

LANDBIRD MIGRATION ALONG THE MIDDLE RIO GRANDE: SUMMARY OF BANDING DATA FROM SPRING AND FALL 1994

WANG YONG¹, DEBORAH M. FINCH¹, AND STEVE W. COX²

¹Rocky Mountain Forest and Range Experiment Station
2205 Columbia SE, Albuquerque, NM 87106

and

²Rio Grande Bird Research, Inc, Albuquerque, NM 87107

Northbound and southbound movement along major waterways is characteristic of migratory birds nesting in North America. It is likely that river corridors are more important to migrating birds in arid parts of North America than in humid, more heavily vegetated areas (Wauer 1977). Although quantitative analyses of landbird migration along the Rio Grande corridor are not reported in the literature, the use of the Rio Grande as a migratory route by landbirds is a well-recognized behavior of southwestern birds. The riparian habitats along the Rio Grande are potential stopover sites for migratory landbirds that use the Great Plains-Rocky Mountain "flight route" (Ligon 1961, Lincoln 1979). In central New Mexico, hot desert conditions prevail during a good portion of the spring and fall migration (personal observation). The availability of food, water, cover, and suitable north-south routing along the river may be critically important and strongly influential in directing migration of landbirds (Ligon 1961, Stevens et al. 1977, Wauer 1977, Finch 1991).

Riparian habitats along the Rio Grande are under increasing pressure. Livestock grazing, logging, water management, recreation, transportation, urban development, and invasion of exotic plant species such as saltcedar (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*) alter these riparian habitats, potentially disrupting migration activities. It is estimated that more than 90% of the original desert riparian habitat in the West has been eliminated by flood control and irrigation projects (Knopf 1988). Riparian ecosystems in New Mexico are listed as endangered in a recent assessment of endangered ecosystems in the United States (Noss et al. 1995). How habitat changes have affected or will affect the landbirds migrating through the Rio Grande is unclear. Effective conservation strategies for neotropical and shorter distance landbirds cannot be established without basic information about the importance of riparian corridors as stopover habitat during migration.

In spring 1994, the Rocky Mountain Forest and Range Experiment Station, at Albuquerque, NM, initiated a study to investigate the use of the Middle Rio Grande (from Elephant Butte Reservoir to Cochiti, NM) riparian habitats as

migration corridors by neotropical and short-distance landbird migrants. The objectives of the study include: (1) to determine species composition, volume, and timing of spring and fall landbird migration in the Middle Rio Grande; (2) to monitor the distribution of migrants among different habitats and characterize the en route macro- and micro-habitat use by stopover migrants; (3) to investigate the biology of landbird migrants when they stopover in riparian habitats; and (4) to investigate the effect of habitat alteration on the stopover ecology of landbird migrants in the Middle Rio Grande. Here we report summarized banding data from 1994 spring and fall field seasons.

METHODS

Mist-nets were operated weekdays at two sites in the middle Rio Grande Valley of New Mexico. The two sites were Bosque del Apache National Wildlife Refuge (BNWR, N33°48' and W106°52'), located about 90 miles south of Albuquerque, NM, and the Rio Grande Nature Center (RGNC, N35°07' and W106°41'), Albuquerque, NM. Banding data were collected in spring from April 4 to June 15, and in fall from August 1 to November 13. At the RGNC during fall migration, the volunteers of Rio Grande Bird Research, Inc. banded migrants during the weekends.

Twenty nylon mist-nets (12 x 2.6 m with 30 mm or 36 mm mesh) were used to capture (and recapture) landbird migrants at each site. We checked nets about every 20 to 30 minutes. Unless rain, high winds, or temperature dictated a change, mist-nets were opened 15 minutes before sunrise, and operated approximately 6 hours each banding day.

Species, subspecies, age, and sex were identified by consulting Pyle et al. (1987), U.S. Fish & Wildlife Service Bird Banding Manual (1984), and various field guides. Body mass of each captured individual was weighed to the nearest 0.1 g using a digital electronic balance (ACCULAB V-333). Morphological measurements including unflattened wing chord, tarsus length, tail length, and molt condition were collected from each bird. Additional information such as feather length, wing span, and wing area were also collected for some species to assist in species identification and to meet other research goals. The amount of skull ossification was examined in fall to identify age. The main energy source for migratory flights in landbird migrants is fatty acids stored as triglycerides in fat deposits, which can constitute up to 50% of live body mass (Berthold 1975, Blem 1980). Migrants accumulate the fat deposits prior to, and during migration. We assessed fat stores of each bird by observing the subcutaneous fat deposits in the interclavicular fossa and abdomen according to a six-point scale developed by Helms and Drury (1960). Each individual was banded with a National Biological Service aluminum leg band. Birds were released immediately after this process.

RESULTS AND DISCUSSION

For the two sites combined, a total of 6,509 landbirds of 102 species were banded during 1994 spring and fall field seasons (Table 1). During the 1994 spring migration we banded 436 individuals of 50 species and 421 individuals of 53 species at RGNC and BNWR, respectively. More birds were banded during the 1994 fall migration: 4,269 individuals of 77 species and 1,383 individuals of 55 species from RGNC and BNWR, respectively. The seasonal difference in the birds captured was large in some species. For example, a total 877 Wilson's Warblers were captured during fall migration from two study sites, while only 34 individuals of this species were captured during the spring migration. An extreme was Chipping Sparrow, while only 3 birds were captured during spring migration, a total of 950 birds were captured during fall migration. The causes for this large variation between seasons could include recruitment of young birds from the summer breeding grounds, different migration routes used by landbird migrants between spring and fall migrations, variation in the habitat use by migrants between spring and fall migration, and different stopover strategies used by spring and fall migrants. The variation in the netting efforts between spring and fall field seasons could partly result in this difference because the fall banding season was longer than the spring, although we do not believe this was a major factor. More detailed analyses are required to test these hypotheses.

Comparing the combined spring and fall data between the two sites, more species and more individuals were captured at the RGNC site (4,705 individuals of 87 species) than at the BNWR site (1,804 individuals of 71 species). In general, more individuals from a given species were captured at RGNC. The few species for which this did not hold true included Lucy's Warbler, Pyrrhuloxia, Summer Tanager, Verdin, Yellow-billed Cuckoo, Ruby-crowned Kinglet, Rufous-side Towhee, Yellow-breasted Chat, Western Wood-Pewee and Common Yellowthroat; more individuals of these species were caught at BNWR. The causes of these patterns are unclear, but could be related to the north or south limits of the distribution of a species, differences of habitat structure, quality, and quantity at each site, variation of migration routes among species, and weather conditions at stopover time. For example, in the middle Rio Grande valley, the BNWR probably represents the northern distribution limit of Pyrrhuloxia and Verdin. No individual of these two species was detected during intensive surveys at RGNC (Finch and Yong unpublished). The Yellow-billed Cuckoo, a sensitive species because of its population declines in parts of the West (Breeding Bird Survey of National Biological Service), was captured only at BNWR. This species generally prefers lowland deciduous woodlands, willow and alder thickets, second-growth woodlands, deserted farmlands and orchards (Johnsgard 1986). We suspected that habitat conditions were more favorable for this species at BNWR.

The most commonly-captured species at RGNC were Chipping Sparrow (882), Yellow-rumped Warbler (492), and Wilson's Warbler (484). The three species accounted for 39% of the total captures at the site. At BNWR, the most commonly-captured species were Wilson's Warbler (427), White-crowned

Sparrow (159), and Ruby-crowned Kinglet (140). The three species accounted for 40% of the total captures at the site.

When we combined the captures from the two sites, the most commonly-captured species were Chipping Sparrow (953 captures), Wilson's Warbler (911), Yellow-rumped Warbler (539), and White-crowned Sparrow (450). These four species made up 44% of total captures. Nineteen additional species comprised another 38% of the captures. Arranged in decreasing abundance, these were Dark-eyed Junco (283), MacGillivray's Warbler (210), House Finch (203), Orange-crowned Warbler (193), Ruby-crowned Kinglet (190), Lark Sparrow (167), Brewer's Sparrow (149), Vesper Sparrow (144), Song Sparrow (135), Blue Grosbeak (121), Savannah Sparrow (118), Black-headed Grosbeak (111), Lazuli Bunting (104), Lincoln's Sparrow (101), American Goldfinch (97), Yellow Warbler (97), and Dusky Flycatcher (92).

Some species that breed mostly in the eastern United State and are rare or otherwise unusual in the Middle Rio Grande Valley were also captured but in low numbers. These species included Black-and-white Warbler, Dickcissel, Gray Catbird, Kentucky Warbler, Magnolia Warbler, Mourning Warbler, Nashville Warbler, Swainson's Thrush, Painted Bunting, Orchard Oriole, Red-eyed Vireo, Rose-breasted Grosbeak, and White-throated Sparrow. Brown-crested Flycatcher, a species not previously reported in the Middle Rio Grande Valley, was captured at BNWR during both spring and fall migration seasons. Western Palm Warbler, a regular migrant along the Pacific Coast but rare in the interior Southwest, was captured at RGNC during the spring migration. One Golden-crowned Sparrow, another regular Pacific Coast species which is rare in the Middle Rio Grande Valley was captured at the RGNC in the fall. Several species such as Kentucky Warbler, Mourning Warbler, Swainson's Thrush, and Red-eyed Vireo were not on the bird checklist of BNWR. Others such as Magnolia Warbler, Palm Warbler, and Cassin's Sparrow were not on the bird checklist of RGNC.

Of the 539 Yellow-rumped Warblers captured from the two sites, most of them are Audubon subspecies (*Dendroica coronata auduboni*), only 3.65% were individuals of the Myrtle subspecies (*D. c. coronata*), which is distributed mostly in the East. Among all the White-crowned Sparrows captured, 63% and 19% were identified as Gambel's (*Zonotrichia leucophrys gambelii*) and Mountain (*Z. l. oriantha*) subspecies, respectively, and the rest were not identified to subspecies. Of the 283 Dark-eyed Juncos captured, 31 (11%) were Gray-headed (*Junco hyemalis caniceps*), 251 (89%) were Oregon (*J. h. montanus* and *shufeldti*), and only 1 was Slate-colored Junco (*J. h. hyemalis*). No White-winged Juncos (*J. h. aikenii*) were detected. The relative abundance of subspecies within these three species was consistent with earlier studies. Both Ligon (1961) and Hubbard (1978) documented that the majority of Yellow-rumped Warblers in New Mexico were Audubon subspecies and Myrtle subspecies were rare to locally fairly common (in the eastern New Mexico) during spring and fall migration. Hubbard (1979) indicated that the Mountain White-crowned Sparrow was less

common in migration while the Gambel's subspecies was more widespread in New Mexico. Hink and Ohmart (1984) documented that in the Middle Rio Grande, large flocks of Dark-eyed Juncos were mainly composed of Oregon subspecies, Gray-headed was uncommon and less numerous but consistently more numerous than Slate-colored. No eastern subspecies of Rufous-sided Towhee, Summer Tanager, Solitary Vireo, or Northern Oriole were captured during this study.

Most Western Flycatchers captured during this study could be Cordilleran Flycatcher (*Empidonax cordilleran*) or "Interior Flycatcher" (Johnson and Marten 1988). No effort was made to separate them from the Pacific-slope Flycatcher or "Costal Flycatcher" (including *E. d. difficilis*, *E. d. inulicola*, and *E. d. crineritius*) because at present, there are no established criteria for separating the two in the field other than by vocalizations (Rosenberg et al. 1991). All the Yellow-bellied Sapsuckers captured during this study were Red-naped subspecies (*Sphyrapicus varius nuchalis*) (AOU 1957), which some ornithologists consider *S. nuchalis* as a species distinct from *S. varius*.

A total of 22 Willow Flycatchers was captured at the two sites, of which some of them were identified as the Southwestern race (*Empidonax traillii extimus*) based on morphology measurements and body color (see Aldrich 1951, Unitt 1987, Hubbard 1987, Browning 1993 for identification criteria). This subspecies is listed as Endangered by the states of New Mexico, Arizona, and California, and was recently federally listed. Southwestern Willow Flycatcher is a riparian obligate species nesting in cottonwood-willow and similar habitats. It is believed that the decline of this species is due to progressive loss of riparian habitat, especially of shrub willow and backwater ponds that the birds use for breeding. Hubbard (1987) speculated that only about 100 pairs of a breeding population were in New Mexico.

The data presented in this study document the large volume and complexity of migratory species composition in the Middle Rio Grande Valley, and suggested the importance of Middle Rio Grande riparian habitats as stopover sites for migratory landbirds. Successful migration depends on a bird's ability to replenish energy reserves rapidly, locate suitable stopover sites and travel routes, avoid predation, and cross unfamiliar habitats. The persistence of migratory landbird populations depends on the health of the ecosystem to provide favorable conditions for survival throughout the annual cycle (Moore et al. 1993, Sherry and Holmes 1993). Consequently, factors associated with the en route ecology of migrants must figure into any analysis of population dynamics and should be emphasized in habitat management.

In our continuing research, we will evaluate in-depth use of Middle Rio Grande riparian habitats by migrating birds, assess the value of different kinds of riparian habitats to the stopover migrants, and identify potential effects of habitat alteration on landbirds.

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Table 1. Landbirds captured at Rio Grande Nature Center (RGNC), Albuquerque, NM and Bosque Del Apache National Wildlife Refuge (BNWR), San Antonio, NM during spring and fall migration seasons of 1994.

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
<i>Accipitridae</i>							
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0	2	2	1	0	1 3
Cooper's Hawk	<i>Accipiter cooperii</i>	1	0	1	0	0	0 1
<i>Falconidae</i>							
American Kestrel	<i>Falco sparverius</i>	0	1	1	1	0	1 2
<i>Columbidae</i>							
Mourning Dove	<i>Zenaidura macroura</i>	2	1	3	1	0	1 4
<i>Cuculidae</i>							
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0	0	0	4	2	6 6
<i>Alcedinidae</i>							
Belted Kingfisher	<i>Ceryle alcyon</i>	0	3	3	0	0	0 3
<i>Picidae</i>							
Downy Woodpecker	<i>Picoides pubescens</i>	3	3	6	1	5	6 12
Hairy Woodpecker	<i>Picoides villosus</i>	0	0	0	1	3	4 4
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0	1	1	0	0	0 1
Northern Flicker	<i>Colaptes auratus</i>	1	8	9	2	5	7 16
<i>Tyrannidae</i>							
Olive-sided Flycatcher	<i>Contopus borealis</i>	1	3	4	0	0	0 4

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
Western Wood-Pewee	<i>Contopus sordidulus</i>	4	14	18	19	9	28
Willow Flycatcher	<i>Empidonax traillii</i>	6	9	15	2	5	7
Least Flycatcher	<i>Empidonax minimus</i>	0	1	1	0	0	1
Hammond's Flycatcher	<i>Empidonax hammondi</i>	0	4	4	0	2	2
Dusky Flycatcher	<i>Empidonax oberholseri</i>	21	30	51	33	8	41
Gray Flycatcher	<i>Empidonax wrightii</i>	5	9	14	5	8	13
Western Flycatcher	<i>Empidonax difficilis</i>	0	17	17	0	3	3
Black Phoebe	<i>Sayornis nigricans</i>	4	8	12	5	0	5
Say's Phoebe	<i>Sayornis saya</i>	0	4	4	0	0	0
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	4	1	5	5	0	5
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	0	0	0	3	1	4
Western Kingbird	<i>Tyrannus verticalis</i>	0	6	6	0	0	0
<i>Hirundinidae</i>							
Violet-green Swallow	<i>Tachycineta thalassina</i>	0	0	0	1	0	1
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0	0	0	9	0	9
<i>Corvidae</i>							
Scrub Jay	<i>Aphelocoma coerulescens</i>	1	3	4	0	3	3
<i>Paridae</i>							
Mountain Chickadee	<i>Parus gambelli</i>	0	5	5	0	1	1
Black-capped Chickadee	<i>Parus atricapillus</i>	0	11	11	0	0	0

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
<i>Remizidae</i>							
Verdin	<i>Auriparus flaviceps</i>	0	0	0	0	1	1
<i>Aegithalidae</i>							
Common Bushit	<i>Psaltiriparus minimus</i>	0	6	6	0	0	0
<i>Sittidae</i>							
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0	2	2	0	1	1
White-breasted Nuthatch	<i>Sitta carolinensis</i>	4	2	6	2	4	6
<i>Troglodytidae</i>							
Bewick's Wren	<i>Thryomanes bewickii</i>	1	25	26	9	12	21
House Wren	<i>Troglodytes aedon</i>	4	19	23	0	3	3
Marsh Wren	<i>Cistothorus palustris</i>	0	0	0	0	1	1
<i>Muscicapidae</i>							
Ruby-crowned Kinglet	<i>Regulus calendula</i>	5	45	50	6	134	140
Blue-gray Gnatcatcher	<i>Poliopitila caerulea</i>	0	0	0	1	0	1
Swainson's Thrush	<i>Catharus ustulatus</i>	0	0	0	0	2	2
Hermit Thrush	<i>Catharus guttatus</i>	14	54	68	2	4	6
American Robin	<i>Turdus migratorius</i>	31	18	49	13	0	13
<i>Mimidae</i>							
Gray Catbird	<i>Dumetella carolinensis</i>	1	0	1	0	1	1
Northern Mockingbird	<i>Mimus polyglottos</i>	0	0	0	1	0	1

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
Sage Thrasher	<i>Oreoscoptes montanus</i>	1	0	1	0	0	0 1
<i>Sturnidae</i>							
European Starling	<i>Sturnus vulgaris</i>	0	0	0	2	0	2 2
<i>Vireonidae</i>							
Solitary Vireo	<i>Vireo solitarius</i>	0	8	8	1	3	4 12
Warbling Vireo	<i>Vireo gilvus</i>	0	15	15	1	12	13 28
Red-eyed Vireo	<i>Vireo olivaceus</i>	0	0	0	0	1	1 1
<i>Emberizidae</i>							
<i>Parulidae</i>							
Orange-crowned Warbler	<i>Vermivora celata</i>	5	165	170	3	20	23 193
Nashville Warbler	<i>Vermivora ruficapilla</i>	0	1	1	0	0	0 1
Virginia Warbler	<i>Vermivora virginiae</i>	6	42	48	6	13	19 67
Lucy's Warbler	<i>Vermivora luciae</i>	0	0	0	4	0	4 4
Yellow Warbler	<i>Dendroica petechia</i>	9	59	67	10	20	30 97
Magnolia Warbler	<i>Dendroica magnolia</i>	1	0	1	0	0	0 1
Yellow-rumped Warbler	<i>Dendroica coronata</i>	87	405	492	5	42	47 539
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	0	1	1	0	0	0 1
Townsend's Warbler	<i>Dendroica townsendi</i>	0	3	3	0	1	1 4
Palm Warbler	<i>Dendroica palmarum</i>	1	0	1	0	0	0 1
Black-and-white Warbler	<i>Mniotilta varia</i>	0	1	1	0	0	0 1
Northern Waterthrush	<i>Seiurus noveboracensis</i>	2	8	10	0	1	1 11
Kentucky Warbler	<i>Oporornis formosus</i>	0	0	0	1	0	1 1

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
Mourning Warbler	<i>Oporornis philadelphia</i>	0	0	0	1	0	1
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	27	109	136	34	40	74
Common Yellowthroat	<i>Geothlypis trichas</i>	4	5	9	17	18	35
Wilson's Warbler	<i>Wilsonia pusilla</i>	11	473	484	23	404	427
Yellow-breasted Chat	<i>Icteria virens</i>	0	1	1	5	2	7
<i>Thraupinae</i>							
Summer Tanager	<i>Piranga rubra</i>	1	0	1	10	12	22
Western Tanager	<i>Piranga ludoviciana</i>	2	53	55	1	11	12
<i>Cardinalinae</i>							
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	0	0	0	0	1	1
Rose-breasted Grosbeak	<i>Phoebastria ludoviciana</i>	0	1	1	0	0	0
Black-headed Grosbeak	<i>Phoebastria melanocephalus</i>	32	42	74	25	12	37
Blue Grosbeak	<i>Guiraca caerulea</i>	5	62	67	27	27	54
Lazuli Bunting	<i>Passerina amoena</i>	3	95	98	0	6	6
Indigo Bunting	<i>Passerina cyanea</i>	0	1	1	0	1	1
Painted Bunting	<i>Passerina ciris</i>	0	1	1	0	0	0
Dickcissel	<i>Spiza americana</i>	0	1	1	0	0	0
<i>Emberizinae</i>							
Green-tailed Towhee	<i>Pipilo chlorurus</i>	1	35	36	2	9	11
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>	1	17	18	20	12	32
Cassin's Sparrow	<i>Aimophila cassinii</i>	1	0	1	0	0	0
Chipping Sparrow	<i>Spizella passerina</i>	2	880	882	1	70	71

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
Clay-colored Sparrow	<i>Spizella pallida</i>	0	43	43	0	27	27 70
Brewer's Sparrow	<i>Spizella breweri</i>	0	97	97	1	51	52 149
Vesper Sparrow	<i>Poocetes gramineus</i>	0	137	137	2	5	7 144
Lark Sparrow	<i>Chondestes grammacus</i>	1	119	120	1	46	47 167
Lark Bunting	<i>Calamospiza melanocorys</i>	0	6	6	0	0	0 6
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1	85	86	0	32	32 118
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0	3	3	0	0	0 3
Song Sparrow	<i>Melospiza melodia</i>	1	72	73	0	62	62 135
Lincoln's Sparrow	<i>Melospiza lincolni</i>	3	78	81	0	20	20 101
White-throated Sparrow	<i>Zonotrichia albicollis</i>	1	4	5	1	0	1 6
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	0	1	1	0	0	0 1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	38	253	291	73	86	159 450
Dark-eyed Junco	<i>Junco hyemalis</i>	2	184	186	5	92	97 283
<i>Icterinae</i>							
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	66	6	72	0	0	0 72
Western Meadowlark	<i>Sturnella neglecta</i>	1	1	2	0	0	0 2
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	5	0	5	0	0	0 5
Brown-headed Cowbird	<i>Molothrus ater</i>	2	0	2	7	1	8 10
Orchard Oriole	<i>Icterus spurius</i>	0	2	2	0	0	0 2
Northern Oriole	<i>Icterus galbula</i>	0	27	27	3	5	8 35
<i>Fringillidae</i>							
House Finch	<i>Carpodacus mexicanus</i>	0	201	201	2	0	2 203
Pine Siskin	<i>Carduelis pinus</i>	0	15	15	0	0	0 15

Table 1. (cont.).

COMMON NAME	SCIENTIFIC NAME ¹	RGNC			BNWR		
		SP	FA	TOT	SP	FA	TOT GTOT ²
Lesser Goldfinch	<i>Carduelis psaltria</i>	0	38	38	0	0	0 38
American Goldfinch	<i>Carduelis tristis</i>	0	97	97	0	0	0 97
Total		436	4,269	4,705	421	1,383	1,804 6,509

¹Common names and scientific names are based on the A. O. U. Check-list of North American Birds (1983).²SP = spring (4 April - 15 June), FA = fall (1 August - 13 Nov), TOT = site total, and GTOT = total of two sites combined.