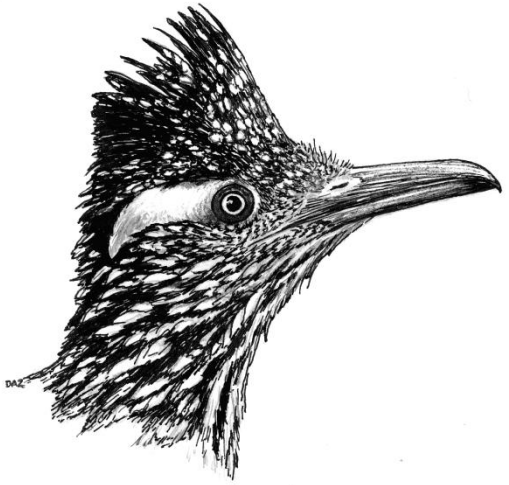
NMOS BULLETIN



New Mexico Ornithological Society

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A NOTE FROM THE PRESIDENT

Summer is over and we are all enjoying some cooler weather and fall migration. I hope that you all have had a good, productive year thus far, and that you have been able to get some precipitation where you live and where you enjoy birding.

I want to make several announcements to the membership. The first is to invite you to attend the fun social event we've named "Birds & Beers." Anyone interested in birds can come to O'Niell's Irish Pub (4310 Central Avenue, NE, Albuquerque) on the last Tuesday of the month and participate in bird quizzes and viewing bird slides, enjoying some great food, and just do some good old socializing with members of NMOS and the Central New Mexico Audubon Society. Activities start around 6:00 pm and I hope to see you at our next get-together.

The second item is to remind you all to put a sticky note on the calendar for the latter half of April 2013. This is to remind you of our 51st Annual Meeting in Silver City. Dale Zimmerman and Roland Shook are already at work organizing the meeting. We will keep the dates away from the Milnesand Prairie-Chicken Festival, and it will be late enough (one of the last two weekends in the month) so that spring migration will be underway for great birding opportunities.

The final note is to remind everyone that our first NMOS Field Trip will be departing in November to Cuba. The trip filled within days of being opened, which speaks volumes about the mystique and potential for Caribbean birding. We are also considering an NMOS Field Trip to El Triunfo, Chiapas in the spring of 2014. Keep that date tucked away in your mind!

Enjoy the fall, do a rain dance or two, and I hope to see you in the field sometime soon.

Dave Krueper
NMOS President

* * *

EVIDENCE FOR DECLINE IN WINTERING DARK-EYED JUNCO (*JUNCO HYEMALIS*) IN NEW MEXICO

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Abstract.— We analyzed Christmas Bird Count reports in New Mexico for Dark-eyed Junco to assess long-term trends in the wintering population of this common and familiar species. Almost half of the individual count circles exhibit a statistically significant decline over the years 1949-2010. Several of the count circles with the highest numbers of juncos (normalized to party-hour) exhibit steep declines. We do not find significant increases in junco numbers in any count circle in the state. These observations indicate that juncos are declining as a wintering species in New Mexico.

INTRODUCTION

The Dark-eyed Junco (*Junco hyemalis*) is a familiar wintering species throughout New Mexico (Rising and Beadle 1996). Anecdotal observations of the author (Española count compiler since 1992) indicated a worrisome decrease in juncos in northern New Mexico, provoking us to explore whether this phenomenon had a larger geographic scope. To most observers, it is evident that junco numbers fluctuate greatly from year to year, making it challenging to identify trends over time and space. The Christmas Bird Count (CBC) offers the best opportunity to determine long-term population trends because of its long history and wide spatial coverage (Bock and Root 1981). In this paper we examine the New Mexico CBC records for the last half-century with a view toward quantifying long-term trends by means of rigorous statistical analysis.

Dark-eyed Juncos wander widely as mixed-subspecies flocks. Identification by CBC participants is comparatively easy, although the distinctions between subspecies groups can be difficult. Although three of these groups are found routinely in New Mexico, we analyzed only at the species level. Wintering habitat consists of "the lower edges of coniferous forests, brushy ravines with scrub oak, mountain mahogany, and hawthorn, sagebrush, and weeds," and in pinyon-juniper woodland, generally at elevations below ~2400 m (~8000 ft), "but not generally in open fields" (Rising and Beadle 1996). They make use of both urban and rural areas. CBC records suggest that historically, New Mexico has had among the highest junco abundances in the western US (National Audubon Society 2011). Changes in winter use of New Mexico would carry potentially profound national implications.

DATA SOURCES AND METHODS

We examined all of the New Mexico CBC records for Dark-eyed Junco (Shipman 2010). For each count circle, we tabulated the sum of reports for all subspecies groups. Total number of individual birds was divided by party-hours for the count to give number of birds per party-hour. Normalization to effort has been discussed in considerable detail by Bock and Root (1981). We expect numbers to be proportional to party-hours for this species, since it is widespread in count circles in New Mexico and only a small fraction of the count area is covered by observers. More elaborate, non-linear dependences on effort have been derived from CBC data in special cases (Link and Sauer 2006), but this would be difficult to implement for Dark-eyed Junco given the limited data available within New Mexico. The effort levels on New Mexico count circles have not increased greatly in the last few decades. Quartiles (0.25, 0.50, 0.75) of the effort level occur at 35, 47, and 60 party-hours, with a mean of 50 party-hours, so effort varies only within a narrow range, probably suppressing the possible non-linear effects of effort, if they exist at all for this species in New Mexico CBC data.

Since our goal was to investigate long-term trends in areas with substantial numbers, we retained only those data that satisfied two criteria: the number of count years $N > 18$, and the median abundance > 3.5 birds/party-hr. The justification for the second of these is that junco reports have large annual fluctuations, and different statistical methods are appropriate when the numbers frequently reach zero for a count year. Notable is the Las Vegas CBC, which historically has had very high numbers (3200 in 1963, 3600 in 1969, 4704 in 1979). Unfortunately, the party-hours reported 1943 - 1988 do not appear reliable, forcing us to omit these data.

The criteria yield acceptable data for 15 CBCs in the time period 1949-2010. Counts in the 1940s were too sporadic to be of use. The longest CBC records are Bosque del Apache (55 years), Española (55), and Santa Fe (51) (Table 1).

Linear Trend Analysis. We adopted the well-known *t*-test for linear regression, since its statistical properties are well established and it is easy to implement. Our goal is not to determine the functional form of the decline in junco numbers, but to be confident about stating that the numbers are either stable, decreasing, or increasing. The simple model for the abundance of juncos in each year is:

$$y_i = A + Bt_i + \varepsilon_i \qquad (1)$$

where y_i = junco count (number/hr), A is a constant over time, B is the slope of the fitted line, t_i denotes the year of the count, and ε_i denotes the annual fluctuation caused by unknown factors, analogous to noise in a laboratory measurement. Count years are indexed by $i = 1,\ldots,N$. We used the standard hypothesis test:

H_0: $B = 0$
H_1: $B < 0$

The null hypothesis is that the observed fluctuation in junco numbers over time for a given count circle is due entirely to randomness. The test for significance of the slope B is the t-test (Miller 1998), based on the test statistic:

$$t = \frac{\hat{B}}{SE_B}, \qquad (2)$$

the ratio of the least-squares estimate of the line slope to the standard error of the slope, which takes into account the magnitude of the annual fluctuations and the number of data points (count years) in the fit. The significance of the slope is measured as a p-value (based on assumptions of normal and independent and identically distributed (i.i.d.) errors). We use the one-sided t-test because we are interested in the significance of a negative trend; an increasing trend ($B > 0$) has an analogous p-value. The fitted (or "estimated") value at the earliest date is denoted $\hat{y}_0$. Then the trend, derived from the fit, is defined in fractional terms as:

$$trend \equiv 100\% \times \frac{\hat{B}}{\hat{y}_0} \qquad (3)$$

with units of percent per year. Here, "percent" refers to the fraction of the wintering population that occurred in the first year of the CBC under analysis. For example, if the count drops from 50 juncos/party-hr to 25 juncos/party-hr over a time period of 50 years, we derive the trend as -1% per year. This is not to be confused with an exponential decay rate of -1% per year, where "percent" refers to the decreasing population over time. The decreases are almost equal, though, when the drop is modest (<30%). Nonparametric linear fitting techniques were also applied, since they have advantages in certain circumstances (Miller 1998).

CBC reports for juncos exhibit sizeable annual fluctuations in all count circles; examples are shown in Figures 1 and 2. It is not uncommon to find changes by a factor of 3 from one year to the next. This makes it challenging to discern long-term trends in wintering junco numbers. In New Mexico, several CBCs have excellent long-term records, and this is the key to making justifiable conclusions for this species. The annual fluctuations are likely due to a variety of factors, related to both observers and climate. Junco flocks are notoriously difficult to quantify. An observer encountering a typical winter flock may see birds flushing up from the ground and away in all directions. Estimates are by nature rough, and can vary significantly between observers. Difficult weather (heavy rain or snow) can decrease reported numbers. It is possible that junco flocks move around as the winter season progresses. Barring advances in census methods, the only way to mitigate these uncertainties is to repeat the CBC observations over many years, allowing the trends to be seen through the fluctuations over time.

RESULTS

We find that several New Mexico CBCs exhibit substantial declines in junco numbers. For Española, typical reports in the 1960s and 1970s were in the range of 20 to 60 birds/hr. In the last decade, reports are only about 10 birds/hr, about ½ to 1/6 of the previous level. The decrease in Santa Fe numbers is similar (Fig. 1). Other CBCs, such as Farmington (Fig. 2), show large annual fluctuations that obscure the slope of the trend line. In cases where the decline is less than typical annual fluctuations, we designate the population as "stable" (Table 1). (This is an abbreviation for the conclusion that a declining trend was not detected.)

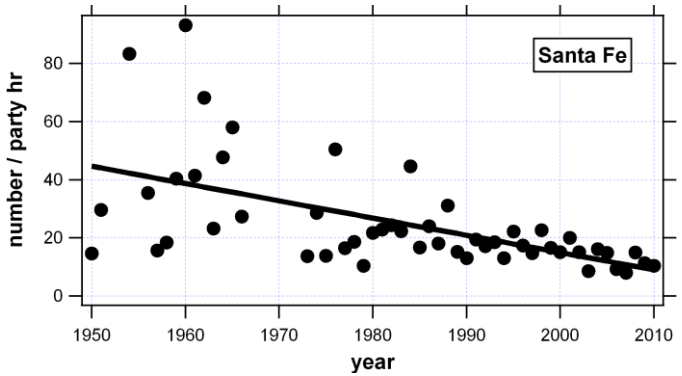

Figure 1. Junco observations for the Santa Fe CBC. Least-squares line corresponds to a trend of –1.3 % per year.

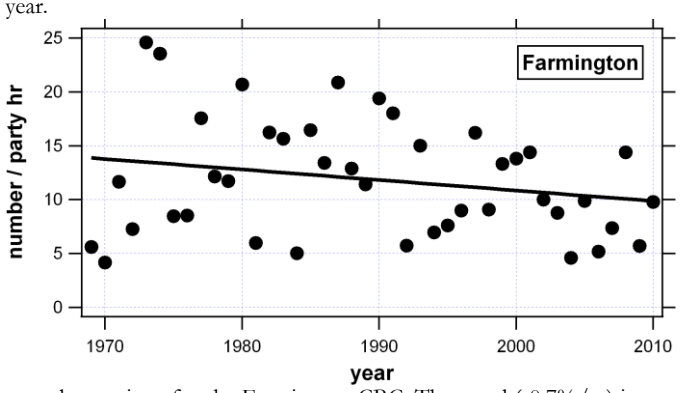

Figure 2. Junco observations for the Farmington CBC. The trend (-0.7%/yr) is negative, but it is not statistically significant (Table 1).

Derived linear trends are combined in one plot for all of the analyzed CBCs in Figure 3. See Table 1 for the trends and their significance. We find that 13 of the 15

CBCs have negative slopes, and these are statistically significant in 7 cases (of which the largest *p* value is 0.027). In the group of 8 CBCs with the highest historical abundance, 4 exhibit significant, and visually striking, decline: Española, Santa Fe, Sandia Mountains, and Albuquerque. The Sevilleta CBC (in Sevilleta National Wildlife Refuge) shows a steep decline, although the observation period is shorter. The group of 7 CBCs with historically lower numbers include 3 CBCs with significant declines. Silver City contrasts with many of the count circles: the fitted line indicates reasonably high abundance and growth in numbers. The increase, however, is not statistically significant ($p = 0.34$). In fact, we do not find significant *increases* in junco numbers in any New Mexico CBC analyzed. Las Vegas CBC historically had some of the highest junco numbers in the state, and they appear to have declined from a few thousand to a few hundred total birds, but unreliable party-hours cloud the interpretation of those reports.

TABLE 1. Linear trend analysis results for 15 CBCs.

	Trend (per yr)	Trend S.E.	*p*-value (*t*-test)	*p*-value (bootst)	N	R^2	Status	Median abundance (birds/hr)
Española	-0.99%	0.32%	0.0017	0.0016	56	0.15	declining	26.8
Zuni	-1.6%	1.3%	0.12	0.093	27	0.055	stable	20.0
Santa Fe	-1.33%	0.27%	<0.0001	<0.0001	52	0.33	declining	18.4
Gila River	-0.61%	0.84%	0.24	0.11	33	0.017	stable	18.1
Silver City	+0.23%	0.55%	0.34	0.15	48	0.004	stable	17.9
Sandia Mtns	-0.91%	0.45%	0.024	0.016	48	0.082	declining	16.5
Albuquerque	-0.80%	0.41%	0.027	0.020	48	0.078	declining	15.0
Farmington	-0.70%	0.49%	0.079	0.045	42	0.049	stable	11.6
Sevilleta	-3.0%	1.1%	0.0048	0.0030	22	0.29	declining	11.1
La Luz	+0.34%	1.1%	0.39	0.22	29	0.003	stable	9.9
Las Cruces	-1.63%	0.55%	0.0030	0.0016	35	0.21	declining	8.7
Bosque del Apache	-0.17%	0.59%	0.39	0.19	56	0.002	stable	8.1
Caballo	-2.7%	0.8%	0.0010	0.0036	26	0.33	declining	8.0
Peloncillo	-0.77%	0.91%	0.20	0.078	37	0.020	stable	6.8
Carlsbad	-0.14%	1.0%	0.45	0.22	46	0.0004	stable	3.7
Las Vegas							prob. declining	

For those CBCs with declining trends, it is worth noting that the magnitude of the decline is generally not well determined: the standard error on the fitted slope is quite large. This is because the large annual fluctuations place weak constraints on the range of possible rates of decline. We should not expect to determine model parameters with high precision when the model makes no attempt to describe year-to-year fluctuations. We also note that these fluctuations do not appear to be repeated from CBC circle to circle: there are no obvious "year effects" as defined by Link and Sauer (2006). The large uncertainty in slopes also shows that there is not much point in fitting an exponential curve to the data.

Significance testing is difficult in cases where the assumptions of the *t*-test are not strictly observed. The ε_i values in Eq. (1) may be non-normal, or the variances in the data may be unequal, which is suggested in Figure 1. Many other linear regression techniques, especially non-parametric, have been devised to account for these problems. (For a detailed discussion, see Draper and Smith (1998)). We investigated other methods to assess the importance of the error structure. The jackknife method, bootstrapping, and Bayesian linear regression (using the WinBUGS software) all gave

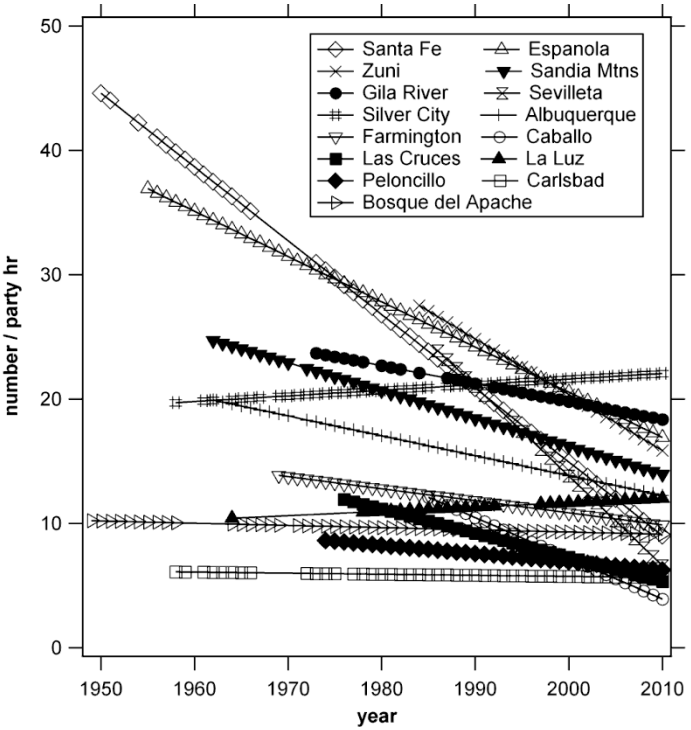

Figure 3. Linear trends derived from regression of CBC data. Least-squares fitted lines are plotted, but individual points are omitted for clarity. See Table 1 for the uncertainty in the trends.

p-values very similar to the *t*-test. Table 1 shows *p*-values from the bootstrapping estimates (from 10^4 resamplings), where we took the bootstrap estimate of the slope uncertainty and inserted it into the *t*-test. Our conclusions for "declining" vs. "stable" remain unchanged. Robust regression yields slightly larger *p*-values for the Albuquerque and Sandia Mountains counts, indicating that high counts of juncos in a

few count years are influential, but that is subject to interpretation (Miller 1998). Fitted slopes for all of the regression analyses were almost identical.

Deduced trends vary substantially among count circles in our analysis, raising the question of whether a state-wide trend can be determined, perhaps from a weighted average as in Geissler and Sauer (1990). A casual glance at Figure 3 and Table 1 leads one to suspect that this will not be easy, since it is not obvious how a single line can be representative of the whole set of lines. Link and Sauer (2006) have developed a method for determining regional trends from CBC data, based on a sophisticated hierarchical Bayesian regression model that incorporates several sources of error and parameterizes the dependence on effort (*i.e.* number of party-hours). Their approach focuses on the statistics of a large set of CBCs taken in combination, which is distinct from performing individual fits and then assembling the results; it is complementary to our analysis. We performed the Bayesian "hierarchical" analysis as described in their paper. The 15 CBCs listed in Table 1 were assigned to a single "stratum." The resulting state-wide exponential decay rate is -0.23%/yr (95% confidence interval: -0.92 to +0.51 %/yr). There is a weak indication of a declining trend, but it is not statistically significant.

DISCUSSION

Although junco populations in winter fluctuate from year to year, the long duration and consistency of the Christmas Bird Count data enables us to discern long-term trends. Several pieces of evidence point to a decline in the number of wintering juncos in New Mexico: (1) 7 of 15 count circles with historically high junco numbers exhibit statistically significant downward trends; (2) none of the count circles exhibit a statistically significant increase; (3) four of the areas with historically high numbers (Santa Fe, Española, Sandia Mountains, Albuquerque) show steep declines. The CBC count circles with significant decreases exhibit an average decline of -1.6% per year. For the Santa Fe CBC, examination of the endpoints of the linear fit in Figure 3 reveals that this circle has lost about 3/4 of the wintering birds in the last 6 decades. There is no obvious geographical correlation: count circles in both the north and south of the state are seeing fewer juncos.

Butcher and Niven (2007) analyzed continental trends in birds from both CBC and Breeding Bird Survey data. They reported that junco numbers are stable in CBC data, but declining slightly in BBS data, although not at a statistically significant level. Their analysis is also regional in spatial scale; in contrast, our approach aims to extract trend information from individual CBC circles. One possible cause of junco decline in New Mexico is that the birds are wintering farther north. Butcher and Niven (2007) found that the mean latitude of junco distribution has shifted north by 187 km (116 mi) in the last 40 years. Although the shift is substantial, the latitudinal extent of New Mexico CBCs is 560 km (347 mi), about three times as large as the northward shift. One might expect that the wintering population in New Mexico has shifted north to Colorado, but

previous work indicates stable numbers there (Niven and Butcher, pers. comm.). Only two western states (Alaska and Montana) exhibit increases, but every western Canadian province shows a large increase (Niven and Butcher, pers. comm.). Numbers have increased in Oklahoma, but the situation is different because one of the Slate-colored Junco subspecies (*J. h. hyemalis*) is a winter dominant there. A quantitative analysis of all of the western states and provinces could be quite informative. Possible changes in the wintering areas in northern Mexico would be interesting to examine, but CBC data in that region are very sparse.

Combining the 15 CBC circles to produce a statewide trend, using a hierarchical Bayesian regression, produces a weak indication of a declining trend (exponential decay rate ≈-0.2%/yr) that is not statistically significant. This is probably due to the fact that the individual trends are not uniform across CBC areas. The hierarchical method should yield more certain parameter estimates when the size of the dataset increases. Published results for American Black Duck in the period 1966-2003 appear to yield an indeterminate trend for a region when the number of CBCs in that region drops below about 20 (Link and Sauer 2006). While the New Mexico data appear to be marginally suitable for this method, it would be useful to repeat it on the full set of bird conservation regions in the wintering area to investigate whether declines of wintering juncos are a national phenomenon. Such a study might additionally clarify the effect of effort.

CBC data can be informative, but the CBC methodology is only weakly standardized. It would be valuable to implement more rigorous census techniques to improve the precision of derived trends in the future. At the same time, we could learn more about the reliability of the current CBC approach in indicating these trends.

ACKNOWLEDGMENTS

We thank Steve Fettig for careful readings of early drafts, editing, and suggestions on statistical analysis. We thank John Shipman for the online database of New Mexico CBC information. William A. Link of the USGS shared his Bayesian regression computer program with us. John P. DeLong made several useful suggestions on the manuscript.

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GREAT HORNED OWLS FEED ON VINEGAROONS

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The Great Horned Owl (*Bubo virginianus*) is an opportunistic feeder, with the most diverse prey profile of any North American raptor (Voose 1988). Arthropods form a very small portion of their diet (0-2% in 4 habitat types in North America (Houston et al. 1998), higher in more arid areas. Up to 8.7% scorpions and spiders (Arachnida), 7.0% centipedes (Chilopoda) and 16.5% insects were found in 47 owl pellets from deserts of Baja California (Llinas-Gutierrez et al. 1991).

The stomach contents of a first year female found dead on Kirtland Air Force Base, Bernalillo County, New Mexico (elevation unknown) on 25 August 2010 (wing saved MSB 39127) adds to this history. It contained remains of 5 individual vinegaroons (Arachnida, Order Uropygi, Family Thelyphonidae, *Mastigoproctus giganteus* (Lucas)), body length up to 75 mm. Vinegaroons are a heavily chitinized, solitary, fossorial predator and an unreported food item for Great Horned Owls. This Great Horned Owl's stomach also contained a Sooty Longwing (Insecta, Order Orthoptera, Family Tettigoniidae, *Capnobotes fuliginosus* (Thomas); the remains of a grasshopper (Orthoptera, Family Acrdidae); and 2 darkling beetles (Order Coleoptera, Family Tenebrionidae, *Eleodeus extricatus* (Say)). Large "nestlings" and just fledged young are often fed on the ground, and undoubtedly feed on anything they can catch, although this is not documented in the literature (cf Houston et al., ibid). This young bird was well fledged, but apparently retained the ground-feeding habit.

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FIELD EXPEDITION TO THE WIND RIVER RANCH, NEW MEXICO

DAVE KRUEPER, NMOS PRESIDENT

From 11-13 May 2012, ten intrepid birders participated in gathering presence/absence data and relative abundance information at the beautiful Wind River Ranch along the Mora River, Mora County. This 4500 acre ranch is being added to the U.S. Fish and Wildlife Service's New Mexico Refuge Complex which also includes Las Vegas and Maxwell National Wildlife Refuges. This ranch is a key piece in the >300,000 acre watershed protection area that has been identified by the USFWS as an "approved boundary" for the refuge lands in the area.

While an incomplete avian checklist had been compiled for the area, to our knowledge this was the first targeted search conducted at the Ranch. The group assembled in the afternoon on 11 May, discussed protocol, and then designated team members and search area boundaries. Early in the morning on 12 May (International Migratory Bird Day), we split into four teams, each of which covered a designated section of the ranch. Habitats included cottonwood/willow riparian along the Mora River, oak/juniper/Ponderosa woodland, abandoned agricultural land, and grasslands. Late that afternoon, we gathered to total our results, have a potluck dinner and socialize while it RAINED on the Ranch. The next morning some of us explored sections of the Ranch again to see if we could add to the avian species totals and to view the resident herd of American bison.

Including a few avian species additions on the day before and the day after the inventory, we tallied a total of 92 species for the weekend. As would be expected, the riparian habitat harbored the highest diversity with 84 species recorded. We documented 49 species in the oak/juniper/Ponderosa woodlands and 30 species in the grassland-associated habitat. Significant was the addition of ten species to the Ranch list: Double-crested Cormorant, Greater Roadrunner, Dusky Flycatcher, Blue-gray Gnatcatcher, Golden-crowned Kinglet, American Pipit, MacGillivray's Warbler, Rufous-crowned Sparrow, Grasshopper Sparrow, and Great-tailed Grackle. Of interest were regular flights of Double-crested Cormorants and Great Blue Herons up and down the Mora River which led us to believe that the birds might be nesting further upriver while feeding downriver at the ponds near Watrous. We also found both Prairie and Peregrine falcons, Long-billed Curlew, what appeared to be an active Belted Kingfisher burrow, all three phoebe species, and several large Cliff Swallow colonies. Besides the several hundred Cliff Swallows, the most common landbirds were Mourning Dove, American Robin, Yellow-breasted Chat, Spotted Towhee, Black-headed Grosbeak, and Red-winged Blackbird.

These data will be used to assemble a revised avian checklist for the Wind River Ranch. We intend to present the full results of the expedition in a future issue of the

NMOS Bulletin, so stay tuned. Many thanks to the following field-hands who participated in this event: Janet Bair, Phillip Garcia, Dave Krueper, Rob Larrañaga, Patricia Mehlhop, Dave Mehlman, Janet Ruth, Martha van der Voort, Leann Wilkins, and Sartor O. Williams.

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RECOGNITION OF NMOS LIFE MEMBERS

I would like to take this opportunity to recognize and to thank our Life Members for their generosity and contributions to NMOS. A Life Membership greatly increases our capacity to hold annual meetings, sponsor our research scholarship program and to print *NMOS Field Notes* and the *NMOS Bulletin*. We're always looking for more Life Members, and so if you have been mulling it over (or even if you have not considered it previously), we would love to have you join us! Let's all give a huge thanks to the following Life Members:

Jonathan Batkin
Leonie Batkin
Robert Cates
Steve & Nancy Cox
James Findley
Roger & Katherine Hammond
Les Hawkins
Tom Hines
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MEMBERSHIP DUES REMINDER

If you have not already paid your 2012 NMOS membership dues, please take a moment to do so now. To pay for membership, please download the membership form from our website (www.nmbirds.org), fill out, and mail to the following address, providing a check made out to "NMOS". Thank you!

New Mexico Ornithological Society
P.O. Box 3068
Albuquerque, NM 87190-3068

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NEW MEXICO ORNITHOLOGICAL SOCIETY

— Founded 1962 —

The New Mexico Ornithological Society was organized to gather and disseminate accurate information concerning the bird life of New Mexico; to promote interest in and appreciation of the value of birds, both aesthetic and economic, to further effective conservation of the state's avifauna; to facilitate opportunity for acquaintance and fellowship among those interested in birds and nature; and to issue publications as a means of furthering these ends.

Membership and Subscriptions: Membership in the New Mexico Ornithological Society is open to anyone with an interest in birds. Memberships are for a calendar year and annual dues are payable 1 January. Dues are: Regular Membership $20; Family $30; Student $10; Supporting $50; Life $500. Address for the New Mexico Ornithological Society: Post Office Box 3068, Albuquerque, NM 87190-3068.

NMOS BULLETIN

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The *Bulletin* is published quarterly; subscription is by membership in NMOS. The *Bulletin* serves two primary purposes: (1) to publish articles of scientific merit concerning the distribution, abundance, status, behavior, and ecology of the avifauna of New Mexico and its contiguous regions; and (2) to publish news and announcements deemed of interest to the New Mexico ornithological community.

NMOS members are encouraged to submit articles and news. Articles received are subject to review and editing. Published articles are noted in major abstracting services. Please submit articles in double-spaced electronic format, such as a Microsoft Word document, by e-mail to the Editor (see inside front cover). Refer to recent issues of the *Bulletin* for examples of style. News items may be submitted to the Editor by way of e-mail.

www.nmbirds.org

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