



Bird Community Monitoring for Canyon de Chelly National Monument

2012 Summary Report

Natural Resource Data Series NPS/SCPN/NRDS—2014/622



ON THE COVER

Spotted towhee (*Pipilo maculatus*)

Photograph courtesy of Ken Schneider

Bird Community Monitoring for Canyon de Chelly National Monument

2012 Summary Report

Natural Resource Data Series NPS/SCPN/NRDS—2014/622

Jennifer A. Holmes
Matthew J. Johnson

Northern Arizona University
P.O. Box 5614
Flagstaff, AZ 86011-5614

February 2014

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Data Series is intended for timely release of basic data sets and data summaries. Care has been taken to ensure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change. Please direct any data requests to the SCPN data manager.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

Funding for this project was provided by the Southern Colorado Plateau I&M Network of the National Park Service to Northern Arizona University under Colorado Plateau Cooperative Ecosystems Study Unit agreement H1200090005 (Task NAU-415).

The corresponding author and project manager for this project is Jennifer Holmes (Jennifer.Holmes@nau.edu). Other contributions were made by the SCPN staff. The 2012 field crew consisted of Evan Buechley, Stephanie Gobert, Jamie Granger, and Sean Mahoney.

This report is available from the Southern Colorado Plateau Network (<http://science.nature.nps.gov/im/units/scpn/>), and the Natural Resource Publications Management Web site (<http://www.nature.nps.gov/publications/nrpm/>) on the Internet. To receive this report in a format optimized for screen readers, please email irma@nps.gov.

Please cite this publication as:

Holmes, J. A., and M. J. Johnson. 2014. Bird community monitoring for Canyon de Chelly National Monument: 2012 summary report. Natural Resource Data Series NPS/SCPN/NRDS—2014/622. National Park Service, Fort Collins, Colorado.

Contents

Tables iv

Figures iv

1 Introduction and background..... 1

2 Methods 1

 2.1 Sampling frame 1

 2.2 Field methods 2

 2.3 Data summary 3

 2.3.1 *Variable Circular Plot count data* 3

 2.3.2 *Habitat data* 3

3 Results 4

 3.1 Summary of bird community data..... 4

 3.2 Summary of bird habitat data 6

4 Discussion..... 9

5 Literature cited..... 9

Figures

Figure 1. Bird monitoring sampling frame for riparian habitat in Canyon de Chelly NM. 2

Figure 2. Basal area of trees, by species, and of snags in riparian habitat in Canyon de Chelly NM, 2012. Error bars represent one standard deviation. 7

Figure 3. Size structure of sapling trees. Mean density (number of stems/ha) of sapling trees in 2 size classes (2.5 to <5, and 5 to <10 cm DBH) in riparian habitat in Canyon de Chelly NM, 2012. Error bars represent one standard deviation. 8

Tables

Table 1. Survey periods, dates, and sampling effort (number of plots sampled) for riparian bird community monitoring at Canyon de Chelly NM in 2012. 2

Table 2. Vegetation cover types and other landcover types in riparian habitat at Canyon de Chelly NM. 3

Table 3. Bird species and number detected during VCP counts in riparian habitat at Canyon de Chelly NM, 2012. Species are listed in descending order of the total number of individuals detected..... 4

Table 4. Mean number of individuals detected per species per VCP count, standard deviation (SD), and plot frequency (% of plots in which the species was detected) for 182 VCP in riparian habitat at Canyon de Chelly NM, 2012. 5

Table 5. Mean cover of vegetation cover and other landcover types, standard deviation (SD), range, and plot frequency within macroplots in target riparian habitat in Canyon de Chelly NM, 2012. 7

Table 6. Basal area of overstory trees, by species, and of all snags, and mean density of saplings by species in riparian habitat in Canyon de Chelly NM, 2012. Basal area is provided for overstory trees (DBH greater or equal to 10 cm), and density is provided for saplings (<10 cm DBH). Scientific and common names are provided for each tree species. 7

Table 7. Mean foliar cover, standard deviation (SD), and range of foliar cover by functional group in target riparian habitat in Canyon de Chelly NM, 2012. 8

1 Introduction and background

The National Park Service Inventory and Monitoring Program was designed to determine the current status and monitor long-term trends in the condition of park natural resources, providing park managers with a strong scientific foundation for making decisions and working with other agencies and the public for the protection of park ecosystems. The goal of bird community monitoring is to provide status and trends data on bird communities in several predominant habitats where integrated upland or riparian vegetation monitoring is also occurring.

For Canyon de Chelly National Monument (CACH), Southern Colorado Plateau Network (SCPN) and park staff selected the riparian habitat as an important ecosystem for vegetation and bird community monitoring. This habitat contributes substantially to the biodiversity of the region, but invasion by nonnative species, hydrologic change, soil erosion, and climate change threaten its integrity.

The riparian woodlands at CACH have been undergoing extensive restoration through the selective thinning of nonnative plants, primarily Russian olive (*Elaeagnus angustifolia*) and tamarisk or salt cedar (*Tamarix* spp.). The objectives for this restoration are 1) to reduce the density of nonnatives to reflect historical conditions, 2) to increase the native plant cover, and 3) to restore the hydrological regime.

In 2012, through a Colorado Plateau Cooperative Ecosystems Study Unit agreement with SCPN, we continued monitoring the bird community of the target riparian habitat in CACH, which had been initiated in 2009. In this report, we document monitoring activities in the 2012 field season and summarize the data that were collected.

2 Methods

2.1 Sampling frame

A sampling frame is the area within which we locate our sites, and hence, the area to which statistical inferences can be made based on monitoring data. For upland monitoring, SCPN generally uses ecological sites developed by the U.S. Natural Resources Conservation Service to create their sampling frames. Ecological sites are landscape divisions with characteristic soils, hydrology, plant communities, and disturbance regimes and responses, and are based on soil survey data (Butler et al. 2003). For riparian monitoring, the bird sampling frame initiates from an individual stream length of a targeted system, and a GIS stream line is identified using the National Hydrography Dataset. A line of points are then placed evenly, usually 150 m apart, along the stream. Each point is examined using an aerial photo or by surveying in the field and then moved to the center of the widest occurrence of riparian vegetation (using a line perpendicular to the stream line). These points within the target riparian habitat form the sampling frame. If there is not at least a 50 m radius of riparian vegetation surrounding a point, it is rejected. In other cases where the riparian vegetation zone is sufficiently wide, additional sampling points can be placed in the zone, as long as the 150 m spacing between points can be maintained. The process is repeated until the entire target riparian area has been assessed for placement of potential sampling points.

In the initial year of monitoring (2009), CACH staff first reviewed the sampling plots and rejected those plots that landed in the proximity of archeological sites. Next, the bird monitoring crew evaluated the accessibility of plots in the field and rejected plots that were inaccessible. For CACH riparian monitoring, sites were deemed inaccessible if they required greater than 2 hours traveling time (by car and foot) from the CACH headquarters.

The bird monitoring crew then visited and assessed each sampling plot to ensure that (1) it fell within the target habitat, and (2) it was at least 50 m from a canyon wall. Any plots that did not meet these criteria were rejected. In the riparian habitat, we selected 91 sampling plots and rejected 41. Only a relatively small area was available for sampling at CACH, and all logistically feasible plots were sampled (i.e., a “census approach” was taken; see Appendix A of Holmes et al., in review).

2.2 Field methods

We conducted bird sampling at permanent sampling plots, or Variable Circular Plots (VCP), within riparian habitat at CACH (Figure 1) over 2 survey periods. We sampled a total of 91 VCP (Table 1). We provide a brief description of field methods here. A more detailed description can be found in Holmes et al. (in review).

At each sampling plot, we conducted a VCP count, noting all birds seen or heard during an 8-minute sampling period, regardless of the distance from the observer. We recorded (1) the species, (2) method of detection, (3) gender (if known), and (4) distance from the sampling plot center to the individual bird. Distances were measured to the nearest meter using a laser range finder. During a single morning, 2 technicians surveying separate groups of sampling plots conducted approximately 9 VCP counts each.

Table 1. Survey periods, dates, and sampling effort (number of plots sampled) for riparian bird community monitoring at Canyon de Chelly NM in 2012.

Survey period	Dates (2012)	Number of VCP counts
1	27 April–2 May	91
2	22 May–29 May	91

Habitat sampling was conducted on a 50 m radius macroplot centered on a sampling plot, and in 4 subplots within the macroplot. First, for the macroplot, we estimated and recorded the area occupied by vegetation types and other land-use types. Then, in the 4 subplots, we recorded tree and snag basal area, canopy closure, and foliar vegetation cover by functional group (e.g., forbs, shrubs). We measured basal area using a Cruz-All (a type of angle gauge), and canopy closure using a spherical densiometer. Ocular estimates of foliar cover were made using a modified Braun-Blanquet cover class scale.

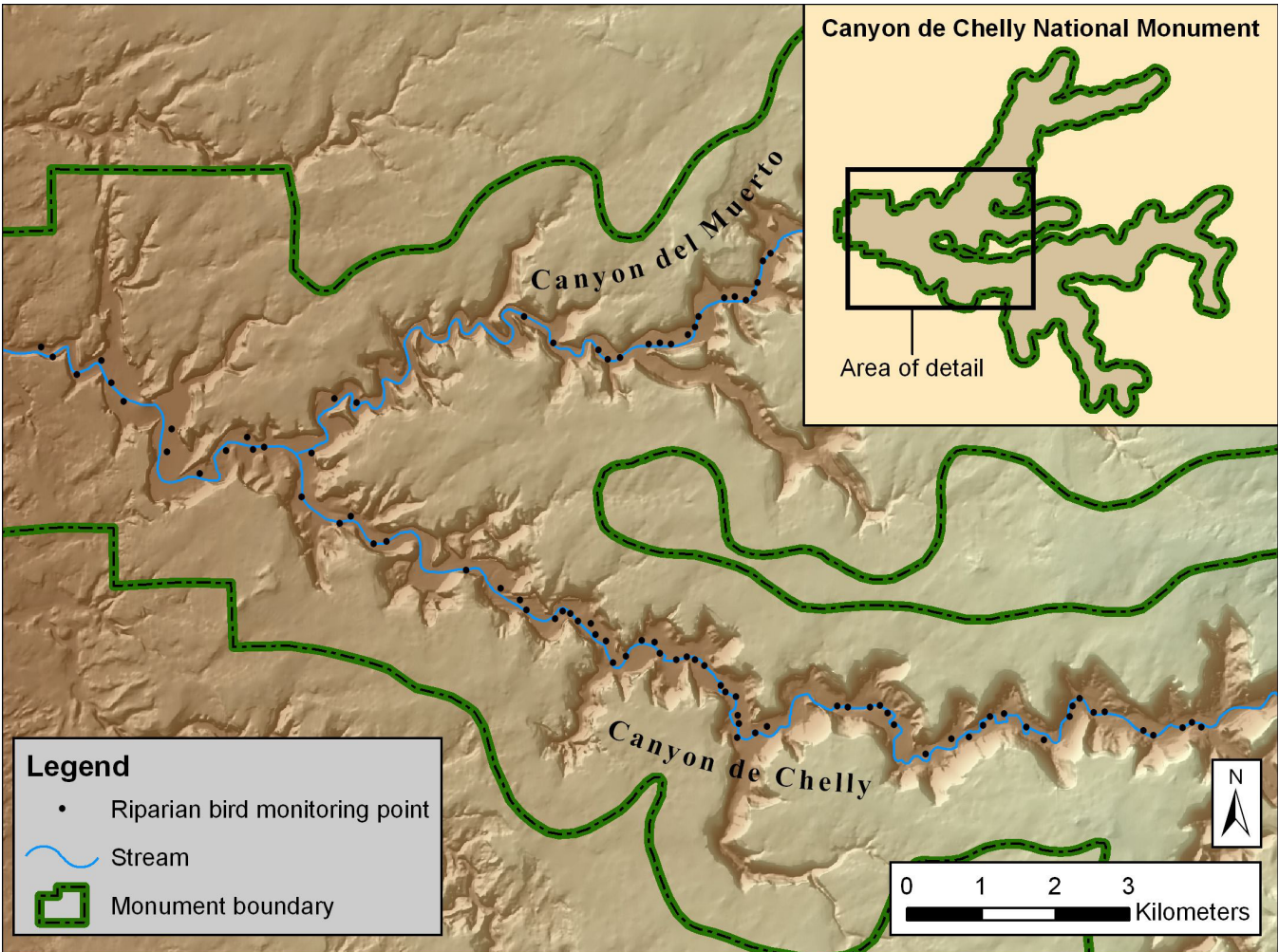


Figure 1. Bird monitoring sampling frame for riparian habitat in Canyon de Chelly NM.

2.3 Data summary

2.3.1 Variable Circular Plot count data

We summarized the following data for all sample units in the target riparian habitat at CACH. The sample unit for bird data is the VCP.

- Observed species richness (unadjusted for detectability) is the number of species detected within a given area and specified time.
- Mean number of individuals detected for each species is reported as the average number of individuals detected per 8-minute VCP count. To calculate mean number of individuals detected for each species, the data for all plots are averaged across the 2 survey periods, and a mean number of individuals detected and standard deviation are calculated for the target habitat. Detectability-based density estimates are not reported here, but they will be derived for multi-year trend reports.
- Frequency is the proportion of plots in which each species was detected. To calculate species frequency, we calculated the proportion of plots in the target habitat in which the species was detected. For example, if a warbling vireo was detected on 85 of the 91 plots in the target habitat during any or all of the 2 visits to that plot, the proportion of plots occupied in the target habitat would be 93.41%.

2.3.2 Habitat data

For CACH, habitat data were collected within a circular 0.8 ha macroplot which contained 4 subplots and was centered on each bird sampling plot. Data were summarized at 2 levels: the macroplot and the target habitat. The means and standard deviations for the target habitat were calculated from the macroplot data.

Vegetation cover types. We classified vegetation into 7 cover types for CACH riparian habitat and 6 other, non-vegetation cover types, as shown in Table 2. For each cover type we calculated

- mean percent cover, by calculating the mean cover and standard deviation for each vegetation type and other landcover types in the target habitat (using the cover class midpoints)
- frequency, by reporting the number of macroplots in which a specific cover type had been recorded, as a proportion of the total number of macroplots

Basal area. We calculated tree basal area (m²/ha) for each tree species, and calculated snag basal area for all snags. We calculated mean basal area for the macroplot, and then mean basal area and standard deviation for the target habitat.

Foliar cover of functional groups. We calculated the mean percent foliar cover for each functional group for the macroplot, using the cover class midpoints, and the mean and standard deviation for the target habitat.

Table 2. Vegetation cover types and other landcover types in riparian habitat at Canyon de Chelly NM.

Cover type	Description
Cottonwood: open understory	Dominated by cottonwood overstory and a sparse understory with few or no trees and/or shrubs.
Cottonwood: dense understory	Dominated by cottonwood overstory and with a dense understory of trees and/or shrubs.
Dense riparian	Dominated by various combinations of Russian olive (<i>Elaeagnus angustifolia</i>), tamarisk (<i>Tamarix ramosissima</i>), Goodding's willow (<i>Salix gooddingii</i>), and cottonwoods (<i>Populus</i> spp.); not dominated by cottonwood overstory.
Restoration treatment	Riparian areas where Russian olive and/or tamarisk have been cut down and left or removed.
Open: grass-dominated	Few to no trees or shrubs, with grass and/or forb cover.
Open: grazed	Few to no trees or shrubs, with little to no grass and/or forb cover due to livestock grazing.
Cultivated	Fields and gardens.
Dry arroyo	A dry deep gully or dry gulch cut by an intermittent stream. Generally devoid of vegetation.
Stream: perennial	A stream that carries water a considerable portion of time, and rarely ceases to flow.
Stream: intermittent	A stream that carries water a considerable portion of time, but that ceases to flow occasionally or seasonally.
Dirt road	Distinct roadway with little to no vegetation growing.
Bare ground	Areas with no vegetation.
Trails	Pathways and seldom used dirt roads with little to no vegetation.

3 Results

3.1 Summary of bird community data

In 2012, we conducted a total of 182 VCP counts in riparian habitat at CACH and detected 2,133 individuals of 48 species (Table 3). The most commonly detected species was the spotted towhee. This species comprised 14.39% of the total number of detections. Other commonly detected species included the chipping sparrow and house finch.

Table 3. Bird species and number detected during VCP counts in riparian habitat at Canyon de Chelly NM, 2012. Species are listed in descending order of the total number of individuals detected.

Common name	Scientific name	Total number of detections	Proportion of all detections (%)
spotted towhee	<i>Pipilo maculatus</i>	307	14.39
chipping sparrow	<i>Spizella passerina</i>	281	13.17
house finch	<i>Carpodacus mexicanus</i>	236	11.06
blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	189	8.86
white-throated swift	<i>Aeronautes saxatalis</i>	187	8.77
warbling vireo	<i>Vireo gilvus</i>	182	8.53
common raven	<i>Corvus corax</i>	105	4.92
cedar waxwing	<i>Bombycilla cedrorum</i>	94	4.41
mourning dove	<i>Zenaida macroura</i>	88	4.13
ash-throated flycatcher	<i>Myiarchus cinerascens</i>	52	2.44
black-headed grosbeak	<i>Pheucticus melanocephalus</i>	49	2.30
violet-green swallow	<i>Tachycineta thalassina</i>	34	1.59
yellow warbler	<i>Setophaga petechia</i>	34	1.59
western tanager	<i>Piranga ludoviciana</i>	29	1.36
American robin	<i>Turdus migratorius</i>	27	1.27
rock wren	<i>Salpinctes obsoletus</i>	26	1.22
hairy woodpecker	<i>Picoides villosus</i>	24	1.13
lesser goldfinch	<i>Carduelis psaltria</i>	20	0.94
plumbeous vireo	<i>Vireo plumbeus</i>	20	0.94
Say's phoebe	<i>Sayornis saya</i>	20	0.94
lazuli bunting	<i>Passerina amoena</i>	16	0.75
black-chinned hummingbird	<i>Archilochus alexandri</i>	15	0.70
western wood-pewee	<i>Contopus sordidulus</i>	13	0.61
yellow-breasted chat	<i>Icteria virens</i>	11	0.52
brown-headed cowbird	<i>Molothrus ater</i>	7	0.33
ruby-crowned kinglet	<i>Regulus calendula</i>	7	0.33
turkey vulture	<i>Cathartes aura</i>	7	0.33
pinyon jay	<i>Gymnorhinus cyanocephalus</i>	6	0.28
peregrine falcon	<i>Falco peregrinus</i>	5	0.23
juniper titmouse	<i>Baeolophus ridgwayi</i>	4	0.19
mallard	<i>Anas platyrhynchos</i>	4	0.19
Wilson's warbler	<i>Wilsonia pusilla</i>	4	0.19
yellow-rumped warbler	<i>Setophaga coronata</i>	4	0.19
blue grosbeak	<i>Passerina caerulea</i>	3	0.14
canyon wren	<i>Catherpes mexicanus</i>	3	0.14

Table 3 (continued)

Common name	Scientific name	Total number of detections	Proportion of all detections (%)
Cooper's hawk	<i>Accipiter cooperii</i>	3	0.14
Lucy's warbler	<i>Vermivora luciae</i>	3	0.14
MacGillivray's warbler	<i>Oporornis tolmiei</i>	2	0.09
pine siskin	<i>Carduelis pinus</i>	2	0.09
western bluebird	<i>Sialia mexicana</i>	2	0.09
hermit thrush	<i>Catharus guttatus</i>	1	0.05
indigo bunting	<i>Passerina cyanea</i>	1	0.05
orange-crowned warbler	<i>Vermivora celata</i>	1	0.05
red-tailed hawk	<i>Buteo jamaicensis</i>	1	0.05
white-breasted nuthatch	<i>Sitta carolinensis</i>	1	0.05
white-crowned sparrow	<i>Zonotrichia leucophrys</i>	1	0.05
willow flycatcher	<i>Empidonax traillii</i>	1	0.05
wild turkey	<i>Meleagris gallopavo</i>	1	0.05

The mean number of individuals detected per species during a VCP count and the frequency of detections for each species detected in CACH riparian habitat are presented in Table 4. The spotted towhee and chipping sparrow had the highest mean number of individuals, with an average of 1.70 and 1.55 individuals detected, respectively, during an 8-minute count. Both species were also widespread in the target habitat—detected on 97.80% and 94.51% of the plots, respectively.

Table 4. Mean number of individuals detected per species per VCP count, standard deviation (SD), and plot frequency (% of plots in which the species was detected) for 182 VCP in riparian habitat at Canyon de Chelly NM, 2012.

Species	Number of individuals		Plot frequency (%)
	Mean	SD	
spotted towhee	1.70	1.16	97.80
chipping sparrow	1.55	1.31	94.51
house finch	1.30	1.25	87.91
blue-gray gnatcatcher	1.04	0.82	87.91
white-throated swift	1.03	2.73	46.15
warbling vireo	1.01	1.22	85.71
common raven	0.58	0.69	72.53
cedar waxwing	0.52	4.43	4.40
mourning dove	0.49	0.83	54.95
ash-throated flycatcher	0.29	0.53	42.86
black-headed grosbeak	0.27	0.54	38.46
violet-green swallow	0.19	1.13	8.79
yellow warbler	0.19	0.54	26.37
western tanager	0.16	0.40	28.57
American robin	0.15	0.47	17.58
rock wren	0.14	0.37	24.18
hairy woodpecker	0.13	0.37	21.98
lesser goldfinch	0.11	0.35	16.48
plumbeous vireo	0.11	0.35	19.78

Table 4 (continued)

Species	Number of individuals		Plot frequency (%)
	Mean	SD	
Say's phoebe	0.11	0.35	17.58
lazuli bunting	0.09	0.38	10.99
black-chinned hummingbird	0.08	0.28	15.38
western wood-pewee	0.07	0.35	9.89
yellow-breasted chat	0.06	0.30	8.79
brown-headed cowbird	0.04	0.22	4.40
ruby-crowned kinglet	0.04	0.19	7.69
turkey vulture	0.04	0.27	5.49
pinyon jay	0.03	0.18	6.59
peregrine falcon	0.03	0.20	4.40
juniper titmouse	0.02	0.23	2.20
mallard	0.02	0.21	2.20
Wilson's warbler	0.02	0.18	3.30
yellow-rumped warbler	0.02	0.15	4.40
blue grosbeak	0.02	0.13	3.30
canyon wren	0.02	0.13	3.30
Cooper's hawk	0.02	0.13	3.30
Lucy's warbler	0.02	0.13	3.30
MacGillivray's warbler	0.01	0.10	2.20
pine siskin	0.01	0.15	1.10
western bluebird	0.01	0.10	2.20
hermit thrush	0.01	0.07	1.10
indigo bunting	0.01	0.07	1.10
orange-crowned warbler	0.01	0.07	1.10
red-tailed hawk	0.01	0.07	1.10
white-breasted nuthatch	0.01	0.07	1.10
white-crowned sparrow	0.01	0.07	1.10
willow flycatcher	0.01	0.07	1.10
wild turkey	0.01	0.07	1.10

3.2 Summary of bird habitat data

We found 13 vegetation cover and other landcover types in the macroplots in the CACH riparian sample area (Table 5). Cottonwood with an open understory had, on average, the highest percent cover and was recorded on 57.14% of the macroplots. Dense riparian, and cottonwood with a dense understory were also common vegetation cover types on the macroplots. Restoration treatment areas were recorded on 19.78% of the macroplots and these sites had, on average, 9.18% cover. The percent cover was highly variable for all vegetation cover types, as reflected in the relatively high standard deviations (SD; Table 5).

In Table 6, the abundance of trees within each species is expressed in terms of basal area of overstory trees, and sapling density in 2 size classes. The abundance of snags is expressed in terms of basal area, recorded for all species combined. Figure 2 illustrates basal area of trees by species or genus and basal area of snags. Of the 4 tree species and 3 genera recorded on the sampling plots, Russian olive had the highest basal area (see Table 6 for scientific and common names of tree species). Figure 3 illustrates the density of sapling trees (less than 10 cm DBH) by species and size class. Russian olive dominated both of the sapling classes; the willow, *Salix exigua*, was also common in the smaller class.

Table 5. Mean cover of vegetation cover and other landcover types, standard deviation (SD), range, and plot frequency within macroplots in target riparian habitat in Canyon de Chelly NM, 2012.

Cover type	Cover (%)			Frequency (%)
	Mean	SD	Range	
Cottonwood: open understory	31.00	35.81	0.00–87.50	57.14
Dense riparian	24.56	36.20	0.00–87.50	35.16
Cottonwood: dense understory	14.68	27.45	0.00–87.50	30.77
Restoration treatment area	9.18	23.27	0.00–87.50	19.78
Open: grass-dominated area	4.56	13.66	0.00–87.50	20.88
Stream: intermittent	4.30	7.71	0.00–37.50	61.54
Dirt road	2.67	6.24	0.00–37.50	43.96
Open: grazed	1.12	4.82	0.00–37.50	9.89
Cultivated	0.41	3.93	0.00–37.50	1.10
Dry arroyo	0.15	0.90	0.00–7.50	3.30
Trails	0.10	0.54	0.00–3.00	4.40
Bare ground	0.08	0.79	0.00–7.50	1.10
Stream: perennial	0.07	0.44	0.00–3.00	2.20

Table 6. Basal area of overstory trees, by species, and of all snags, and mean density of saplings by species in riparian habitat in Canyon de Chelly NM, 2012. Basal area is provided for overstory trees (DBH greater or equal to 10 cm), and density is provided for saplings (<10 cm DBH). Scientific and common names are provided for each tree species.

Species	Common name	Basal area (m ² /ha)	Sapling density (stems/ha) by size class	
			2.5 to <5 cm DBH	5 to <10 cm DBH
<i>Elaeagnus angustifolia</i>	Russian olive	17.75	66.81	86.75
<i>Populus</i> spp.	Cottonwood	8.69	4.90	18.54
<i>Salix exigua</i>	Willow	8.05	55.27	2.80
<i>Salix gooddingii</i>	Goodding's willow	1.56	2.45	8.05
<i>Juniperus</i> spp.	Juniper	0.05	—	—
<i>Ulmus</i> spp.	Elm	0.01	—	0.35
<i>Salix amygdaloides</i>	Willow	—	—	0.35
All species		36.12	129.42	116.83
Snags		0.54		

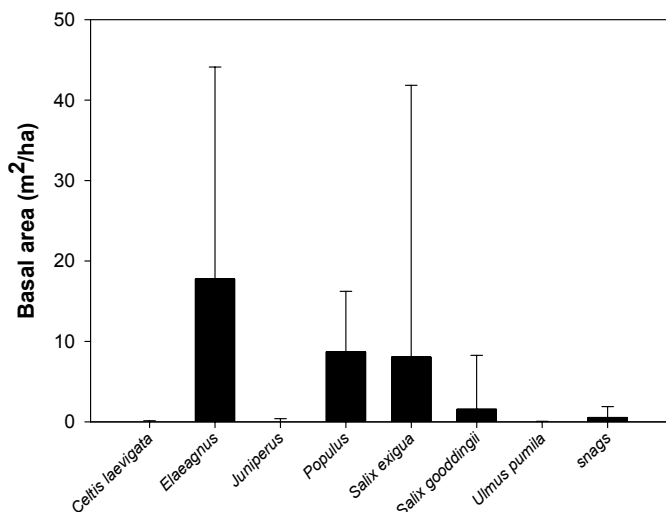
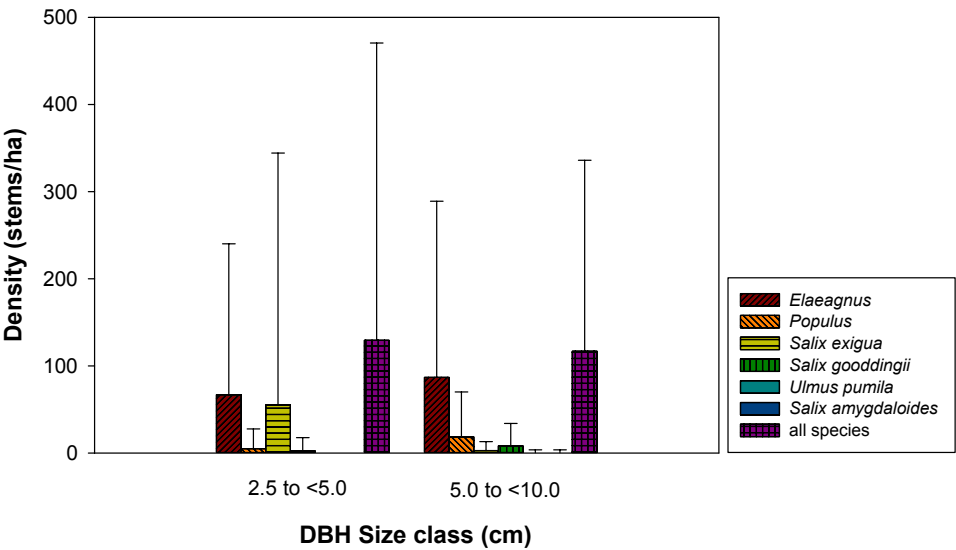


Figure 2. Basal area of trees, by species, and of snags in riparian habitat in Canyon de Chelly NM, 2012. Error bars represent one standard deviation.

Figure 3. Size structure of sapling trees. Mean density (number of stems/ha) of sapling trees in 2 size classes (2.5 to <5, and 5 to <10 cm DBH) in riparian habitat in Canyon de Chelly NM, 2012. Error bars represent one standard deviation.



The understory of the riparian habitat at CACH was mainly comprised of forbs and standing dead herbaceous cover (Table 7). There was considerable variation in the amount of total shrub and herbaceous cover—mean foliar cover ranged from 0 to 22.63%.

Table 7. Mean foliar cover, standard deviation (SD), and range of foliar cover by functional group in target riparian habitat in Canyon de Chelly NM, 2012.

Functional groups	Foliar cover (%)		
	Mean	SD	Range
Tree seedlings	0.78	1.62	0.00–10.13
Total shrub and herbaceous cover (no trees)	3.51	3.71	0.00–22.63
Perennial grasses, graminoids	0.89	1.83	0.00–12.00
Annual grasses	0.66	0.82	0.00–3.50
Forbs	1.78	2.04	0.00–11.38
Shrubs, dwarf shrubs and woody vines	0.06	0.24	0.00–1.88
Cacti, succulents	0.16	0.45	0.00–1.88
Standing dead herbaceous	2.00	3.22	0.00–21.38
Woody standing dead	1.66	2.22	0.00–10.88

4 Discussion

These data represent the second year of sampling for the riparian bird community at CACH. As in 2009, the majority of species in the riparian bird community are also commonly found in upland habitats. Yet 4 riparian obligate species were detected: yellow warbler, yellow-breasted chat, blue grosbeak, and Lucy's warbler.

We detected more spotted towhees than any other bird species. They are a common species in Arizona's semiarid scrubby thickets, including brushy canyons. Spotted towhees forage on the ground, and leaf litter is thought to be an important habitat component, along with shrubs that provide cover (Wise-Gervais 2005). Trend estimates using BBS (Breeding Bird Survey) data for 1968–1995 showed a statewide increase in the species in Arizona during that time (Greenlaw 1996).

One riparian obligate, the Lucy's warbler, is of particular interest. Published range maps, including the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005), do not include northeast Arizona and Canyon de Chelly NM in the Lucy's warbler's range. We detected this species in 2009 and again in 2012, and our detections indicate an expansion of the species' range, although we did not confirm breeding. The Lucy's warbler is on the Rare Species Yellow WatchList, part of the United States WatchList of Birds of Conservation Concern (Butcher et al. 2007). It is on the WatchList primarily due to its relatively small breeding range, which extends from extreme southern Utah and Nevada south to southeastern California and northern Sonora and east to New Mexico and extreme western Texas.

Our long-range plan for riparian bird community monitoring is to conduct VCP counts every 3 years to continue collecting data on bird species abundance, distribution, and habitat metrics. When sufficient data have been collected, we will analyze changes in these data over time.

5 Literature cited

- Butcher, G. S., D. K. Niven, A. O. Panjabi, D. N. Pashley, and K. V. Rosenberg. 2007. The 2007 WatchList for United States Birds. *American Birds* 61:18–25.
- Butler, L. D., J. B. Cooper, R. H. Johnson, A. J. Norman, G. L. Peacock, P. L. Shaver, and K. E. Spaeth. 2003. National range and pasture handbook. US Department of Agriculture, Natural Resource Conservation Service, Grazing Lands Technology Institute, Fort Worth, Texas.
- Corman, T. E., and C. Wise-Gervais, Eds. 2005. Arizona Breeding Bird Atlas. University of New Mexico Press, Albuquerque, New Mexico.
- Greenlaw, J. S. 1996. Spotted Towhee (*Pipilo maculatus*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/263>.
- Holmes, J. A., M. J. Johnson, C. Lauver, J. Norris, A. Snyder, and L. Thomas. *In review*. Habitat-based bird community monitoring protocol for the Southern Colorado Plateau Network. National Park Service, Fort Collins, Colorado.
- Wise-Gervais, C. 2005. Spotted Towhee. Pp. 496–497 in Corman, T. E., and C. Wise-Gervais (Eds.), Arizona Breeding Bird Atlas. University of New Mexico Press, Albuquerque, New Mexico.