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LA-UR-05-8515

November 2005

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Title Bird Survey Results from Mortandad and Ten-Site
Canyons in 2005

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Cover photo: Northern flicker (*Colaptes auratus*)

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Bird Survey Results from Mortandad and Ten-Site Canyons in 2005

INTRODUCTION

This project was completed by the Ecology Group (ENV-ECO) from Los Alamos National Laboratory (LANL) in support of a biological investigation study conducted in Mortandad and Ten-site canyons by LANL's Environmental Characterization and Remediation Group (ENV-ECR). Details on the biological investigation can be found in the ENV-ECR work plan for the Mortandad Canyon system (LANL/ECR 2005). There were two main sites surveyed to determine avian use of areas that are potentially contaminated. The areas surveyed included reaches in upper Mortandad Canyon and the entire length of Ten-site Canyon. All sites were surveyed in the summer of 2005.

METHODS

The bird survey areas consisted of homogeneous vegetative types within the canyon bottoms that were reached by foot. In each survey area, the birds present were recorded by a point count method. Upon arrival to a survey area, surveyors walked through the area, stopping at 200-m (656-ft) intervals and recording all birds seen or heard within a six-minute period. Surveys began soon after daybreak and ended before 11 a.m. Each observation of a species encountered was recorded with the following information: species code, sex, age, and estimated distance from the observation point. Surveyors also recorded habitat type and meteorological information at each observation point. At the completion of each survey point, the primary surveyor would record all species, comparing the species list with the other surveyor's list. Bird identification was based on taxonomic keys from The National Geographic Society (1983), Ehrlich et al. (1988), or Travis (1992).

RESULTS

Figure 1 and Tables 1 through 3 summarize the results of the surveys. Tables 2 and 3 provide a general list of species that occur in each area and the relative abundance of each species at each location during the survey. These data are not intended to represent a total number of species in a particular area or population levels of any recorded species. These data can, if repeated, provide general trends in species composition but cannot provide a measurement of density or population levels. The diversity of each site (Table 1) was calculated using the Shannon-Weiner Biodiversity Index. Based on diversity indices of 2.726 for upper Mortandad Canyon and 2.519 for Ten-site Canyon, it can be reasonably assumed that all the sites have similar diversity of bird populations. Among all of the sites, 230 birds were recorded that represented 27 species. The diet types of the species at each study area are shown in Figure 1 and Tables 2 and 3.

As can be seen in the survey data, a majority of the birds feed on insects taken in flight or picked off of vegetation and ground surfaces. Considering other dietary types, excluding aerial-captured insects, a majority of the birds are in direct contact with soil or plant surfaces during feeding. As a result of the species foraging in this area, it can be reasonably assumed that, if there are environmental contaminants in the environment, a majority of the birds feeding in this area come

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into contact with them. Further evaluations of animal species using these areas should include analysis of avian vectors as a pathway for contaminant transport.

Sampling birds for contaminant concentrations could provide valuable insights into the importance of this highly mobile group for dispersal of contaminants in the environment. Birds are widespread in food webs and could contribute to contaminant uptake at various levels of predator-prey interaction.

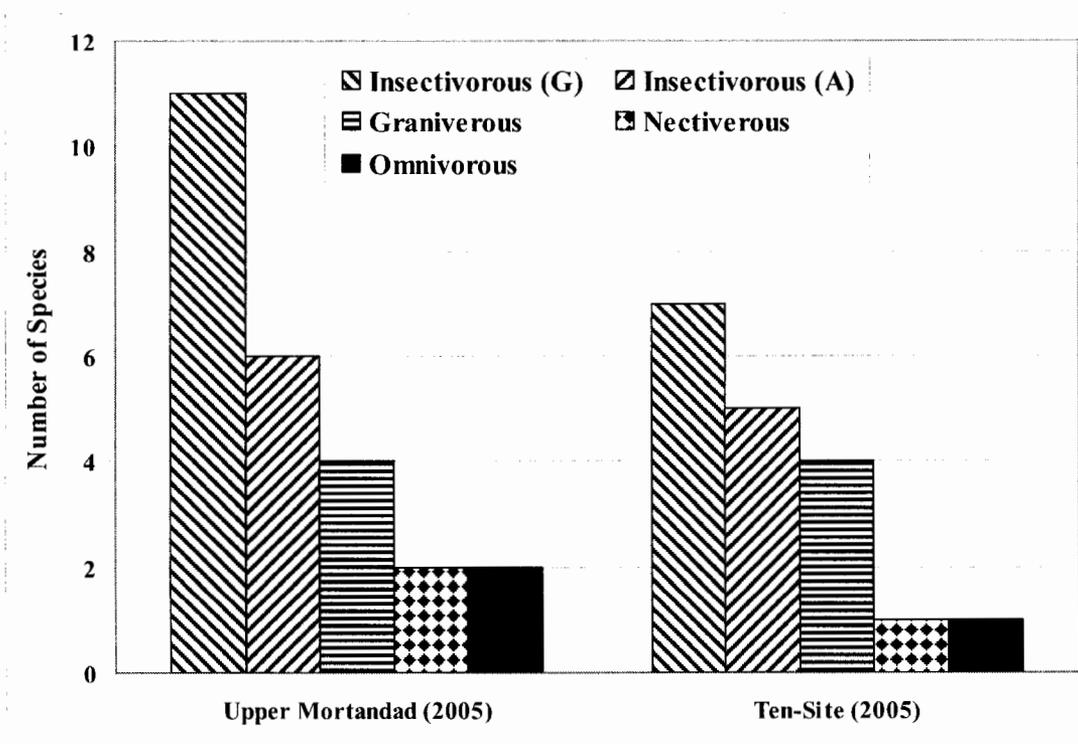


Figure 1. Summary of major diet types at each survey location.
(G = Insects foraged off of the ground or vegetation; A = Insects foraged in the air)

Table 1. Summary of Survey Locations

Site	Investigation Reach	Total Number of Birds	Number of Species	Diversity of Site $H' = -[\sum (p_i)(\ln p_i)]$
Upper Mortandad Canyon (2005)	M-1, M-2, E-1	124	25	2.726
Ten-site Canyon (2005)	TS-1, TS-2, Pratt	106	18	2.519

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Table 2. Survey Results from Upper Mortandad Canyon (July 27, 2005)

Species	Species Code	Diet*	Number Seen	Relative Abundance (%)
Broad-tailed Hummingbird	BTHU	N	21	16.94
Pygmy Nuthatch	PYNU	I/G	20	16.13
White-breasted Nuthatch	WBNU	I/G	13	10.48
Violet-green Swallow	VGSW	I/A	10	8.06
Western Bluebird	WEBL	I/A	8	6.45
House Finch	HOFI	S	7	5.65
Mountain Chickadee	MOCH	I/G	6	4.84
Cordilleran Flycatcher	COFL	I/A	5	4.03
Grey Flycatcher	GRFL	I/A	5	4.03
Northern Flicker	NOFL	I/G	5	4.03
Western Wood-Pewee	WWPE	I/A	4	3.23
Rufous Hummingbird	RUHU	N	3	2.42
Brown-headed Cowbird	BHCO	I/G	2	1.61
Western Tanager	WETA	I/G	2	1.61
Common Raven	CORA	O/C	2	1.61
Red Crossbill	RECR	S	2	1.61
Townsend's Solitaire	TOSO	I/A	1	0.81
Canyon Wren	CAWR	I/G	1	0.81
Hairy Woodpecker	HAWO	I/G	1	0.81
Plumbeous Vireo	PLVI	I/G	1	0.81
Spotted Towhee	SPTO	I/G	1	0.81
Williamson's Sapsucker	WISA	I/G	1	0.81
Scrub Jay	SCJA	O	1	0.81
Canyon Towhee	CATO	S	1	0.81
Lesser Goldfinch	LEGO	S	1	0.81
TOTAL			124	100.00

*I = Insects (G = surface forage; A = aerial forage); N = Nectar; S = Seed; O = Omnivorous; C = Carrion

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Table 3. Survey Results from Ten-Site Canyon (July 27, 2005)

Species	Species Code	Diet*	Number Seen	Relative Abundance (%)
Pygmy Nuthatch	PYNU	I/G	20	18.87
Violet-green Swallow	VGSW	I/A	15	14.15
Western Bluebird	WEBL	I/A	12	11.32
Mountain Chickadee	MOCH	I/G	11	10.38
White-breasted Nuthatch	WBNU	I/G	8	7.55
Broad-tailed Hummingbird	BTHU	N	8	7.55
Common Raven	CORA	O/C	6	5.66
Northern Flicker	NOFL	I/G	5	4.72
Western Wood-Pewee	WWPE	I/A	4	3.77
Hairy Woodpecker	HAWO	I/G	4	3.77
Spotted Towhee	SPTO	I/G	3	2.83
Grey Flycatcher	GRFL	I/A	2	1.89
House Finch	HOFI	S	2	1.89
Mourning Dove	MODO	S	2	1.89
Cordilleran Flycatcher	COFL	I/A	1	0.94
American Robin	AMRO	I/G	1	0.94
Lesser Goldfinch	LEGO	S	1	0.94
Red Crossbill	RECR	S	1	0.94
TOTAL			106	100.00

*I = Insects (G = surface forage; A = aerial forage); N = Nectar; S = Seed; O = Omnivorous; C = Carrion

CONCLUSION

The site surveys employed in this study provide a limited estimate of the species diversity for each location at the time of survey. Bird populations will vary between years and within years depending on the season. Additionally, environmental factors such as drought (Fair and Keller 2004) or fire can significantly affect avian population dynamics in the short term. To begin to detect permanent trends in avian populations, all sites would require annual surveys over a longer period of time. To detect any potential effects from sources of environmental contaminants, an invasive and long-term monitoring program would need to be established.

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