.7	16.3	24.0	12	139
Song Sparrow	2005	16.8	14.5	19.5	9	46
	2006	20.4	17.6	23.7	9	58
	2007	17.1	14.8	19.7	9	50
	2008	15.0	13.1	17.2	8	44
	2009	12.9	10.9	15.3	10	29
Black-headed Grosbeak	2005	2.9	2.1	4.2	22	12
	2006	6.8	4.8	9.7	22	28
	2007	3.6	2.5	5.1	21	15
	2008	4.5	3.2	6.5	22	19
	2009	4.8	3.4	6.8	22	17
Blue Grosbeak	2005	3.2	1.8	5.9	37	13
	2006	6.2	3.4	11.3	37	25
	2007	--	--	--	--	3
	2008	--	--	--	--	5
	2009	4.0	2.2	7.4	37	14
Lazuli Bunting[2]	2005	63.8	51.7	78.7	13	110
	2006	53.9	45.1	64.5	11	134
	2007	41.1	28.5	59.2	22	159
	2008	57.6	48.1	69.0	11	150
	2009	61.4	47.3	79.6	15	147
Brown-headed Cowbird	2005	--	--	--	--	7
	2006	10.7	7.3	15.7	23	26
	2007	7.4	5.1	10.9	23	17
	2008	5.8	4.0	8.4	23	14
	2009	8.3	5.6	12.2	24	15
Bullock's Oriole	2005	--	--	--	--	3
	2006	7.6	5.9	9.9	16	22
	2007	5.5	4.2	7.1	16	16
	2008	--	--	--	--	9
	2009	4.8	3.6	6.5	18	11
House Finch	2005	24.1	21.6	26.9	7	108
	2006	33.5	30.4	37.0	6	175
	2007	29.8	26.3	33.9	8	187
	2008	31.8	28.4	35.6	7	186
	2009	27.3	22.8	32.8	11	157

Species	Year	D	LCL	UCL	%CV	n
Lesser Goldfinch	2005	11.1	9.5	13.0	10	24
	2006	22.5	19.0	26.6	10	45
	2007	40.7	35.5	46.7	8	93
	2008	26.6	20.4	34.5	16	54
	2009	38.5	33.4	44.4	9	76

[1]D = estimated density (birds/km^2); LCL and UCL = lower and upper 90% confidence limits on D; %CV = percent coefficient of variation of D; n = number of annual independent detections used to estimate D.
[2]Species of conservation and management concern (see Appendix B).

Pinyon Juniper (PJ)

We surveyed 15 transects in PJ this year. We calculated density estimates for 32 species in PJ, 17 of which are species of conservation and management concern. The pooled 2005-2009 data from PJ yielded robust density estimates (CV < 50%) for all 32 species (Table 4). We should be able to reach our target of detecting population changes of at least 3% within 30 years for these 32 species, which represent 39% of species detected in PJ on or between point-count stations and 89% of individual birds detected in PJ.

The following 10 species had the highest estimated densities of all species recorded in PJ in 2009 (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. House Finch
8. Spotted Towhee
9. Bewick's Wren
10. Gray Vireo

The following 14 species had higher estimated densities in PJ compared to the other two habitats sampled in 2009 (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. Gray Vireo
8. Mountain Bluebird
9. Mourning Dove
10. Western Scrub-Jay
11. Mountain Chickadee
12. Virginia's Warbler
13. Grace's Warbler
14. Pinyon Jay

Table 4. Estimated densities of breeding birds in Pinyon-Juniper habitat in the Northern Colorado Plateau Network, 2005-2009[1].

Species	Year	D	LCL	UCL	%CV	n
Mourning Dove	2005	16.9	14.1	20.3	11	141
	2006	20.3	15.0	27.6	19	154
	2007	22.7	16.9	30.5	18	168
	2008	16.1	13.5	19.3	11	158

Species	Year	D	LCL	UCL	%CV	n
Mourning Dove (Cont.)	2009	9.1	7.3	11.5	14	97
White-throated Swift[2]	2005	14.6	12.2	17.4	11	90
	2006	18.1	14.8	22.2	12	95
	2007	22.3	18.1	27.4	13	113
	2008	17.5	13.5	22.7	16	73
	2009	8.4	7.1	10.1	11	48
Gray Flycatcher	2005	27.1	21.7	33.8	14	114
	2006	20.7	16.6	25.9	14	86
	2007	20.1	16.0	25.1	14	84
	2008	26.0	20.7	32.6	14	101
	2009	47.6	37.8	60.0	14	177
Dusky Flycatcher[2]	2005	3.5	2.9	4.3	12	12
	2006	10.4	8.5	12.7	12	35
	2007	8.2	6.7	10.1	12	28
	2008	12.7	10.2	15.7	13	40
	2009	4.4	3.6	5.4	12	14
Say's Phoebe[2]	2005	1.6	1.3	1.8	9	26
	2006	--	--	--	--	8
	2007	--	--	--	--	8
	2008	--	--	--	--	9
	2009	0.8	0.7	0.9	9	12
Ash-throated Flycatcher	2005	13.9	12.3	15.7	7	122
	2006	13.7	12.1	15.6	8	125
	2007	10.0	6.7	14.9	25	117
	2008	15.8	14.3	17.6	6	116
	2009	11.2	9.3	13.4	11	104
Gray Vireo[2]	2005	6.6	5.8	7.6	8	76
	2006	5.5	4.8	6.3	8	63
	2007	6.4	5.6	7.3	8	74
	2008	8.5	7.4	9.7	8	91
	2009	12.8	11.2	14.6	8	136
Plumbeous Vireo[2]	2005	8.5	7.3	9.9	9	62
	2006	6.1	5.3	7.1	9	44
	2007	6.1	5.2	7.0	9	44
	2008	6.4	5.5	7.4	9	43
	2009	6.2	5.3	7.3	9	42
Western Scrub-Jay	2005	7.2	5.4	9.5	17	33
	2006	8.6	6.5	11.6	18	32
	2007	8.3	6.2	11.2	18	30
	2008	9.5	7.1	12.8	18	33
	2009	4.3	3.2	5.9	18	15
Pinyon Jay[2]	2005	1.6	1.4	1.9	10	31

Species	Year	D	LCL	UCL	%CV	n
Pinyon Jay[2] (Cont.)	2006	3.5	2.6	4.8	18	46
	2007	6.3	4.7	8.4	18	65
	2008	1.3	0.9	1.9	21	18
	2009	2.2	1.9	2.6	9	35
Common Raven	2005	0.8	0.6	1.0	18	16
	2006	0.4	0.4	0.6	14	11
	2007	1.8	1.4	2.3	15	40
	2008	0.9	0.7	1.1	14	21
	2009	--	--	--	--	4
Violet-green Swallow[2]	2005	9.1	6.8	12.1	17	34
	2006	13.8	10.4	18.4	18	50
	2007	18.3	13.3	25.1	20	59
	2008	15.7	11.4	21.8	20	44
	2009	11.1	8.3	14.7	17	35
Mountain Chickadee	2005	6.3	3.6	11.1	35	21
	2006	--	--	--	--	9
	2007	3.3	1.9	5.9	35	11
	2008	3.3	1.9	5.7	35	10
	2009	4.2	2.4	7.4	35	13
Juniper Titmouse[2]	2005	21.9	17.3	27.7	14	79
	2006	19.3	15.4	24.3	14	76
	2007	20.3	16.2	25.6	14	82
	2008	23.2	18.5	29.1	14	89
	2009	53.9	42.5	68.3	15	201
Bushtit	2005	104.7	74.0	148.2	21	37
	2006	64.7	47.6	87.9	18	26
	2007	41.3	25.8	66.1	28	15
	2008	--	--	--	--	7
	2009	90.5	72.3	113.3	14	40
White-breasted Nuthatch	2005	4.6	1.9	10.8	55	13
	2006	4.7	2.0	11.1	56	12
	2007	7.1	3.0	16.8	55	20
	2008	--	--	--	--	9
	2009	--	--	--	--	7
Rock Wren[2]	2005	4.9	3.9	6.1	13	84
	2006	2.9	2.5	3.3	8	81
	2007	4.9	3.5	6.8	20	85
	2008	8.8	6.7	11.5	16	101
	2009	8.2	5.9	11.3	20	97
Canyon Wren[2]	2005	0.3	0.3	0.3	8	15
	2006	0.5	0.4	0.6	8	25
	2007	0.5	0.4	0.6	8	25

Species	Year	D	LCL	UCL	%CV	n
Canyon Wren[2] (Cont.)	2008	--	--	--	--	5
	2009	0.4	0.3	0.4	8	16
Bewick's Wren[2]	2005	14.0	9.9	19.7	21	151
	2006	25.2	20.6	30.8	12	148
	2007	21.9	17.9	26.9	12	122
	2008	15.0	13.0	17.2	9	112
	2009	13.2	12.3	14.2	4	82
Blue-gray Gnatcatcher	2005	86.9	79.1	95.4	6	127
	2006	64.1	58.7	70.1	5	93
	2007	88.1	80.3	96.7	6	127
	2008	75.1	68.0	82.8	6	99
	2009	174.4	156.3	194.7	7	228
Mountain Bluebird[2]	2005	12.2	9.2	16.2	17	63
	2006	6.6	5.0	8.7	17	33
	2007	8.5	6.2	11.6	19	38
	2008	7.2	5.5	9.5	17	34
	2009	12.0	8.9	16.3	19	42
American Robin	2005	2.0	1.6	2.4	12	26
	2006	2.7	2.2	3.2	11	36
	2007	2.5	2.1	3.0	12	34
	2008	2.0	1.6	2.4	12	25
	2009	1.1	0.9	1.3	11	14
Virginia's Warbler[2]	2005	8.8	8.0	9.6	6	53
	2006	5.9	5.3	6.5	6	35
	2007	6.0	5.4	6.6	6	36
	2008	4.3	4.0	4.7	5	24
	2009	3.9	3.6	4.3	5	22
Yellow-rumped Warbler	2005	1.6	1.3	2.1	14	11
	2006	3.8	3.0	4.9	15	26
	2007	1.6	1.3	2.1	14	11
	2008	2.1	1.6	2.6	15	13
	2009	--	--	--	--	1
Black-throated Gray Warbler[2]	2005	94.9	72.8	123.8	16	276
	2006	87.1	64.3	118.0	19	365
	2007	91.1	77.7	106.7	9	332
	2008	61.1	44.8	83.5	19	354
	2009	112.3	88.3	142.9	15	375
Grace's Warbler[2]	2005	--	--	--	--	6
	2006	1.7	1.2	2.3	20	13
	2007	2.5	1.8	3.6	20	20
	2008	--	--	--	--	9
	2009	2.6	1.9	3.7	20	19

Species	Year	D	LCL	UCL	%CV	n
Western Tanager	2005	1.1	0.9	1.4	14	17
	2006	1.7	1.3	2.1	14	25
	2007	2.0	1.6	2.5	14	30
	2008	1.2	1.0	1.6	14	17
	2009	--	--	--	--	8
Green-tailed Towhee[2]	2005	1.9	1.4	2.5	17	15
	2006	--	--	--	--	6
	2007	2.9	2.1	3.8	18	23
	2008	1.5	1.1	2.0	17	11
	2009	--	--	--	--	5
Spotted Towhee	2005	17.0	15.0	19.2	7	94
	2006	13.9	12.3	15.7	7	76
	2007	22.3	19.3	25.9	9	123
	2008	9.8	8.7	11.0	7	50
	2009	22.3	19.3	25.8	9	113
Chipping Sparrow	2005	15.1	12.0	19.2	14	84
	2006	33.2	24.4	45.0	18	60
	2007	31.6	20.4	49.0	27	81
	2008	25.9	15.2	44.2	33	103
	2009	48.4	38.6	60.6	14	162
Brewer's Sparrow[2]	2005	--	--	--	--	7
	2006	--	--	--	--	7
	2007	2.5	1.9	3.3	16	20
	2008	2.2	1.7	2.8	16	16
	2009	1.5	1.1	2.0	18	10
Vesper Sparrow	2005	--	--	--	--	9
	2006	1.3	1.0	1.7	15	15
	2007	1.3	1.0	1.7	15	15
	2008	--	--	--	--	6
	2009	1.9	1.5	2.5	16	20
Lark Sparrow	2005	2.3	1.9	2.8	12	20
	2006	1.9	1.6	2.3	11	17
	2007	2.0	1.7	2.4	10	19
	2008	1.5	1.3	1.7	10	13
	2009	1.9	1.7	2.3	10	17
Black-throated Sparrow[2]	2005	5.0	4.5	5.6	7	40
	2006	8.7	7.7	9.9	7	67
	2007	11.7	10.2	13.4	8	93
	2008	9.3	8.0	10.9	9	69
	2009	11.1	9.7	12.6	8	76
Western Meadowlark	2005	2.9	2.4	3.7	13	40
	2006	1.5	1.2	1.8	13	20

Species	Year	D	LCL	UCL	%CV	n
Western Meadowlark (Cont.)	2007	1.6	1.3	1.9	12	21
	2008	1.1	0.9	1.4	12	14
	2009	1.8	1.5	2.3	13	23
Brown-headed Cowbird	2005	4.2	3.0	6.0	21	18
	2006	3.8	2.6	5.4	22	14
	2007	4.2	3.0	5.9	20	17
	2008	2.9	2.1	4.1	20	11
	2009	5.1	3.6	7.2	21	18
House Finch	2005	18.4	15.7	21.7	10	104
	2006	11.8	10.3	13.6	8	75
	2007	23.4	20.4	26.9	8	156
	2008	21.1	18.4	24.2	8	134
	2009	23.8	20.6	27.6	9	146

[1]D = estimated density (birds/km^2); LCL and UCL = lower and upper 90% confidence limits on D; %CV = percent coefficient of variation of D; n = number of annual independent detections used to estimate D.
[2]Species of conservation and management concern (see Appendix B).

Sage Shrubland (SA)

We surveyed 15 transects in SA this year. We calculated density estimates for 30 species in SA, 14 of which are species of conservation and management concern. The pooled 2005-2009 data from SA yielded robust density estimates (Coefficient of Variation, CV < 50%) for 29 species and a moderately robust estimate (CV = 50-75%) for one species (Table 5). We should be able to reach our target of detecting a population change of at least 3% within 30 years for these 30 species, which represent 35% of species detected on or between point-count stations in SA and 89% of individual birds detected in SA.

The following species had the ten highest estimated densities of species recorded in SA in 2009 (listed in order from highest to lowest density):

1. Brewer's Sparrow
2. Vesper Sparrow
3. Green-tailed Towhee
4. Blue-gray Gnatcatcher
5. Lark Sparrow
6. Lazuli Bunting
7. Violet-green Swallow
8. Chipping Sparrow
9. Dusky Flycatcher
10. Broad-tailed Hummingbird

The following 16 species had higher estimated densities in SA compared to the other two habitats sampled in 2009 (listed in order from highest to lowest density):

1. Brewer's Sparrow
2. Vesper Sparrow
3. Green-tailed Towhee
4. Lark Sparrow
5. Dusky Flycatcher
6. Broad-tailed Hummingbird
7. Western Meadowlark
8. Horned Lark
9. Brewer's Blackbird
10. Sage Thrasher
11. Sage Sparrow
12. American Robin
13. Northern Flicker
14. Black-billed Magpie
15. Western Tanager
16. Common Raven

Table 5. Estimated densities of breeding birds in Sage-Shrubland habitat in the Northern Colorado Plateau Network, 2005-2009[1].

Species	Year	D	LCL	UCL	%CV	n
Mourning Dove	2005	2.3	1.7	3.0	16	55
	2006	2.8	2.2	3.6	14	108
	2007	3.8	3.0	4.9	14	64
	2008	4.4	3.6	5.5	13	69
	2009	6.3	4.3	9.2	23	64
Broad-tailed Hummingbird[2]	2005	12.3	9.4	16.2	17	22
	2006	11.5	8.8	15.2	17	21
	2007	12.6	9.6	16.7	17	23
	2008	18.3	13.9	24.0	17	31
	2009	8.0	6.1	10.5	17	13
Northern Flicker	2005	1.3	0.7	2.5	42	18
	2006	1.9	1.0	3.7	42	27
	2007	1.0	0.5	1.9	42	14
	2008	0.7	0.4	1.5	42	10
	2009	1.6	0.8	3.2	42	21
Gray Flycatcher	2005	2.9	2.6	3.3	7	23
	2006	--	--	--	--	8
	2007	--	--	--	--	7
	2008	1.6	1.4	1.8	8	12
	2009	3.2	2.8	3.6	8	23
Dusky Flycatcher[2]	2005	3.3	2.6	4.2	15	30
	2006	5.6	4.4	7.2	15	53
	2007	6.0	4.7	7.7	15	55
	2008	7.8	6.0	10.0	15	68
	2009	8.8	6.8	11.4	16	74
Say's Phoebe[2]	2005	1.0	0.7	1.5	25	12
	2006	1.2	0.8	1.9	25	15
	2007	--	--	--	--	8
	2008	1.3	0.9	2.0	26	15
	2009	1.7	1.1	2.6	26	17
Ash-throated Flycatcher	2005	1.3	0.6	2.7	46	16
	2006	1.0	0.5	2.2	46	13
	2007	1.1	0.5	2.3	46	14
	2008	1.0	0.5	2.1	46	12
	2009	--	--	--	--	8
Warbling Vireo[2]	2005	1.3	1.0	1.8	18	17
	2006	0.8	0.6	1.0	18	10
	2007	1.6	1.2	2.1	18	21

Species	Year	D	LCL	UCL	%CV	n
Warbling Vireo[2] (Cont.)	2008	--	--	--	--	2
	2009	--	--	--	--	3
Black-billed Magpie[2]	2005	2.8	1.7	4.4	29	69
	2006	3.0	1.9	4.6	27	94
	2007	1.7	1.1	2.6	28	48
	2008	1.4	0.9	2.2	27	45
	2009	1.0	0.7	1.5	26	31
Common Raven	2005	0.3	0.1	0.7	61	11
	2006	1.0	0.4	2.5	62	29
	2007	1.4	0.5	3.4	61	50
	2008	0.8	0.3	2.2	61	31
	2009	0.7	0.3	1.8	61	24
Horned Lark	2005	2.8	2.4	3.3	10	27
	2006	3.4	2.8	4.0	11	31
	2007	3.9	3.3	4.6	10	38
	2008	2.1	1.8	2.5	10	19
	2009	5.1	4.3	6.0	10	44
Violet-green Swallow[2]	2005	7.7	4.7	12.6	30	12
	2006	11.3	7.3	17.5	27	21
	2007	6.1	4.1	9.2	25	12
	2008	9.6	5.7	16.1	32	12
	2009	9.5	6.3	14.3	25	16
Rock Wren[2]	2005	3.1	2.5	4.0	14	85
	2006	5.0	4.1	6.1	12	162
	2007	6.4	4.6	9.1	21	74
	2008	4.3	3.5	5.4	13	87
	2009	3.2	2.5	4.1	15	70
Blue-gray Gnatcatcher	2005	9.8	7.5	12.9	16	29
	2006	5.6	4.3	7.4	16	17
	2007	4.3	3.2	5.8	18	12
	2008	14.6	11.2	19.1	16	41
	2009	13.4	10.2	17.6	17	36
Mountain Bluebird[2]	2005	6.3	5.5	7.1	7	64
	2006	7.7	6.9	8.5	7	85
	2007	7.7	6.8	8.7	7	80
	2008	6.8	6.0	7.6	7	67
	2009	7.0	6.0	8.2	9	60
American Robin	2005	2.1	1.9	2.5	8	40
	2006	4.1	3.6	4.7	9	79
	2007	2.8	2.5	3.2	8	55
	2008	2.0	1.8	2.3	8	36
	2009	1.7	1.5	2.0	9	29

Species	Year	D	LCL	UCL	%CV	n
Sage Thrasher[2]	2005	2.8	2.5	3.1	7	76
	2006	2.6	2.3	2.9	7	70
	2007	2.5	2.3	2.8	6	71
	2008	5.2	4.5	6.1	9	135
	2009	4.4	3.9	5.0	7	110
Virginia's Warbler	2005	1.3	1.1	1.5	9	16
	2006	1.6	1.4	1.9	9	21
	2007	0.9	0.7	1.0	9	11
	2008	2.7	2.3	3.1	10	32
	2009	1.8	1.5	2.0	9	20
Yellow-rumped Warbler	2005	--	--	--	--	9
	2006	1.9	1.6	2.4	12	21
	2007	1.3	1.1	1.6	12	14
	2008	1.4	1.1	1.8	14	13
	2009	--	--	--	--	8
Black-throated Gray Warbler[2]	2005	2.1	1.5	3.1	23	28
	2006	1.6	1.1	2.3	23	21
	2007	1.1	0.8	1.6	23	15
	2008	2.4	1.6	3.5	23	30
	2009	3.9	2.7	5.8	24	47
Western Tanager	2005	0.5	0.4	0.5	8	13
	2006	0.6	0.5	0.7	9	17
	2007	0.9	0.7	1.0	9	25
	2008	0.7	0.6	0.8	9	19
	2009	0.8	0.7	0.9	9	20
Green-tailed Towhee[2]	2005	31.3	25.2	38.8	13	272
	2006	43.4	31.9	58.9	18	388
	2007	31.5	24.9	40.0	14	283
	2008	27.1	22.0	33.4	13	227
	2009	30.3	23.9	38.3	14	242
Spotted Towhee	2005	6.1	5.3	7.1	8	56
	2006	6.6	5.7	7.5	8	61
	2007	5.4	4.7	6.1	8	50
	2008	7.8	6.8	9.0	8	68
	2009	4.9	4.3	5.7	8	41
Chipping Sparrow	2005	6.7	5.2	8.7	16	32
	2006	11.6	9.0	15.0	16	57
	2007	10.2	7.8	13.3	16	48
	2008	9.4	7.3	12.2	16	44
	2009	9.4	7.3	12.2	16	42
Brewer's Sparrow[2]	2005	84.7	69.5	103.2	12	455
	2006	88.2	71.8	108.4	12	486

Species	Year	D	LCL	UCL	%CV	n
Brewer's Sparrow[2] (Cont.)	2007	77.6	64.6	93.3	11	427
	2008	71.1	59.8	84.4	10	366
	2009	111.0	86.5	142.6	15	543
Vesper Sparrow	2005	31.4	26.4	37.3	10	248
	2006	26.7	21.9	32.5	12	310
	2007	40.3	33.4	48.7	11	372
	2008	52.6	38.4	72.0	19	342
	2009	50.6	31.1	82.2	30	391
Lark Sparrow	2005	8.7	7.3	10.3	10	84
	2006	9.4	8.0	11.1	10	95
	2007	6.2	5.2	7.2	10	63
	2008	2.5	2.1	2.9	10	24
	2009	13.1	10.3	16.6	14	118
Black-throated Sparrow[2]	2005	0.6	0.5	0.7	9	10
	2006	1.8	1.6	2.1	9	29
	2007	1.1	1.0	1.3	9	18
	2008	--	--	--	--	3
	2009	1.7	1.4	2.0	11	23
Sage Sparrow[2]	2005	3.1	2.6	3.8	12	36
	2006	2.2	1.8	2.7	12	25
	2007	2.7	2.2	3.2	12	31
	2008	1.8	1.5	2.2	12	20
	2009	2.8	2.3	3.5	13	25
Lazuli Bunting[2]	2005	--	--	--	--	6
	2006	--	--	--	--	6
	2007	--	--	--	--	5
	2008	--	--	--	--	0
	2009	10.9	9.0	13.2	12	73
Western Meadowlark	2005	4.5	3.5	5.7	15	133
	2006	4.4	3.3	5.7	16	159
	2007	6.5	4.9	8.5	17	130
	2008	8.3	6.3	11.1	17	169
	2009	6.9	5.1	9.4	19	196
Brewer's Blackbird	2005	--	--	--	--	5
	2006	6.5	5.5	7.5	9	42
	2007	3.4	2.6	4.3	15	19
	2008	--	--	--	--	8
	2009	5.0	4.0	6.1	13	26
Brown-headed Cowbird	2005	--	--	--	--	6
	2006	5.8	4.5	7.6	16	26
	2007	2.4	1.9	3.0	14	12
	2008	3.2	2.5	4.1	14	15

Species	Year	D	LCL	UCL	%CV	n
Brown-headed Cowbird (Cont.)	2009	--	--	--	--	8
House Finch	2005	--	--	--	--	4
	2006	5.0	4.2	5.9	10	60
	2007	2.8	2.4	3.2	9	35
	2008	3.1	2.7	3.7	9	36
	2009	4.5	3.8	5.4	10	50

[1]D = estimated density (birds/km^2); LCL and UCL = lower and upper 90% confidence limits on D; %CV = percent coefficient of variation of D; n = number of annual independent detections used to estimate D.
[2]Species of conservation and management concern (see Appendix B).

Pipe Springs National Monument (PISP)

We conducted 2 days of inventory efforts on PISP. The inventory efforts included 7 point counts and opportunistic surveys throughout the park.

DISCUSSION AND RECOMMENDATIONS

2009 Distance Analysis

In Tables 3-5, we give density estimates for all years' data (2005-2009). We did this for two reasons: 1) to provide a comparison of the five years' density estimates, and more importantly, 2) to provide more statistically rigorous estimates for 2005 – 2008. Each year of data added to this program's dataset will improve our ability to accurately estimate densities of and determine positive or negative trends of the species that occupy the NCPN. Please note that the density estimates presented in this report replace the estimates provided in the 2005 – 2008 reports.

Prospects for Population Monitoring

The National Park Service's project objective is to determine the population status and trends of breeding landbird species in Low-Elevation Riparian, Pinyon-Juniper, and Sage Shrubland. Determining landbird population trends is a long-term goal, and we will not be able to make definitive statements about population trends for any species for several years. However, in the short term, this program provides information needed to effectively manage and conserve landbird populations in the NCPN, including the spatial distribution, abundance, and relationships to important habitat characteristics for each species (please visit http://www.rmbo.org/public/monitoring to search this information). Initial information shows, the Mourning Dove an apparent annual decline in Low-Elevation Riparian habitat. Black Phoebe (in low-elevation riparian habitat), Black-throated Sparrow (in low-elevation riparian habitat) and Dusky Flycatcher (in sage shrubland habitat) are three species that are showing an apparent annual increase. Formal trend analyses will be conducted next year using all data through 2010.

Using distance sampling to monitor populations is a relatively new science. The software that RMBO uses (program Distance) is a new tool, and as with any statistical analysis program, is not perfect for every situation. We have noticed that for some species the densities are substantially higher than those presented in published literature. This problem seems to occur for bird species that we consistently detect at close distances (or bird species that are difficult to detect at far distances). These are typically species that do not sing loudly or produce sounds that are not detectable from a distance (i.e., Blue-gray Gnatcatcher or Black-chinned

Hummingbird). Black-chinned Hummingbird is one of these species for which we are presenting density estimates that are substantially higher than reported in published literature. Baltosser and Russell (2000) reports density estimates for the Black-chinned Hummingbird ranging from 17.5 to 82.5 birds/km$^{2.}$ In this report we present density estimates for Black-chinned Hummingbird in low-elevation riparian habitat ranging from 140.4 in 2008 to 272.2 birds/km^2 in 2006. This is one facet of distance sampling that RMBO intends to investigate in the future and develop a correction factor to adjust the estimates.

The Future of Avian Monitoring

In 2007, the North American Bird Conservation Initiative (NABCI) monitoring subcommittee outlined four recommendations for improving monitoring programs (NABCI 2007). First, monitoring programs should integrate an adaptive management approach into the monitoring process to incorporate management and conservation priorities. This goal is not practical for the goals and scope of the NCPN monitoring program; however we hope that trends identified in this early-warning program will lead to increased research and projects on species experiencing declines. The second recommendation is to coordinate landbird monitoring among organizations and across spatial scales to make monitoring more efficient and effective. RMBO coordinates with a variety of Federal, State, and local agencies throughout 12 different states in an effort to monitor landbird populations across a broad region using a spatially-balanced study design. Monitoring at different spatial scales is important in understanding population trends (NABCI 2007), and the NABCI report recommends using Bird Conservation Regions (BCRs) as a starting point for integrated landbird monitoring. We are working towards monitoring at the BCR scale. In 2009, we surveyed an entire BCR (BCR17 – Badlands and Prairies). In 2011, we plan on expanding this program to the state of Utah and Region 4 of the Forest Service. The third recommendation is to improve statistical design and review the chosen design periodically to make sure it meets the desired needs. In many of our study areas (e.g. Colorado, Wyoming) we are in a transition from habitat-based monitoring to using a spatially balanced study design. This design is more statistically rigorous and will allow us to analyze data at a variety of spatial scales. The NCPN will now be within a larger region that will be implementing the same design. The NCPN can adapt to this design where appropriate recognizing that many of the parks are small and this design may prove ineffective. The fourth recommendation is to create a database where all data resides and that is available to those who need it to make informed management decisions. We currently have an online database (http://www.rmbo.org/public/monitoring), where land managers, as well as the general public, can view distribution maps, species counts by project, past monitoring reports, and species accounts. In addition, RMBO is a partner of the Avian Knowledge Network (AKN) whose goal is to 1) compile bird monitoring data from various contributor organizations and organize them into one format and 2) make this data available to land managers, scientists, and the public for decision-making, research, and educational purposes.

Species Accounts

In 2009, we recorded 46 species of conservation and management concern according to the Utah Department of Wildlife Resources (UDWR), the U.S. Fish and Wildlife Service (USFWS), and Partners In Flight (PIF) (Table 6, Appendix B). Historically, we included full species accounts in our report for species of management interest. Starting in 2008, we provide this information online in the species account section of our Avian Data Center website. We provide information on life history, distribution, density estimates, and graphical representations of density estimates for all species detected. We will update this information annually. For online accounts, please visit: http://www.rmbo.org/public/monitoring/speciesaccounts.aspx

LITERATURE CITED

A.O.U. Check-list of North American Birds, 7th Edition. 2007. <http://www.aou.org/checklist/north/full.php>

Baltosser, William H. and Stephen M. Russell. 2000. Black-chinned Hummingbird (*Archilochus alexandri*), The Birds of North America Online (A.Poole, Ed.). Ithica: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/495>

Birdlife International. 2003. Biodiversity indicator for Europe: population trends of wild birds. <http://www.birdlife.org/action/science/indicators/pdfs/eu_briefing_bird_indicator.pdf>

Buckland, S.T., D.R. Anderson, K.P. Burnham, and J.L. Laake. 1993. *Distance Sampling: Estimating Abundance of Biological Populations.* Chapman and Hall, London, reprinted 1999 by RUWPA, University of St. Andrews, Scotland. 446pp.

Bureau of Land Management. 1998. Birds as indicators of riparian vegetation condition in the western U.S. Bureau of Land Management, Partners in Flight, Boise, Idaho. BLM/ID/PT-98/004+6635. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/birds/ripveg/index.htm>

Croonquist, M., and R. Brooks. 1991. Use of avian and mammalian guilds as indicators of cumulative impacts in riparian wetland areas. Environmental Management 15(5):701-714.

Hanni, D., C. White, J. Blakesley, G. Levandoski, and J. Birek. 2009. Point Transect Protocol. Unpublished document. Rocky Mountain Bird Observatory, Brighton, CO. 37 pp. <http://www.rmbo.org/PUBLIC/MONITORING/protocols/PT_Protocol_final_2009.pdf>

Hutto, R. L. 1998. Using landbirds as an indicator species group. Pp. 75-92 in Marzluff, J. M., and R. Sallabanks (eds.), Avian conservation: Research and Management. Island Press, Washington, DC.

Leukering, T. 2000. Point Transect Protocol for *Monitoring Colorado's Birds*. Unpublished document. Rocky Mountain Bird Observatory, Brighton, CO. 16 pp.

Leukering, T., M. Carter, A. Panjabi, D. Faulkner, and R. Levad. 2000. Monitoring Colorado's Birds: The Plan for Count-based Monitoring. Unpublished document. Rocky Mountain Bird Observatory, Brighton, CO. 25 pp. <http://www.rmbo.org/public/monitoring/plans/MCB_plan_2004.pdf>

Manley, P.N., W.M. Block, F.R. Thompson, G.S. Butcher, C. Paige, L.H. Suring, D.S. Winn, D. Roth, C.J. Ralph, E. Morris, C.H. Flather, and K. Byford. 1993. Guidelines for Monitoring Populations of Neotropical Migratory Birds on National Forest System Lands. USDA Forest Service, Washington. 35 pp.

Morrison, M. 1986. Bird populations as indicators of environmental change. Curr. Ornithology 3:429-451.

U.S. North American Bird Conservation Initiative Monitoring Subcommittee (NABCI). 2007. Opportunities for Improving Avian Monitoring. U.S. North American Bird Conservation Initiative Report. 50 pp. Available from the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Arlington, VA. <http://www.nabci-us.org/>

O'Connell, T.J., L.E. Jackson, and R.P. Brooks. 2000. Bird Guilds as indictors of ecological condition in the central Appalachians. Ecological Applications 10:1706-1721.

Partners In Flight. 2005. Species Assessment Database. <http://www.rmbo.org/pif/pifdb.html>

Rich, T. 2002. Using breeding land birds in the assessment of western riparian systems. Wildlife Society Bulletin. 30(4):1128-1139.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY.

Sauer, J.R. 1993. Monitoring Goals and Programs of the U.S. Fish and Wildlife Service. In Finch, D.M. and P.W. Stangel (eds.) Status and Management of Neotropical Migratory Birds; 1992 Set. 21-25; Estes Park, Co. Gen. Tech. Rep. RM-229. Fort Collins, CO. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 422 pp.

Thomas, L., S. T. Buckland, E. A. Rexstad, J. L. Laake, S. Strindberg, S. L. Hedley, J. R. B. Bishop, T. A. Marques, and K. P. Burnham. 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. Journal of Applied Ecology 47:5-14.

U.S. Environmental Protection Agency. 2002. Methods for evaluating wetland condition: biological assessment methods for birds. Office of Water, U.S. Environmental Protection Agency, Washington. D.C. EPA-822-R-02-023.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. <http://www.fws.gov/migratorybirds/>

Utah Division of Wildlife Resources. 2005. Utah Comprehensive Wildlife Conservation Strategy. 281 pp. (Accessed 1 November, 2009). <http://wildlife.utah.gov/cwcs/utah_cwcs_strategy.pdf>

APPENDIX A

List of all bird species observed during surveys in the Northern Colorado Plateau Network, with species totals by habitat for 2009, and yearly species totals from 2005-2009.

	Number of individuals observed per habitat, 2009[1]				Number of individuals observed per year and total (in all habitats sampled), 2005-2009					
Species	**LR**	**PJ**	**SA**	**PSNM**	**2005**	**2006**	**2007**	**2008**	**2009**	**Total**
Canada Goose	33		42		36	26	149	117	75	403
Gadwall					2	1	4			7
Mallard	5				2	16	3	17	5	43
Blue-winged Teal					1					1
Northern Shoveler							4			4
Green-winged Teal						1				1
Common Merganser[2]			1		6	6	10	4	1	27
Chukar	1	1				5	7		2	14
Greater Sage-Grouse[3]					19	2	1			22
Dusky Grouse[3]					1		1			2
Wild Turkey	15	2			6	14	2	7	17	46
Gambel's Quail[3]				7	9	15		1	7	32
Eared Grebe			1						1	1
Western Grebe						1				1
Great Blue Heron	1				10	3	3	3	1	20
White-faced Ibis					1					1
Turkey Vulture	9	8	2		25	30	29	9	19	112
Osprey[3]					1			1		2
Northern Harrier[3]			2		2	4	5	6	2	19
Sharp-shinned Hawk						1	1	2		4
Cooper's Hawk	6	2			17	17	14	5	8	61
Northern Goshawk[3]								1		1
Red-tailed Hawk	3	2	7		12	17	11	9	12	61
Golden Eagle[3]		1			8	10	4	6	1	29
American Kestrel	1	1	8		10	10	11	9	10	50
Peregrine Falcon[3]	1			2	5	5	7	10	3	30
Prairie Falcon[3]			1		2			2	1	5
Sandhill Crane[2]			1			1		2	1	4
Killdeer			5		4	3	2	3	5	17

	Number of individuals observed per habitat, 2009[1]				Number of individuals observed per year and total (in all habitats sampled), 2005-2009					
Species	**LR**	**PJ**	**SA**	**PSNM**	**2005**	**2006**	**2007**	**2008**	**2009**	**Total**
Spotted Sandpiper	1		2		1	2	7		3	13
Ring-billed Gull[2]							2			2
California Gull					13	3				16
Rock Pigeon					2	5	3			10
Eurasian Collared-Dove							1			1
Mourning Dove	58	144	80	1	426	573	520	402	283	2204
Yellow-billed Cuckoo[3]						1				1
Western Screech-Owl					1					1
Great Horned Owl					3			1		4
Long-eared Owl						2				2
Short-eared Owl[3]			1			4			1	5
Common Nighthawk[3]		6			2	2	1	2	6	13
Common Poorwill					1	1	1			3
White-throated Swift[3]	198	142	8	15	573	676	815	514	363	2941
Black-chinned Hummingbird	70	31	4		51	68	53	53	105	330
Broad-tailed Hummingbird[3]	7	6	16		68	30	48	76	29	251
Belted Kingfisher							1			1
Williamson's Sapsucker[3]					1		1	1		3
Red-naped Sapsucker[3]	2					2		1	2	5
Downy Woodpecker	11	2	1	1	5	11	3	8	15	42
Hairy Woodpecker	4	18	6		13	21	22	17	28	101
Northern Flicker	4	10	36		50	57	58	22	50	237
Olive-sided Flycatcher[3]			18		16	4	4	2	18	44
Western Wood-Pewee	35	1	20		40	44	64	44	56	248
Willow Flycatcher[3]	1				1	3	3		1	8
Hammond's Flycatcher[3]		21					9	9	21	39
Gray Flycatcher	9	225	31		160	116	108	142	265	791
Dusky Flycatcher[3]	1	23	84		51	111	99	136	108	505
Cordilleran Flycatcher[3]	3				4	1	2	3	3	13
Black Phoebe	35				12	16	30	13	35	106
Say's Phoebe[3]	76	21	19	8	102	98	63	95	124	482
Ash-throated Flycatcher	226	221	19	2	302	415	360	358	468	1903
Cassin's Kingbird		1		24		2			25	27
Western Kingbird	4	12	8	4	2	5	2	6	28	43

	Number of individuals observed per habitat, 2009[1]				Number of individuals observed per year and total (in all habitats sampled), 2005-2009					
Species	**LR**	**PJ**	**SA**	**PSNM**	**2005**	**2006**	**2007**	**2008**	**2009**	**Total**
Loggerhead Shrike[3]					3	1		1		5
Gray Vireo[3]	41	189	21	3	137	128	104	150	254	773
Plumbeous Vireo[3]	75	51	24		147	165	139	131	150	732
Warbling Vireo[3]	25	10	4		44	58	67	51	39	259
Steller's Jay			5		5	5	16	9	5	40
Western Scrub-Jay	21	33	5		117	90	80	85	59	431
Pinyon Jay[3]	2	91	4		122	177	229	74	97	699
Clark's Nutcracker[3]	1	6	27		65	29	26	17	34	171
Black-billed Magpie[3]			54		109	122	63	54	54	402
American Crow	2				12	1	2	4	2	21
Common Raven	27	69	49	10	141	158	199	171	155	824
Horned Lark			50		31	41	43	23	50	188
Tree Swallow		3	2		3	40	28	102	5	178
Violet-green Swallow[3]	312	73	29	1	283	514	546	429	415	2187
Northern Rough-winged Swallow	19			7	7	7	6	8	26	54
Bank Swallow							2	1		3
Cliff Swallow					189	66	49	87		391
Barn Swallow			2		1	2	3	1	2	9
Black-capped Chickadee		2			1	5	4		2	12
Mountain Chickadee	3	17	6		34	22	25	14	26	121
Juniper Titmouse[3]	35	232	4	6	147	120	138	159	277	841
Bushtit	23	72			190	140	53	30	95	508
Red-breasted Nuthatch		1	1		11	5	7	1	2	26
White-breasted Nuthatch		15	8		27	28	30	17	23	125
Pygmy Nuthatch[3]		3	7		13	10	23	7	10	63
Rock Wren[3]	146	171	100	8	315	403	349	303	425	1795
Canyon Wren[3]	38	19		2	52	105	70	37	59	323
Bewick's Wren[3]	112	108	2	5	240	307	197	205	227	1176
House Wren	45	6	10		59	62	39	55	61	276
American Dipper[3]	1				1	1	1	2	1	6
Ruby-crowned Kinglet		11			4	4	3	9	11	31
Blue-gray Gnatcatcher	260	257	40		347	307	296	337	557	1844
Western Bluebird[3]	15	5	9		17	19	20	18	29	103
Mountain Bluebird[3]	2	66	77		160	138	179	116	145	738

	Number of individuals observed per habitat, 2009[1]				Number of individuals observed per year and total (in all habitats sampled), 2005-2009					
Species	**LR**	**PJ**	**SA**	**PSNM**	**2005**	**2006**	**2007**	**2008**	**2009**	**Total**
Townsend's Solitaire[3]		14	5		5	6	13	6	19	49
Veery[2]						1				1
Swainson's Thrush		1							1	1
Hermit Thrush		18	6		15	21	2		24	62
American Robin	11	21	34	2	104	156	144	131	68	603
Northern Mockingbird	5	13	4	16		25	11	17	38	91
Sage Thrasher[3]			128		93	95	88	156	128	560
European Starling					15	21	11	17		64
Cedar Waxwing[2]	1						3	1	1	5
Phainopepla	1	2							3	3
Orange-crowned Warbler					2	2	2	2		8
Virginia's Warbler[3]	2	23	21		122	109	102	161	46	540
Lucy's Warbler[3]	46				1		11	20	46	78
Yellow Warbler	287		5		158	175	155	182	292	962
Yellow-rumped Warbler	4	3	8		26	66	32	51	15	190
Black-throated Gray Warbler[3]	63	533	51		397	552	458	566	647	2620
Grace's Warbler[3]		19	7		15	31	40	31	26	143
MacGillivray's Warbler	6	1			3	9	3	4	7	26
Common Yellowthroat	32	1	1		13	30	29	9	34	115
Wilson's Warbler[2]	3					4		3	3	10
Yellow-breasted Chat	64	2	6		52	58	54	49	72	285
Summer Tanager				1					1	1
Western Tanager	6	13	26		45	69	72	59	45	290
Green-tailed Towhee[3]	5	8	317		350	463	364	302	330	1809
Spotted Towhee	354	134	53		432	610	500	405	541	2488
Chipping Sparrow	34	206	47		156	155	196	218	287	1012
Brewer's Sparrow[3]	5	11	706		599	641	600	539	722	3101
Black-chinned Sparrow[3]	10	4			9	6	4		14	33
Vesper Sparrow		16	467		381	495	489	473	483	2321
Lark Sparrow	7	24	150		140	157	104	51	181	633
Black-throated Sparrow	190	107	38	32	114	178	194	151	367	1004
Sage Sparrow[3]			41		43	33	31	21	41	169
Savannah Sparrow						1	1			2
Song Sparrow	37	1	1		62	76	69	62	39	308

	Number of individuals observed per habitat, 2009[1]				Number of individuals observed per year and total (in all habitats sampled), 2005-2009					
Species	**LR**	**PJ**	**SA**	**PSNM**	**2005**	**2006**	**2007**	**2008**	**2009**	**Total**
Lincoln's Sparrow[2]		1			1			2	1	4
White-crowned Sparrow[2]			2			6	4	16	2	28
Dark-eyed Junco		1	3		40	19	47	35	4	145
Black-headed Grosbeak	26	19	1		27	54	37	37	46	201
Blue Grosbeak	30	1		4	14	32	6	6	35	93
Lazuli Bunting[3]	178	21	85		183	157	226	190	284	1040
Indigo Bunting	6					1			6	7
Red-winged Blackbird			1			4	1	2	1	8
Western Meadowlark	3	40	239		229	239	182	213	282	1145
Brewer's Blackbird			38		10	56	29	10	38	143
Brown-headed Cowbird	22	25	18	4	55	83	51	47	69	305
Bullock's Oriole	14		1	7	7	35	19	13	22	96
Scott's Oriole	6						1	5	6	12
Cassin's Finch[3]		2			4	39	14	14	2	73
House Finch	276	231	62	8	286	363	446	429	577	2101
Red Crossbill[3]		9	14		1	23	11		23	58
Pine Siskin[3]	5	1	10		4	22	4	17	16	63
Lesser Goldfinch	136	48	2	5	47	77	120	87	191	522
American Goldfinch	4	1	4		14	5	9	7	9	44
Evening Grosbeak[2]							1			1

[1] Habitats: LR=Low-Elevation Riparian; PJ=Pinyon-Juniper; SA=Sage Shrubland; PSNM=Pipe Springs National Monument.
[2] This species was most likely a migrant based on the time of year and where we recorded it.
[3] Species of conservation and management concern (Appendix B).

APPENDIX B

Species of conservation and management concern observed on transects in the Northern Colorado Plateau Network from 2005-2009, with conservation and management designations and species totals per habitat.

	Species Management Designation				Number of individuals observed per habitat, 2005-2009[4]			
			Partners In Flight[3]					
Species	UDWR[1]	USFWS[2]	BCR 10	BCR 16	LR	PJ	SA	PSNM
Greater Sage-Grouse	Tier II		CC,RC,CS,RS	CC,RC			22	
Dusky Grouse			CC,RC	CC			2	
Gambel's Quail	Tier III				1	22	2	7
Osprey	Tier III					1	1	
Northern Harrier		BCC	RC		3		16	
Northern Goshawk	Tier I		RC,RS				1	
Golden Eagle		BCC		RC	3	13	13	
Peregrine Falcon	Tier III	BCC			19	6	3	2
Prairie Falcon		BCC		RC	1		4	
Yellow-billed Cuckoo	Tier I				1			
Short-eared Owl	Tier II	BCC	CC				5	
Common Nighthawk				RC	1	10	2	
White-throated Swift			CC	CC,RS	1900	874	152	15
Broad-tailed Hummingbird	Tier III			RS	56	66	129	
Williamson's Sapsucker	Tier III		CS,RS	CS,RS		1	2	
Red-naped Sapsucker			CS,RS		4		1	
Olive-sided Flycatcher			CC,RC	CC	1	8	35	
Willow Flycatcher	Tier I	BCC	CC,RS	CC,RC	7	1		
Hammond's Flycatcher			RS			34	5	
Dusky Flycatcher			CS,RS		26	154	325	
Cordilleran Flycatcher				RS	10	3		
Say's Phoebe				RS	293	97	84	8
Loggerhead Shrike		BCC	RC	RC	1	2	2	
Gray Vireo	Tier III	BCC		CC,RC,RS	155	576	39	3
Plumbeous Vireo				RS	372	298	62	
Warbling Vireo				RS	175	22	62	
Pinyon Jay		BCC	CC	CC,RC,CS,RS	55	560	84	
Clark's Nutcracker			CS,RS	CS,RS	33	54	84	

	Species Management Designation				Number of individuals observed per habitat, 2005-2009[4]			
			Partners In Flight[3]					
Species	UDWR[1]	USFWS[2]	BCR 10	BCR 16	LR	PJ	SA	PSNM
Black-billed Magpie				RS	4	8	390	
Violet-green Swallow				RS	1619	389	178	1
Juniper Titmouse				RC,RS	193	615	27	6
Pygmy Nuthatch				RC		32	31	
Rock Wren				RS	599	624	564	8
Canyon Wren				RC	223	94	4	2
Bewick's Wren		BCC			421	726	24	5
American Dipper			RS		6			
Western Bluebird				RS	28	23	52	
Mountain Bluebird				RC,CS,RS	44	269	425	
Townsend's Solitaire			RS		3	31	15	
Sage Thrasher	Tier III	BCC				1	559	
Virginia's Warbler	Tier III			CC,RC,RS	212	188	140	
Lucy's Warbler	Tier III				78			
Black-throated Gray Warbler				RC	399	2064	157	
Grace's Warbler				CC,RC	3	81	59	
Green-tailed Towhee				CS,RS	17	71	1721	
Brewer's Sparrow	Tier III		CC,RC	CC,RC	17	64	3020	
Black-chinned Sparrow				CC	18	14	1	
Black-throated Sparrow				RC	447	417	108	32
Sage Sparrow	Tier III	BCC		RC	3		166	
Lazuli Bunting			RS		877	54	109	
Cassin's Finch		BCC	RC,CS,RS	RC	5	42	26	
Red Crossbill			RS			20	38	
Pine Siskin				RC,RS	30	10	23	

[1] UDWR=Utah Division of Wildlife Resources, Tier X= Utah Comprehensive Wildlife Conservation Strategy Tier X Species of Greatest Conservation Need (Utah Division of Wildlife Resources 2005).

[2] USFWS=United States Fish and Wildlife Service, BCC=Bird of Conservation Concern for Region 6 (Mountain-Prairie Region) (US Fish and Wildlife Service 2002).

[3] Partners In Flight, BCR10=Bird Conservation Region 10 (Northern Rockies), BCR 16=Bird Conservation Region 16 (Southern Rockies/Colorado Plateau), CC=Continental Concern Species, RC=Regional Concern Species, CS=Continental Stewardship Species, RS = Regional Stewardship Species (Partners In Flight, 2005).

[4] Habitats: LR=Low-Elevation Riparian; PJ=Pinyon-Juniper; SA=Sage Shrubland; PSNM=Pipe Springs National Monument.

APPENDIX C

Species recorded during the inventory in Pipe Springs National Monument, 2009.

Species[1]
Mallard
Gambel's Quail[2]
Red-tailed Hawk
Golden Eagle[2]
Peregrine Falcon[2]
Killdeer
Mourning Dove
White-throated Swift[2]
Black-chinned Hummingbird
Downy Woodpecker
Gray Flycatcher
Say's Phoebe[2]
Ash-throated Flycatcher
Cassin's Kingbird
Western Kingbird
Gray Vireo[2]
Western Scrub-Jay
Common Raven
Violet-green Swallow[2]
Northern Rough-winged Swallow
Juniper Titmouse[2]
Rock Wren[2]
Canyon Wren[2]
Bewick's Wren[2]
Blue-gray Gnatcatcher
American Robin
Northern Mockingbird
European Starling
Black-throated Gray Warbler[2]
Black-throated Sparrow[2]
Summer Tanager
Blue Grosbeak
Black-throated Sparrow[2]
Brown-headed Cowbird
Bullock's Oriole
Scott's Oriole
House Finch
Lesser Goldfinch
House Sparrow

[1]Note from the observer: Some of the counts in this table include juveniles, particularly Bewick's Wren, Black-throated Sparrow, Northern Mockingbird, Rock Wren, and Say's Phoebe.
[2]Species of conservation and management concern (Appendix B).