

Importance of Pinyon-Juniper Habitat to Birds

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Abstract—Breeding bird surveys on seven sites in pinyon-juniper communities of Utah resulted in 53 total species. Blue-gray Gnatcatcher and Black-throated Gray Warbler were the only two species occurring on all seven transects. Of total species present 77 percent are considered neotropical migrants. Understory vegetation at each location appeared to be an important factor in determining bird species composition.

The purpose of this study was to identify the species of birds using the pinyon and juniper forest habitat in Utah during the breeding season. An additional goal was to try to determine the numbers of each species. Although this effort was not funded by any government agency or private contributions this objective corresponds with the "Level 1" monitoring described by the USDA Forest Service which "will allow practitioners to estimate the overall population trends of a variety of bird species within a forest. These monitoring efforts will help the USDA Forest Service meet its legal mandate to monitor populations of "indicators" of the broader vertebrate community" (Hutto 1994).

Study Sites

Seven locations (fig. 1) were selected in the following Utah habitats and are listed by elevation, and from earliest count date to latest count date:

1. Knoll Hollow, 5,900-6,400 ft, Spanish Fork Canyon, Utah County; July 7, 1995.
2. Oquirrh Mountains, 5,400-5,600 ft, north of Cedar Fort, Utah County; May 23, 1997.
3. Beaver Dam Mountains, 4,400-4,900 ft, Washington County; May 27, 1997. The reason for selecting this site in southwestern Utah was to determine if there was a noticeable influence of Mojave Desert vegetation on the avifauna.
4. Foothills on east side of Stansbury Mountains near South Willow Canyon, 5,720-6,560 ft, Tooele County; June 19, 1997.
5. Dove Creek area, 6,000-6,100 ft, Box Elder County; June 20, 1997. Purpose in selecting this site in northwestern Utah was to determine if species composition was similar to other Great Basin habitats that had been previously sampled.

In: Monsen, Stephen B.; Stevens, Richard, comps. 1999. Proceedings: ecology and management of pinyon-juniper communities within the Interior West; 1997 September 15-18; Provo, UT. Proc. RMRS-P-9. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

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6. Long Ridge, west of Nephi, 5,900-6,200 ft, Juab County; June 27, 1997. Dog Valley to the west had suffered a serious fire the previous summer. The reason for selecting this location was to determine if bird species had been concentrated on this unburned ridge as a result of habitat lost to fire on either side.

7. Foothills at the base of the Wasatch Plateau, 6,600-7,000 ft, southeast of Spring City, Sanpete County; July 1, 1997. This was a thickly wooded area of pinyon and juniper. I felt that it was important to determine if species composition was as similar at the Colorado Plateau-Great Basin interface as it was at the other locations.

Elevations for this study ranged between 4,400 ft at the Beaver Dam Mountain site to 7,000 ft at the Wasatch Plateau site near Spring City.

Methods

Study sites in suitable habitat were randomly selected and determined by accessibility. Protocol called for each transect to be 2 miles long. Each of the 10 sampling points was positioned at 0.2 mile intervals (Hutto 1994).

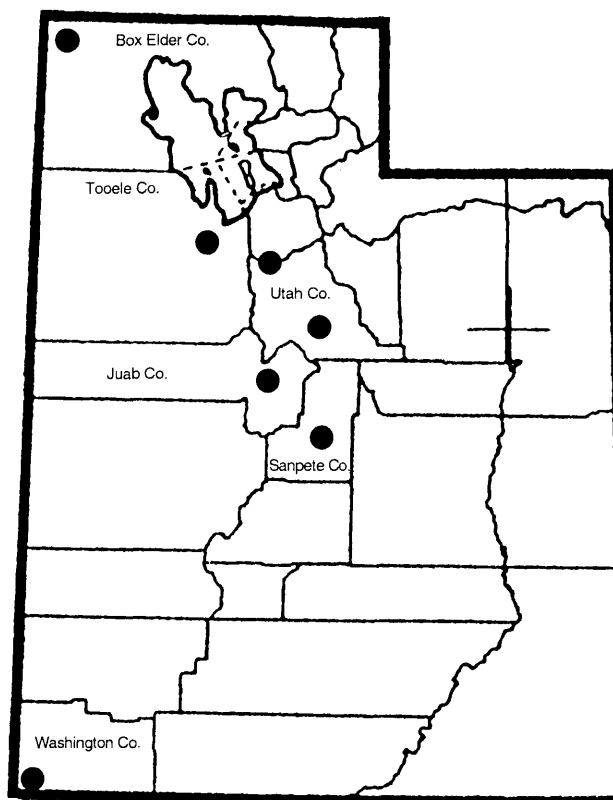


Figure 1—Location of the seven Utah study sites.

Following the protocol (Hutto 1994), transects were established at sites with minimal disturbance. Two of the transects were conducted on tertiary roads where vehicle noise was at a minimum; five of the transects were walked using compass headings to maintain as straight a line as possible. As determined by protocol 10 minutes was the time allocated at each point during which birds were identified by sight, sound or a combination of both (National Geographical Society 1987). Binoculars (8 x 30) were used in making identification of observed birds. Birds farther than 50 yd away on either side of the transect line were not counted. Birds detected flying over the plot rather than detected from within the vegetation were recorded separately and were not listed as part of the vegetation avifauna. Counts began immediately upon arrival at the census station. No attracting devices or records of calls were used.

Counts started after the predawn chorus was over (between 6:30 and 7:00 a.m.) and concluded by 10:30 a.m. This corresponds with the period of time during which bird activity and song is more-or-less constant. It was important to not record a bird more than once at each interval point. If a bird was flushed during the move from one interval point to the next it was not included in the totals.

Results

As a result of sampling seven separate sites, a total of 53 species were identified (table 1). The Blue-gray Gnatcatcher and Black-throated Gray Warbler were the only two species that occurred on all seven transects. However, Mourning Dove, Juniper (formerly Plain) Titmouse, Spotted (formerly Rufous-sided) Towhee and Chipping Sparrow occurred on six of the seven transects (table 2).

There were 22 species that occurred only once on any of the seven transects (table 3). In terms of total numbers for all seven transects the Mourning Dove was the most abundant species (table 2). The Oquirrh mountain transect had the highest number of total bird species with 27 followed closely by Knoll Hollow in Spanish Fork Canyon with 26 (table 1).

Of the 53 total species listed on the seven transects 41 are considered neotropical migrants (table 4). By definition neotropical migrants are birds that spend their summers in Canada and the United States and their winters in Mexico, the Caribbean, Central America, and South America (the region known as the New World tropics, or neotropics). Although the name "neotropical migrant" sounds exotic, we're actually talking about common birds, and lots of them—at least 250 species, nearly one-third of the birds that breed in North America (Line 1993).

Discussion

A total of 53 bird species were identified on seven pinyon-juniper transects (table 1). In most cases the type of shrub understory appeared to influence species diversity. For example the Virginia's Warbler occurred on only three transects. The two locations with the most sightings, both $n = 7$, had heavy concentrations of Gambel's oak. At the other locations, there was only one sighting. The only

transect where Brewer's Sparrow, a characteristic sagebrush inhabitant (Ryser 1985), occurred, was in the Dove Creek area where sagebrush was the dominant understory species. The Black-throated and Black-chinned Sparrows were found only in southwestern Utah at the Beaver Dam Mountain site in association with an understory of blackbrush, cliffrose, and yucca. Based on my observations, the Black-chinned Sparrow is more of a seasonal resident of Mojave Desert upland shrub communities whereas the Black-throated Sparrow is more of a seasonal resident of both the Mojave and Great Basin Deserts. The Beaver Dam Mountain site is, in fact, a vegetational ecotone between the Mojave and Great Basin Deserts (Holmgren 1972) so it is not surprising to find both of these sparrows in residence.

The Spanish Fork Canyon transect was completed in the summer of 1995 while I was conducting neotropical bird surveys for the USDA Forest Service on the Uinta National Forest. The site had been identified as a possible chaining area. This location harbored stands of very large pinyon pine and juniper trees, the most mature of any of the transects I studied. Sometime after the survey was conducted the decision was made to not chain the area. As it turned out this site was the second most productive of all seven transects. On this transect there were only six points on which totals were obtained instead of the usual ten because the vegetation over the brow of the hill where the additional four stops would have occurred was all Gambel's oak. Therefore, I believe, this particular example indicates the importance of obtaining bird species composition and numbers before conducting chaining operations that would seriously impact breeding birds dependant on this type of habitat.

The most productive site was the Oquirrh Mountain site. I believe that the high number of bird species there is a reflection of the layered canopy. This site had more structural diversity than any of the other sites.

The area surrounding the Long Ridge site had recently burned prompting a working hypothesis that this location might be a refugia for displaced breeding birds. The data confirm this hypothesis inasmuch as Mourning Dove ($n = 16$), Gray Flycatcher ($n = 10$), Juniper Titmouse ($n = 10$), Bewick's Wren ($n = 12$), Blue-gray Gnatcatcher ($n = 7$), Solitary Vireo ($n = 6$), Spotted Towhee ($n = 12$), Brown-headed Cowbird ($n = 9$), and House Finch ($n = 13$) were at their highest numbers at this site (table 1).

Of the 53 bird species documented to occur in the pinyon-juniper stands of this study, 41 of them are considered to be neotropical migrants (table 4). Data indicate that the pinyon-juniper forests provide important habitat for at least nine of these neotropical migrants (table 2). Food, cover, and nesting are three essential requirements provided by this important community type.

In summary, I discovered that the pinyon-juniper forest supported a greater variety of bird species than I had anticipated based on my limited experience in birding this type of habitat. But the total number of species depending entirely on this type of habitat for breeding purposes is low compared to other types of habitat in the state. The results verify the importance of the pinyon-juniper forest to the continued breeding success of the Blue-gray Gnatcatcher, the Black-throated Gray Warbler and the Gray Flycatcher, all of which are neotropical migrants.

Table 1— Bird species by transect (see appendix for mnemonic bird species code).

	Oquirrh	Beaver Dam Mountain	Stansbury	Dove Creek	Long Ridge	Spring City	Spanish Fork Canyon
COHA					1		
RTHA	2			1			1
GOEA	1						
AMKE			1				
MODO	9	5	10	5	16	10	
CONI			2	1			1
BLTH	2						
RSFL				1			5
GRFL	4		9	10	10	8	
COFL	2					1	
ATFL		2			2		3
SCJA	8	5			2	5	1
CLNU							1
PIJA	2						
BBMA	2						12
CORA	5					4	1
MOCH						1	5
UNCH			1	1			
RBNU							1
WBNU							4
PLTI	5	3	1	2	10	3	
ROWR					1		
BEWR	1	4			12		
HOWR	1						
BGGN	2	1	1	5	7	3	1
MOBL				3		2	3
TOSO							4
HETH							1
AMRO	7		2	9		1	2
SATH			1	5			
NOMO		1					
GRVI		11					
SOVI	1		2	2	6	5	1
WAVI	5		1				
VIWA	7					7	1
BTYW	2	4	3	1	1	5	4
WETA	4		8		1	6	2
BHGR	6		3			1	1
LAZB							3
GTTO			3	9			
RSTO	5		8	6	12	5	1
BCSP		4					
CHSP	7		15	4	8	8	9
BRES				29			
LASP	1						
BTSP		6					
WEME				2	1	1	
BRBL				3			
BHCO	2	2	1	2	9		
SCOR		1					
CAFI	1						
HOFI		8		1	13		10
PISI	4						7
Total	27	14	17	20	17	18	26

Table 2—Twelve bird species with highest total numbers on seven transects (see appendix for mnemonic bird species code).

Pneumonic	Bird species	Number	# of Locations
MODO	Mourning Dove*	55	6
CHSP	Chipping Sparrow*	51	6
GRYF	Gray Flycatcher*	41	5
RSTO	Rufous-sided Towhee*	37	6
HOFI	House Finch	32	4
BRES	Brewer's Sparrow*	29	1
PLTI	Plain Titmouse	24	6
SCJA	Scrub Jay	21	5
AMRO	American Robin*	21	5
WETA	Western Tanager*	21	5
BGGN	Blue-gray Gnatcatcher*	20	7
BTYW	Black-throated Gray Warbler*	20	7

*Neotropical Migrant

Table 3—Species occurring only once, listed by transect (see appendix for mnemonic bird species code).

Spanish Fork	Oquirrh	Beaver Dam Mountain	Stansbury	Dove Creek	Long Ridge	Spring City
CLNU	GOEA	NOMO	AMKE	BRES	COHA	
RBNU	BLTH	GRVI		BRBL	ROWR	
WBNU	PIJA	BCSP				
TOSO	HOWR	BTSP				
HETH	LASP	SCOR				
LAZB	CAFI					

Table 4—Neotropical species occurring in the pinyon-juniper forests of Utah (see appendix for mnemonic bird species code).

1. COHA	11. ATFL	21. GRVI	31. BCSP
2. RTHA	12. ROWR	22. SOVI	32. CHSP
3. GOEA	13. HOWR	23. WAVI	33. BRES
4. AMKE	14. BGGN	24. VIWA	34. LASP
5. MODO	15. MOBL	25. BTYW	35. BTSP
6. CONI	16. TOSO	26. WETA	36. WEME
7. BLTH	17. HETH	27. BHGR	37. BRBL
8. RSFL	18. AMRO	28. LAZB	38. BHCO
9. GRYF	19. SATH	29. GTTO	39. SCOR
10. COFL	20. NOMO	30. RSTO	40. CAFI
			41. PISI

Studies should be conducted during the winter to determine the importance of pinyon-juniper habitats to the survival of wintering bird species.

Acknowledgments

I appreciate Dea Nelson and Dave Stricklin of the Uinta National Forest for funding a 3 year neotropical bird study that provided the background and impetus for the current study. I thank my Provo High School colleague, Doyle Nielson, for providing technical assistance. I also thank my friend, Durant McArthur, for some helpful suggestions and technical assistance.

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Appendix—Four-letter mnemonic bird codes of all birds encountered in this study

Code	Standard bird names	Code	Standard bird names
COHA	Cooper's Hawk	HETH	Hermit Thrush
RTHA	Red-tailed Hawk	AMRO	American Robin
GOEA	Golden Eagle	SATH	Sage Thrasher
AMKE	American Kestrel	NOMO	Northern Mockingbird
MODO	Mourning Dove	GRVI	Gray Vireo
CONI	Common Nighthawk	SOVI	Solitary Vireo
BLTH	Broad-tailed Hummingbird	WAVI	Warbling Vireo
RSFL	Red-shafted Flicker	VIWA	Virginia's Warbler
GRFL	Gray Flycatcher	BTYW	Black-throated Gray Warbler
COFL	Cordilleran Flycatcher	WETA	Western Tanager
ATFL	Ash-throated Flycatcher	BHGR	Black-headed Grosbeak
SCJA	Scrub Jay	LAZB	Lazuli Bunting
CLNU	Clark's Nutcracker	GTTO	Green-tailed Towhee
PIJA	Pinyon Jay	RSTO	Rufous-sided Towhee ^a
BBMA	Black-billed Magpie	BCSP	Black-chinned Sparrow
CORA	Common Raven	CHSP	Chipping Sparrow
MOCH	Mountain Chickadee	BRES	Brewer's Sparrow
UNCH	Unknown Chickadee	LASP	Lark Sparrow
RBNU	Red-breasted Nuthatch	BTSP	Black-throated sparrow
WBNU	White-breasted Nuthatch	WEME	Western Meadowlark
PLTI	Plain Titmouse ^a	BRBL	Brewer's Blackbird
ROWR	Rock Wren	BHCO	Brown-headed Cowbird
BEWR	Bewick's Wren	SCOR	Scott's Oriole
HOWR	House Wren	CAFI	Cassin's Finch
BGGN	Blue-gray Gnatcatcher	HOFI	House Finch
MOBL	Mountain Bluebird	PISI	Pine Siskin
TOSO	Townsend's Solitaire		

^a New name for the Plain Titmouse is Juniper Titmouse and new name for the Rufous-sided Towhee is Spotted Towhee (American Ornithologists' Union 1995).