

Upper Rio Grande Basin Water Operations Review and EIS  
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RIP-100

**BOSQUE BIOLOGICAL MONITORING PROGRAM:  
BIRD POPULATIONS IN RIO GRANDE VALLEY STATE PARK,  
WINTER 1996-97 AND SPRING 1997**

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## EXECUTIVE SUMMARY

The Rio Grande in central New Mexico and its floodplain gallery forest form a wildlife habitat that is rare in this region. Hink and Ohmart's (1984) biological team, working within 163 miles of bosque recorded 277 species of birds in the bosque or adjacent fields and pastures. Rio Grande Valley State Park (RGVSP) extends for 20 miles through the heart of the City of Albuquerque and semi-rural Bernalillo County. This study and report on bird population counts between December 1996 and June 1997 meets long-term monitoring recommendations of the RGVSP Management Plan, a cooperative agreement between the City of Albuquerque and the New Mexico Parks and Recreation Division.

Birds were counted along 12 2500-ft transects at approximately 2-week intervals between 4 December 1996 and 21 February 1997 (Winter) and 1 May and 20 June 1997 (Breeding Season). Densities for each species on each transect were calculated using lateral distance estimates, as described by Emlen (1971) and modified by Balph et al. (1977) and Anderson et al. (1977). The lateral interval (0-10, 10-25, 25-50, 50-100, and 100-200) yielding the highest density estimate was used to calculate the estimated population for that species within 40 ha (100 acres). We also used a canoe to travel 16 miles of the Rio Grande and count waterbirds that utilized riverine habitat and raptors that were generally few and widespread (= low density).

Thirty four species of raptors and birds associated with open water or water edges were recorded on the 10 counts from the canoe. Twenty five species were recorded during both winter and breeding season counts; 16 species (64%) were recorded in both seasons. Nine species were unique to each season. Counts from the canoe documented large numbers of waterfowl using the river during the winter. Numbers of Canada Geese, Wood Ducks, Sandhill Cranes and Bald Eagles, a Threatened species, wintering in the RGVSP have increased markedly during the last decade.

We recorded 62 bird species on transects in winter; 19 to 32 species were recorded on the 12 transects. Estimated densities ranged from 253 to 1043 birds /100 acres. Average winter bird density reported by Hoffman (1990) for 12 transects was 771, 35% higher than the 525 birds/100 acres calculated for the 11 Bosque transects of 1996-97.

We recorded 90 species on transects during the breeding season; 22 to 48 species were recorded on the 12 transects. Estimated densities ranged from 308 to 1016 birds /100 acres. Average spring-summer bird density reported by Hoffman (1990) for 12 bosque transects was 1057 birds/100 acres, which is 2-3.5 times the 295 (without migrants) or 591 birds/100 acres calculated for the 11 bosque transects of 1996-97.

Bird density estimates can vary greatly year-to-year and these differences do not prove a major declines in breeding or wintering bird populations. The drought of 1995-96 probably decreased seed and fruit production in the RGVSP and could have caused short-term declines in bird populations. Bird censusing should be repeated as soon as fiscally possible. Management decisions in the RGVSP should include data on bird populations, particularly Threatened or Endangered species.

## INTRODUCTION

The Rio Grande flows north to south through the heart of New Mexico, providing a constant supply of water in an otherwise arid region. In the Middle Rio Grande Valley of central New Mexico, the river and its floodplain gallery forest form a wildlife habitat that is rare in this region. It is attractive to a variety of wildlife, including birds. In the most intensive study to date, Hink and Ohmart's (1984) biological team, working within 163 miles of bosque from San Acacia to Espanola, recorded 277 species of birds in the bosque or adjacent fields and pastures.

Rio Grande Valley State Park (RGVSP) extends for 20 miles through the heart of the City of Albuquerque and semi-rural Bernalillo County, with a human population in excess of 500 thousand. The City of Albuquerque shares responsibility for the management of RGVSP with the New Mexico Parks and Recreation Division. The RGVSP Management Plan calls for a long-term monitoring program of vegetation and wildlife within the Park; this report summarizes bird population data gathered between December 1996 and June 1997 and compares that data with previous population studies in the RGVSP.

## STUDY AREA

### Emlen Transects

City of Albuquerque personnel relocated 10 of the 12 transects censused by Hoffman (1990) and moved two others, #9 from private lands to a nearby mix of RGVSP and private lands, and #10 from private to nearby RGVSP lands (Fig. 1). All transects were 2500 feet in length and variable in width, dependent upon adjacent habitat and the hearing and seeing ability of the observer. Transects were placed throughout the 20 mile length of the RGVSP. They were numbered from south to north. All transects but the new Transect 9 were within or adjacent to wooded (bosque) riparian areas of the Rio Grande floodplain. Transect 9 was on the edge of the Oxbow Marsh and censused birds in the marsh and adjacent shrublands. Two transects, #3 and #12, had many areas with excellent views of adjacent river channel so that riverine birds could also be seen and counted. Transect 4 had intermittent views of the river channel. Waterbirds on the river could be heard and recorded from all 12 transects. Detailed descriptions of Transects 1-8 and 11-12 were provided by Hoffman (1990). Little change has occurred in the 10 repeated transects, so Hoffman's (1990) descriptions are summarized here.

Transect 1 was the southern most transect (Fig. 1). It was on the east side of the Rio Grande, about 3 miles south of Rio Bravo Bridge. Much of the transect passed through a stand of old, large cottonwoods (*Populus fremontii* var. *wislizenii*) with a sparse (north end) or dense (south end) Russian-olive (*Elaeagnus angustifolia*) understory. In the center was a burn area about 150 m wide with grass, annuals, and scattered Russian olives. There was no evidence of human activities in the forest and little evidence of pedestrian, equestrian, or bicyclist activity on the adjacent levee.

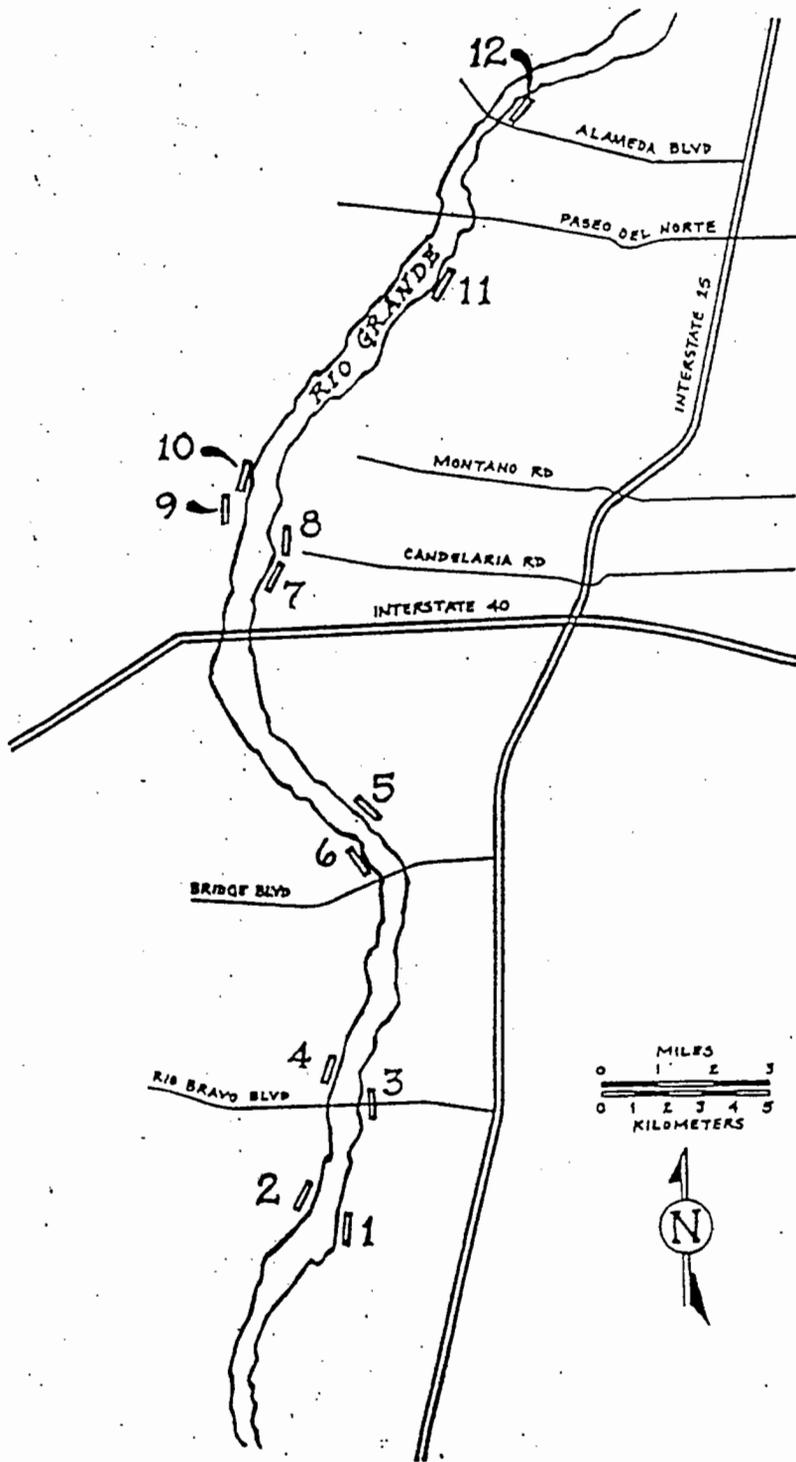


Fig. 1. Approximate locations of 12 2500' Emlen transects, Rio Grande Valley State Park, December 1996 to June 1997. Counts of waterbirds and raptors began at Alameda Bridge and ended at Transect 2.

Transect 2 was also on the south end of RGVSP, across the Rio Grande from Transect 1. The northern two thirds of the transect followed the ecotone between old-growth cottonwood forest and a dense, pure stand of Russian-olive beyond which was a grassy area adjacent to the river. The southern third of the transect passed through a dense Russian-olive/salt cedar (*Tamarix chinensis*) stand under scattered old-growth cottonwoods. A 10 ft wide path to the river, that separated these two areas, showed regular though light human use. Equestrian and foot traffic on the levee appeared light, though heavier than adjacent to Transect 1.

Transect 3 was centered under the eastern side of Rio Bravo Bridge. Mature close-canopied cottonwood forest with a moderate Russian-olive understory was on the east side of the transect. The view of the river to the west of the transect was largely unobstructed; scattered to moderate stands of Russian-olive over a grass/herbaceous flat lay between the transect and the river. Traffic noise from Rio Bravo penetrated to the ends of the transects. A parking lot at the bridge insured extensive use of the area by pedestrians, equestrians, bicyclists and their dogs.

Transect 4 began a quarter mile north of Rio Bravo Bridge on the west side of the Rio Grande. The transect traversed a narrow (100 ft. wide) stand of cottonwood/Russian-olive/Siberian elm (*Ulmus pumila*) forest of medium-age. Pedestrian and bicyclist use of the levee and short trails to the river was noted.

Transect 5 was in a largely mature stand of cottonwood on the east side of the Rio Grande, across drain ditch and street from Albuquerque Zoo. A replanted burn was on the east side of the transect near the center. Canopy closure was virtually complete elsewhere; a moderate understory of Russian-olive was also present throughout. A nearly pure stand of elm dominated the transect near the south end. A major recreation path was used as the transect; road and zoo noise made the transect a challenge to census.

Transect 6, directly across the Rio Grande from Transect 5, was a mix of young and middle-aged cottonwoods, with a moderate understory of mulberry and Russian-olive, especially near the river. There was little sign of a 1980s burn (Hoffman 1990). Adjacent to a major neighborhood, there was considerable evidence of hiking and bicycling. Some evidence of homeless campsites was also found.

Transect 7 was directly north of I-40 on the east side of the river. It was also previously censused by Hink and Ohmart (1984). Young to intermediate-aged cottonwoods dominated the overstory, with a moderate understory of Russian-olive. The transect followed a well-used path. Early morning walkers and joggers were regularly encountered during the counts.

Transect 8 was also a relocated Hink and Ohmart (1984) transect. It was located between the Rio Grande Nature Center and the river on the east side of the Rio Grande. Cottonwoods were large along an old slough that was adjacent to the north half of the transect, but small (young) for the remainder. Russian-olive grew adjacent to the slough; elsewhere the understory consisted mostly of forbs. Nature Center paths allowed heavy human use of the area.

Transect 9 followed the west and north edges of the Oxbow Marsh, formed by the outflow of the Corrales Drain and located approximately half way between I-40 and Montano Bridge. The marsh was dominated by emergent stands of cattail (*Typha latifolia*) and roundstem bulrush (*Scirpus occidentalis*) with smaller areas of open water. For the most part the western side of the transect was below a 25-50 foot sand slope, but birds in the brushy hills beyond were heard and sometimes seen. A border of cottonwoods, willows (*Salix exigua* - *S. gooddingii*), and salt cedar found along the marsh edge adjacent to the transect.

The south end of Transect 10 was about one half mile north of the new Montano Bridge on the west side of the Rio Grande. It followed a well used dirt path that meandered through a medium-aged to decadent cottonwood forest that contained patches of willows and scattered Russian-olives and salt cedar. Censusing occurred during reconstruction of the adjacent levee by U. S. Army Corps of Engineers' contractors. Construction activities and noises interfered with some censuses, but may have limited hikers, bikers, and runners from visiting the area during the study.

The north end of Transect 11 was about one quarter mile south of Paseo del Norte Bridge on the east side of the river. The transect, located midway between the river and the levee, passed through an very open, young forest with scattered cottonwoods and Russian-olive. Well-developed shrub areas were also present. Highway noise was quite evident at the north end of the transect, but diminished as the surveyor moved south. The levee is paved and has considerable bicycle and foot traffic. Trails within the woodland traversed by the transect were also used by pedestrians.

The south end of Transect 12 was about one quarter mile north of the Alameda Bridge. This transect censused a narrow strip of habitat between the river and the east-side levee. Most of the transect had a canopy of tall cottonwoods; a moderate to heavy understory of salt cedar predominated throughout. Sandbars, islands, and open river were visible for the entire length of the transect. A new parking lot south of Alameda Bridge insures that this area will continue to be heavily used by hikers; horse ownership in this semirural setting also assured heavy use of the levee by equestrians.

### **Waterbird/Raptor Count Route**

Emlen transects were not suitable for monitoring populations of waterbirds that utilized adjacent riverine habitat and raptors that were generally few and widespread (= low density). In 1996-1997 we used a canoe to travel the Rio Grande 16 miles from Alameda Bridge near Transect 1 to the trail through Transect 2 on the southwest end of the study area. The RGVSP was divided into 4 river segments by relatively evenly spaced bridges: Alameda Bridge to Montano Bridge, Montano Bridge to Central Bridge, Central Bridge to Rio Bravo Bridge, and Rio Bravo Bridge to Transect 2 (Fig. 1). During winter counts river flows ranged from 590 (7 Dec 1996) to 800 (all February floats) cfs (cubic ft/sec). Spring flows began at 1600 cfs (1 May 1997) and increased to 5200 cfs (17 June 1997), allowing for fast passage through the study area.

## METHODS

### Emlen Transects

Bird counts were conducted twice a month between 4 December 1996 and 21 February 1997 (Winter) and between 1 May and 20 June 1997 (Breeding Season). Birds were censused along all 12 transects at approximately 2-week intervals. A single observer walked slowly along the transect, recording all birds heard and/or seen and estimating their lateral distance from the transect centerline. Lateral distance intervals (meters) were 0-10, 10-25, 25-50, 50-100, 100-200, and 200-400. Almost all birds were recorded at lateral distances of less than 100 m. Observers also recorded time and weather conditions. Counts were not conducted during moderate to heavy precipitation or if winds were in excess of 15 mph. Counts were conducted in the morning and completed by midday in winter and mid-morning during the breeding season. Each transect required 25-40 minutes to complete during the winter and 40-60 minutes to complete during the breeding season to complete. An individual observer might complete 3-4 transects in a morning during the winter, but was limited to only 2/morning during the breeding season.

Densities for each species on each transect were calculated for each lateral distance interval, as described by Emlen (1971) and modified by Balph et al. (1977) and Anderson et al. (1977). The interval yielding the highest density estimate was used to calculate the estimated population for that species within 40 ha (100 acres). On narrow bosque transects (#4 and #12) the interval for calculating density of bosque birds was limited to 25 m, comparable to conducting direct counts on these transects (Hoffman 1990). Estimates for waterbirds heard and/or seen in the river channel, however, were the same as on all other transects. Birds per/40 ha (100 acres) were calculated for each species with the following multipliers: 0-10 m, 32.80; 0-25, 21.87; 0-50, 13.12; 0-100, 6.56; and 0-200, 1.64. Transect 9, adjacent to Oxbow Marsh, was treated as a 1-sided transect for most species of birds recorded as those species were recorded on either the marsh or upland side of the transect. For 1-sided species the multipliers were half (ie., 0-10 m = 16.40) that of 2-sided transects. Total number of species (hereafter, total species) recorded during one season on each transect was also tallied.

Relative importance of each transect during each season was assessed by ranking total species and density totals from highest to lowest (1-12) (Hoffman 1990). These 2 rankings were summed and the transects were ranked for the season. Then these rankings for winter and the breeding season were summed and an overall rank of importance to birds for the study period (1996-97) was reached. Transects utilized by unique or rare species were also noted.

Transect 9 was unique among the 12 transects; it was predominantly open marsh on one side and open brushland on the other. We sometimes removed Transect 9 data from the analysis so that only those transects with forested or brushy habitats were analyzed. This was particularly necessary in making comparisons with results of previous studies (Hink and Ohmart 1984, Hoffman 1990). These non-marsh transects are referred to as bosque transects.

Some species, though seen or heard from Emlen transects, did not utilize bosque habitat. Particularly in winter, waterfowl and cranes were recorded flying over Emlen transects. Those waterbird species seen or heard on adjacent sections of the Rio Grande were included in overall totals for the transect and a density estimated. Then data sets were further refined to exclude those species and total species and densities recalculated. Finally, during the breeding season many migrant land birds were recorded as they moved through the RGVSP on their way to higher or more northerly breeding habitats. An additional analysis removed these migrant species from the breeding season data set and total species and densities recalculated. This removed birds that were not utilizing the Albuquerque bosque for breeding, giving a more accurate estimate of breeding populations. Total species and densities for 10 transects previously censused and summarized by Hoffman (1990) and 2 transects that were also utilized by Hink and Ohmart (1984) were available for direct comparisons. Population means for similar habitat types were also available (Hink and Ohmart 1984).

### **Waterbird/Raptor Counts**

In past studies waterbirds and raptors were surveyed by different methods. Hink and Ohmart (1984), whose study area was much larger, censused raptors and large birds from vehicles driven along levee roads. Hoffman (1990) counted waterfowl, waders and raptors by accessing fields and the river at various locations. He reported his results in birds/hour of survey time.

In 1996-1997 a canoe was used to travel the Rio Grande 16 miles from Alameda Bridge to Transect 2 on the southwest end of the study area. Counts were started in late morning following completion of several Emlen Transects and completed no later than a hour before sunset. We recorded all raptors, waterfowl and other waterbirds seen from the canoe and the time required to pass through 4 river segments, divided by bridges, that were of approximately equal length (~4 miles). Counts during winter required 6-7 hrs and parts of 2 days because days were short; Alameda to Rio Bravo was completed on one day and Rio Bravo to Transect 2 on another. All four river segments were surveyed in 4-5 hrs on one day during the breeding season. The Rio Grande ranged from 100 to 300 yards in width through the study area. We generally followed one edge or the other of the river, depending upon the likelihood of encountering shy, hidden species. Open water species (most ducks, geese, cranes) were easily seen from wherever the canoe floated in the river channel. Total species and bird counts from each segment were compared using Analysis of Variance. Counts per hour and per mile of observation were also compared with data from previous studies.

An additional long-term data set available for the RGVSP is from the Audubon Society's annual Albuquerque Christmas Bird Count (CBC). A CBC involves a group of volunteers that spend one preselected late December or early January day within a 15-mile diameter circle enumerating all birds by species that they encounter. The Albuquerque CBC has been conducted every year since 1961. The count circle includes the Rio Grande from north of Corrales to Central Bridge. Though observer effort and coverage area does vary year to year, the 36 year data set is valuable for evaluating long-term trends for some species, particularly waterbirds.

## RESULTS

Between 1 December 1996 and 18 June 1997 we conducted 120 Emlen transect and 12 waterbird/raptor counts and recorded 120 avian species. Six additional species were encountered away from formal counts. All species, including scientific names, and types of count on which they were documented are given in Appendix A. Nomenclature reflects the most recent changes in common names, scientific names, and phylogenetic order (American Ornithologists' Union [AOU] 1997) preparatory to publication of the Seventh Edition of the AOU Checklist of North American Birds (AOU, in press), as summarized by Williams (1997).

### Emlen Transects

We recorded 62 bird species while on Emlen Transects during winter and 90 species during the breeding season (Appendix A). Thirty eight species were recorded during both seasons, 15 were recorded only in winter, and 46 were recorded only during the breeding season.

*Winter* - Estimated bird densities ranged from 253 birds/100 acres on Transect 8 to 1043 birds/100 acres on Transect 5, with a mean density of 614 birds/100 acres (Table 1). Almost half (508) of the 1043 birds/100 acres on Transect 5 were Dark-eyed Juncos; European Starlings and House Sparrows at the Rio Grande Zoo across the street did not figure into the calculation of the population estimate. Total species ranged from 15 on Transect 8 to 32 on Transect 9 with a mean of 21 species/transect.

Table 1. Total species and estimates of birds/100 acres for 12 Emlen Transects, Rio Grande Valley State Park, Bernalillo County, New Mexico, Winter, 1996-97.

Transect	<u>All species</u>		<u>Bosque (Without Waterbirds)</u>	
	Total Species	Birds/100 acres	Total Species	Birds/100 acres
1	19	838	18	668
2	21	296	20	229
3	21	759	19	735
4	20	367	19	327
5	19	1043	19	1043
6	21	427	19	402
7	20	515	19	433
8	15	253	14	230
9	32	928	22	897
10	21	341	20	269
11	20	1000	18	955
12	22	603	20	489

When waterbirds were eliminated from the data set, estimated bird densities ranged from 229 birds/100 acres on Transect 2 to 1040 birds/100 acres on Transect 5, with a mean density of 556 birds/100 acres (Table 1). Total species ranged from 14 on Transect 8 to 22 on Transect 9 with a mean of 19 species/transect. If data from Transect 9 are removed from the data set, mean bird density of these true bosque transects becomes 525 birds/100 acres and average total species remains at 19.

Average winter bird density reported by Hoffman (1990) for 12 Bosque transects was 771 birds/100 acres, which is 35% higher than the 525 birds/100 acres calculated for the 11 Bosque transects of 1996-97. Hink and Ohmart (1984) reported average winter densities for 4 Bosque habitats similar to those censused herein of 109, 933, 1166, and 2159 birds/100 acres, but also reported marked differences in both of the higher means between years (1981 and 1982) of the study.

The 10 species with the highest average estimated densities (birds/100 acres) during winters of 1996-97 and 1988-90 (Hoffman 1990) are shown in Table 2. Though 7 of the 10 are the same, Hoffman's (1990) average densities were higher for most species. Most notable was a mean estimate of 310 American Robins/100 acres in 1988-1990, compared with only 43/100 acres

Table 2. Average densities of 10 most common winter birds of 1996-96 versus average densities of 10 most common winter birds of 1987-90 (Hoffman 1990), Rio Grande Valley State Park, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Species	1996-97		1988-90	
	#/100 acres	Rank <sup>1</sup>	#/100 acres	Rank
Dark-eyed Junco	189	1	72	2
American Crow	80	2	11	10
American Goldfinch	73	3	--	-
White-crowned Sparrow	55	4	71	3
American Robin	43	5	310	1
Canada Goose	27	6	--	-
Red-winged Blackbird	26	7	--	-
Mallard	25	8	17	7
European Starling	21	9	20	6
House Finch	20	10	11	10
Song Sparrow	4	18	52	4
Northern Flicker	12	13	30	5
Spotted Towhee	12	13	16	8
Black-capped Chickadee	19	11	13	9

<sup>1</sup>Ranks higher than 10 are shown for 1996-97 species that ranked in the top 10 in 1988-90.

in 1996-97. However, Dark-eyed Juncos averaged higher in 1996-97 (189) than in 1988-90 (72).

The Oxbow Marsh transect (#9) ranked highest among the 12 transects in relative importance (Table 3). Among Bosque transects, Transects 12 and 5 ranked highest in relative importance and Transects 4 and 8 ranked lowest.

**Breeding Season** - Estimated bird densities ranged from 308 birds/100 acres on Transect 2 to 1016 birds/100 acres on Transect 7, with a mean density of 591 birds/100 acres (Table 4). Total species ranged from 22 on Transect 2 to 48 on Transect 9 with a mean of 35 species/transect.

When waterbirds were eliminated from the data set, estimated bird densities ranged from 276 birds/100 acres on Transect 4 to 889 birds/100 acres on Transect 9, with a mean density of 503 birds/100 acres (Table 4). Total species ranged from 20 on Transect 2 to 40 on Transect 9 with a mean of 29 species/transect.

Since many species documented during the breeding season were migrants, they inflate species and density totals during the breeding season. When removed from the data set, estimated bird densities ranged from 154 birds/100 acres on Transect 2 to 313 birds/100 acres on Transect 9 (Table 4), with a mean density of 298 birds/100 acres. Probable breeding species ranged from 11 on Transect 2 to 25 on Transect 9 with a mean of 18 species/transect. If, as in winter, data from

Table 3. Rankings of transects by value to birds, reached by combining rankings by total species and total birds/100 acres, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Transect	Winter		All	Breeding Season		Combined	
	All	Bosque		Bosque	breeders	All	Bosque
1	7	10	5	6	4	6	8
2	10	8	12	11	12	11	11
3	3	4	7	7	7	5	5
4	11	11	11	11	11	12	12
5	5	2	8	8	10	7	3
6	6	8	9	9	8	10	10
7	9	7	3	3	1	4	5
8	12	12	2	2	2	7	7
9	1	1	1	1	2	1	1
10	7	5	5	5	4	3	3
11	4	6	10	10	9	9	8
12	2	2	4	4	6	2	2

Table 4. Total species and estimated birds/100 acres for 12 Emlen Transects during the breeding season, Rio Grande Valley State Park, 1997.

Transect	All Species		Bosque (Without Waterbirds)		Probable Breeders (Without Waterbirds & Without Migrants)	
	Total Species	Birds/100 acres	Total Species	Birds/100 acres	Total Species	Birds/100 acres
1	38	726	32	595	19	363
2	22	308	20	294	11	154
3	33	508	27	483	17	350
4	26	338	21	276	12	172
5	31	439	26	418	15	260
6	30	419	26	400	15	275
7	38	1016	32	673	21	397
8	39	947	34	722	20	471
9	48	889	40	627	25	331
10	40	485	36	402	22	263
11	30	381	26	317	16	223
12	40	638	35	575	21	312

Transect 9, the marsh transect, are removed from the data set, mean bird density of the remaining bosque transects of 295 birds/100 acres and average total species drops to 17.

Average spring-summer bird density reported by Hoffman (1990) for 12 Bosque transects was 1057 birds/100 acres, which is 3.5 times the 295 birds/100 acres calculated for the 11 bosque transects of 1996-97. Hink and Ohmart (1984) reported average spring densities for 4 bosque habitats similar to those censused herein of 332, 550, 871, and 1086 birds/100 acres. These estimates range from equal to 1997 data to about 3.5 times 1997 data.

The 10 species with the highest average estimated densities (birds/100 acres) during the breeding season for 1996-97 and 1988-90 (Hoffman 1990) are shown in Table 5. Only 5 of the 10 are the same, and Hoffman's (1990) average densities were higher for all species. His averages for Black-chinned Hummingbirds, Black-headed Grosbeaks, and Mourning Doves are 1.63, 3.14, and 6.26 times greater, respectively, than those of 1996-97.

The Oxbow Marsh transect (#9) also ranked highest among the 12 transects in relative importance (Table 3) during the breeding season. Among Bosque transects, Transects 7 and 8 ranked highest in relative importance and Transects 2 and 4 ranked lowest. Transect 8, that ranked lowest in relative importance in winter, ranked second for bosque species and third for breeding species.

Table 5. Average densities of 10 most common winter birds of 1996-96 versus average densities of 10 most common winter birds of 1987-90 (Hoffman 1990), Rio Grande Valley State Park.

Species	1996-97		1988-90	
	#/100 acres	Rank <sup>1</sup>	#/100 acres	Rank
Black-chinned Hummingbird	124	1	197	1
Red-winged Blackbird	67	2	--	-
Black-headed Grosbeak	36	3	113	3
Spotted Towhee	22	4	--	-
Brown-headed Cowbird	21	5	45	5
Mourning Dove	19	5	119	2
Bewick's Wren	16	6	--	-
Black-capped Chickadee	15	7	--	-
House Finch	13	8	34	6
Cliff Swallow	13	8	--	-
European Starling	12	10	34	6
Blue Grosbeak	11	11	32	8
American Robin	9	14	58	4
House Sparrow	2	29	31	9
Northern Flicker	8	16	14	10

<sup>1</sup>Ranks higher than 10 are shown for 1996-97 species that ranked in the top 10 in 1988-90.

### River Censuses

Thirty four species of raptors and birds associated with open water or water edges were recorded on the 10 censuses (Appendix A). Twenty five species were recorded during both winter and breeding season counts; 16 species (64%) were recorded in both seasons. Nine species were unique to each season.

Though many of the same species were found along the river both in winter and during the breeding season, many more individuals were present during the winter. The average count during 5 complete winter censuses was 2326 birds, while the average breeding season count (n=4) was only 203 birds. The difference is greater than one order of magnitude and is highly significant (t=10.6, p<0.01).

**Winter** - The most abundant wintering species were Mallards (Table 6), Canada Geese (Table 7), and Wood Ducks (Table 8). Mallards were most abundant in the river segment below Rio Bravo Bridge, but the mean count was not significantly different from those of the other segments (F=1.87, p=0.17). The average Canada Goose count was significantly higher (F=3.23, p<0.05) in the Alameda to Montano segment. Wood Ducks were most abundant in the river segment below Rio Bravo Bridge (F=9.10, p<0.01). Almost all Wood Ducks were found in areas

Table 6. Counts of Mallards by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	89	91	217		397
December 16-17	184	173	347	354	1058
January 2-3	124	184	302	513	1123
January 18-19	249	175	165	396	985
February 2-3	273	320	214	320	1127
February 20-21	418	520	319	290	1247
Average Count	223	244	261	375	1040

Table 7. Counts of Canada Geese by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	481	31	31		746
December 16-17	359	91	113	147	710
January 2-3	531	183	264	261	1239
January 18-19	25	86	129	0	240
February 2-3	384	146	125	113	768
February 20-21	207	370	35	79	691
Average Count	331	151	150	120	732

Table 8. Counts of Wood Ducks by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	18	5	4		27
December 16-17	14	9	6	110	139
January 2-3	8	14	5	102	129
January 18-19	4	74	0	133	211
February 2-3	0	151	12	72	235
February 20-21	2	23	22	68	115
Means	8	46	8	95	143

where Russian-olive overhung the river's edge and their berries were readily accessible. When the canoe route was shifted in the Montano to Central segment so that it was adjacent to Russian-olive by the river near the Oxbow for the last 3 counts, Wood Duck counts there were not significantly different from the same 3 counts below Rio Bravo ( $t=-0.19$ ,  $p=0.43$ ).

Albuquerque CBC data for 1961-1996 shows that Mallards ( $t=10.12$ ,  $p<0.01$ ), Canada Goose ( $t=3.53$ ,  $p<0.01$ ), Wood Duck ( $t=4.53$ ,  $p<0.01$ ), and Sandhill Crane ( $t=3.97$ ,  $p<0.01$ ) counts were all significantly higher for the period 1983-1996 than for the period 1961-1982 (Table 9). Counts from canoes were begun in 1983 and were part of the CBC in all years but 1989 and 1990. Mallard counts were significantly higher ( $t=5.24$ ,  $p<0.01$ ) during 12 years when a canoe-based count occurred ( $\bar{x}=1179$ ) than during the 2 years that it did not ( $\bar{x}=555$ ), but Canada Goose ( $t=1.72$ ,  $p=0.06$ ), Wood Duck ( $t=0.97$ ,  $p=.17$ ), and Sandhill Crane ( $t=-1.33$ ,  $p=.12$ ) were not. Sandhill Crane counts were higher in non-canoe years ( $\bar{x}=147$ ) than in canoe years ( $\bar{x}=98$ ) but not significant, while Canada Goose (non-canoe -  $\bar{x}=191$ ; canoe -  $\bar{x}=436$ ) and Wood Duck counts (non-canoe -  $\bar{x}=85$ ; canoe -  $\bar{x}=114$ ) were lower but not significant.

On 1996-97 Waterbird/Raptor counts Common Mergansers were most abundant in the Montano to Central segment (Table 10), but the difference was not significant ( $F=2.53$ ,  $p=0.09$ ). American Wigeons were significantly more abundant in that segment (Table 11). The two most commonly encountered raptors, Red-tailed Hawks (Table 12) and Cooper's Hawks (Table 13), were not significantly more abundant in any river segment ( $F=2.04$ ,  $p=0.14$ ;  $F=0.20$ ,  $p=0.89$  respectively).

A final analysis of winter data was of total species for the 4 river segments (Table 14). The number of waterbirds and raptor species encountered was greater on the Alameda to Montano segment and the Rio Bravo to end segments than on the 2 intermediate segments ( $F=11.72$ ,  $p<0.01$ ).

**Breeding Season** - Though all 3 of the most abundant wintering species remained and bred along the river, they were far fewer in number. Counts were too low to make statistical comparisons. Canoe trips down the river did document breeding by all 3 species. Canada Goose broods, a maximum of 4 on any one census, were encountered on all 4 breeding season counts. All Canada Goose broods were recorded between Alameda and Central Bridges; most were in the vicinity of the Rio Grande Nature Center and the new Montano Bridge. A Mallard brood was also recorded near Montano Bridge on 16 May and 17 June and another brood was seen on Transect 8 near the Nature Center on 4 June. Two Wood Duck broods were seen less than half a mile south of Rio Bravo Bridge on 15 May 1997.

**Comparisons** - Hoffman (1990) also found that waterbirds and raptors were much more abundant in winter than in summer. He recorded 3383 birds of 22 species in 18 hrs of winter-time observation. He averaged 188 birds/hr, including 85 Mallards/hr, 46 Canada Geese/hr, and 2 Red-tailed Hawks/hr. From the canoe we totaled 11,628 birds of 25 species in 35 hrs. Our

Table 9. Counts of 4 waterbirds on Albuquerque Christmas Bird Counts, 1961-1996.

Year	Canada Goose	Wood Duck	Mallard	Sandhill Crane
1961	0	0	98	0
1962	0	0	20	0
1963	0	0	22	0
1964	0	0	14	0
1965	0	0	6	0
1966	0	0	16	0
1967	0	0	14	0
1968	1	0	43	0
1969	0	0	100	0
1970	0	0	0	0
1971	11	0	8	0
1972	0	0	173	51
1973	0	0	25	0
1974	0	0	37	0
1975	12	0	133	0
1976	0	0	94	0
1977	0	0	42	0
1978	0	0	126	0
1979	0	20	139	0
1980	100	2	148	0
1981	0	2	154	0
1982	8	6	171	0
1983	307	0	1353	0
1984	40	1	683	3
1985	100	0	916	0
1986	52	4	1088	1
1987	147	32	1417	91
1988	228	142	1142	24
1989	130	73	480	126
1990	253	96	630	169
1991	568	165	789	224
1992	584	182	960	187
1993	604	222	1751	309
1994	1264	188	1169	58
1995	243	198	1609	147
1996	741	234	1270	143

Table 10. Counts of Common Mergansers by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	6	4	5		15
December 16-17	5	6	10	12	33
January 2-3	19	3	6	13	41
January 18-19	12	7	30	20	69
February 2-3	16	7	40	7	70
February 20-21	7	2	20	0	29
Average Count	11	5	19	10	43

Table 11. Counts of American Wigeons by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	5	0	0		5
December 16-17	7	42	3	2	54
January 2-3	0	25	0	0	25
January 18-19	1	0	10	2	13
February 2-3	20	40	0	2	62
February 20-21	30	44	8	7	89
Average Count	11	25	4	3	41

Table 12. Counts of Red-tailed Hawks by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	2	2	2		6
December 16-17	1	1	1	1	4
January 2-3	3	2	2	1	8
January 18-19	4	0	2	1	7
February 2-3	3	2	4	3	12
February 20-21	3	2	3	2	10
Average Count	3	2	2	2	8

Table 13. Counts of Cooper's Hawks by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end	Totals
December 7	0	0	0		0
December 16-17	0	0	1	1	2
January 2-3	1	0	1	1	3
January 18-19	0	4	1	0	5
February 2-3	1	0	0	0	1
February 20-21	1	1	0	2	4
Average Count <sup>1</sup>	0	1	0	1	3

<sup>1</sup>0 = < 0.5

Table 14. Total species by river segment, winter 1996-97, Rio Grande Valley State Park, Bernalillo County, New Mexico.

Date(s)	Alameda to Montano	Montano to Central	Central to Rio Bravo	Rio Bravo to end
December 7	13	8	9	
December 16-17	11	11	12	17
January 2-3	13	10	11	13
January 18-19	13	11	11	13
February 2-3	12	10	12	13
February 20-21	11	9	10	15

average count was 329 birds/hr, including 175 Mallards/hr, 124 Canada Geese/hr, and 1 Red-tailed Hawk/hr.

Hink and Ohmart (1984) had one of their roadside censuses along the levee road from Central Avenue to Alameda Street on the east side of the river. They totaled 29.0 large birds or raptors/10 miles, including 3.0 raptors/10 miles, 6.1 ducks, geese, and coots/10 miles, and 18.3 cranes/10 miles on that route. On Waterbird/Raptor counts from canoes, we averaged 1938 birds/10 miles, including 14.3 raptors/10 miles, 1039 Mallards and 732 Canada Geese/10 miles, and 37 cranes/10 miles on the river census.

### Threatened and Endangered Species

**Bald Eagle** - Bald Eagles were among the first species listed as endangered by the Federal Government (USFWS) when the Endangered Species Act was passed in the early 1970s. By the

mid-1990s their populations were considered to be sufficiently recovered that they were downlisted to Threatened. Wintering population trends along the Rio Grande in and near Albuquerque show this upward trend.

Hink and Ohmart (1984) reported Bald Eagles as regular and fairly common winter residents at Cochiti Lake, but that they were only irregularly seen south of there. They had sightings near Bernalillo, Isleta, and Los Lunas, but none in the vicinity of Albuquerque. Hoffman (1990) reported 6 sightings of eagles in 3 winters (1988-90) including 4 times in 1990 on or near Emlen Transects. Bald Eagles were never recorded during the 1960s and 1970s and only twice seen in the 1980s during the Audubon Society's annual Albuquerque CBC. However, during the 1990s the CBC has averaged 3 Bald Eagles, mostly along the river north of Alameda Bridge (Table 15).

We also encountered Bald Eagles 4 times while conducting counts along Avian Transects during the winter of 1996-97 at a rate equal to or exceeding that of Hoffman (1990). Censuses of birds along the river by canoe, however (Table 16), showed that 4-8 Bald Eagles were wintering within the southern portion of RGVSP in December and January. Another 2-4 eagles wintered in the area above Alameda Bridge; though not a part of our study area, data was provided from the Albuquerque CBC and from counts conducted there by Hawks Aloft (Eric Meyer, pers. commun.). Bald Eagle use of areas away from the center of Albuquerque (above Alameda Bridge, below Rio Bravo Bridge) was significantly greater than the areas in between ( $F=2.87$ ,  $p<0.05$ ).

Bald Eagles roosted at night in 2 roosts south of Rio Bravo Bridge from their discovery through the end of February (Table 17). Since roosts were not counted simultaneously, it is not certain if some of the eagles were counted at both locations, but the peak night-time use of the area between Rio Bravo and I-25 bridges was at least 18 eagles. Some eagles roosting at the South Roost could be foraging during the day south of I-25.

*Southwestern Willow Flycatcher* - Hoffman (1990) reported a Willow Flycatcher singing near Transect 1 in early June of one year of his study. We recorded 3 singing male Willow Flycatchers on Transect 9 on 24 May 1997. None were heard in June and it is likely that those heard in May were migrants of more northerly breeding subspecies. The subspecies that breeds in New Mexico, the Southwestern Willow Flycatcher, is listed as Endangered by USFWS.

### Unusual Species

Hoffman (1990) reported a successful nesting by Common Black-Hawks (*Buteogallus anthracinus*) along Transect 1 in 1989. A large stick nest that may have been used by Great Horned Owls in 1997 was seen there, but no Common Black-Hawks were observed. We did observe recently fledged Black-billed Magpie young being fed by 2 adults near Transect 1 in June 1997. This was probably the first documented nesting by this species in Bernalillo County.

Table 15. Bald Eagles counted within the Albuquerque Christmas Bird Count circle, 1983-1996).

Year	Eagles	Year	Eagles	Year	Eagles	Year	Eagles
1961 -		1984	0	1989	0	1993	5
1980	0	1985	0	1990	0	1994	3
1981	1	1986	0	1991	3	1995	3
1982	0	1987	1	1992	1	1996	2
1983	0	1988	0				

Table 16. Bald Eagles counted from a canoe along the Rio Grande in Albuquerque, Winter 1996-97. River is divided into segments between bridges crossing it.

Date	Corrales - Alameda <sup>1</sup>		Alameda - Montano		Montano - Central		Central - Rio Bravo		Rio Bravo - I-25 <sup>2</sup>		Total
	Ad.	Im.	Ad.	Im.	Ad.	Im.	Ad.	Im.	Ad.	Im.	
7 Dec									--	--	
16-17 Dec							1		1	2	4
21 Dec	2										2
2-3 Jan									2	3	5
18-19 Jan							1	2	3	2	8
1 Feb	4										
2-3 Feb											
20-21 Feb											

<sup>1</sup>Counts on this area provided by Eric Meyer, Hawks Aloft; Wendy Brown, Albuquerque CBC.

<sup>2</sup>Counts along this segment ended about half-way between the bridges, since it would have been difficult to take the canoe from the river at I-25. This segment was not censused on 7 December.

Table 17. Evening counts of Bald Eagles at 2 night roosts, Rio Grande between Bridge Street and I-25 bridges, Winter 1996-1997.

Date	North Roost		South Roost		Total		Total
	Adult	Immature	Adult	Immature	Adult	Immature	
16 Dec	1	1	--	--	1	1	2
2 Jan	2	1	3	8	5	9	14
19 Jan <sup>1</sup>	4	4	9	9	13	13	26
2 Feb	0	1	7	7	7	8	15
20 Feb	1	0	2	2	3	2	5

<sup>1</sup>Since both roosts were not counted simultaneously, it is possible that some or possibly all eagles counted at the North Roost could have moved down to the South Roost by dark.

A Fox Sparrow was seen near the south end of Transect 7 on 20 January 1997. It was unusual because it was one of the red subspecies, more common in the eastern United States. Another rare eastern species recorded near Transect 8 in late January and early February was a Woodcock. This was only the seventh New Mexico record for this species. Finally an Eastern Phoebe was present at the new Montano Bridge throughout June and early July. It sang throughout June, but was apparently unsuccessful in attracting a mate; no nest was found. This was the second summer record for the entire Rio Grande Valley for this species.

## DISCUSSION

Hoffman (1990) recorded 133 species of birds in 1987-88 and 1989-90; we recorded 126 in 1996-97. He reported 30 species that we did not record, but we found 23 that he did not for a net overlap of 103 species. He recorded more migrant land birds on his list, which two migration seasons might explain, and we recorded more waterbirds on ours, due primarily to use of the canoe to cover the entire river a dozen times during this study.

### Bosque Winter Birds

Average winter bird densities on Bosque transects were 35% lower in 1996-97 than reported by Hoffman (1990). It is not clear, however if he excluded any waterbird species from his totals; our average density with waterbirds and Transect 9 was 683, only 5% less than his average density. Of the 10 transects shared in common, 6 had higher overall winter densities during this study than in his. Even a 35% difference in density would be easily explained by fluctuations in food availability and the vagaries of weather, as Hoffman (1990) also stated.

Hoffman's (1990) average American Robin count was 6 times greater than in this study. The data from 4 winters' counts on Transects 7 and 8 (Table 18) shows that robin densities can vary greatly between years and/or areas. From mid-summer 1995 to mid-summer 1996 New Mexico suffered from a severe drought. This limited seed and fruit production throughout the state in 1996. Robins are frugivorous in winter and in RGVSP feed primarily on Russian-olive berries. Limited berry production greatly restricted the number of wintering robins (and Hermit Thrushes) the area was able to support. Most robins were forced to winter elsewhere.

Table 18. A comparison of winter bird densities on Transects 7 and 8 during 3 different study periods.

Transect	All birds <sup>1</sup>				American Robins only <sup>1</sup>			
	1981	1982	1989	1997	1981	1982	1989	1997
7	1228	----	324	433	904	---	20	66
8	86	326	51	230	30	256	3	22

<sup>1</sup>1981, 1982 (Hink and Ohmart 1984), 1989 (Hoffman 1990), 1997 (this study).

Table 19 A comparison of breeding bird densities on Transects 7 and 8 during 3 different study periods.

Transect	Spring <sup>1</sup>			Summer <sup>2</sup>			All Birds <sup>3</sup>	Bosque Breeders <sup>4</sup>
	1981	1982	1989	1981	1982	1989	1997	1997
7	950	606	678	819	514	1022	1016	397
8	376	898	761	898	456	818	947	471

<sup>1</sup>March through May (Hink and Ohmart 1984), May (Hoffman 1990).

<sup>2</sup>June through August (Hink and Ohmart 1984, June through July (Hoffman 1990).

<sup>3</sup>May through June (this study), includes waterbirds and migrants.

<sup>4</sup>May through June (this study), does not include waterbirds and migrants.

### Bosque Breeding Birds

Hink and Ohmart (1984) estimated that 85-95 species of birds breed in the Middle Rio Grande Valley. Hoffman (1990) reported that 69 species documented in the RGVSP between 1987 and 1990 probably bred there. We recorded 68 of those species; we agree that 60-65 of those species likely breed most years in RGVSP, but that several species (Common Black-Hawk, Willow Flycatcher, and Common Raven) breed irregularly or do not presently breed there. Hoffman (1990) also listed two species, Great Blue Heron, Western Scrub-Jay, for which there are no historic breeding records in the RGVSP.

Bewick's Wrens were not recorded as breeding species by either Hink and Ohmart (1984) or Hoffman (1990). In 1997 they were present and territorial on 10 of 11 bosque transects. Greatest estimated densities were on Transects 6 (38/100 acres), 7 (44), and 12 (44). Bewick's wrens nest in cavities, whether excavated (ie., woodpecker holes) or natural (loose bark, broken of hollow limbs, etc.), and their expansion into the Rio Grande bosque may be indicative of greater decadence in the gallery forest.

Two other notable differences in the 10 most common breeding species (Table 5) were Mourning Dove and Black-capped Chickadee. Hoffman (1990) reported >6 times the density of doves but the chickadees did not appear in his top 10. Both species are normally quite common in Rio Grande bosque (Hink and Ohmart 1984; W. H. Howe, pers. commun.), so these differences may be due to some anomaly in the timing of counts. More July counts by Hoffman (1990) likely increased the Mourning Dove count over 1997 figures.

Average breeding bird densities on bosque transects were 3.5 times higher in 1988-90 (Hoffman 1990) than during the current study. It is not clear, however if he excluded any waterbirds or migrants from his totals. Even including both those bird groups and Transect 9 would only bring the current average density to half that reported by Hoffman (1990).

There were 2 transects where censusing occurred during all 3 study periods (Table 19). Bosque breeding birds on Transect 7 in 1997 varied from 52% to 252% below Spring and Summer population estimates of the 3 previous years of study. On Transect 8 population estimates for 1997 varied from 20% above to 201% below Spring and Summer population estimates of the 3 previous years of study. Numerous studies of breeding populations show marked fluctuations in densities based on census data. It is not possible from this limited data set to say whether breeding populations are declining or whether extraneous factors, particularly the 1995-96 drought, temporarily dropped populations.

### **Marsh Birds**

Transect 9 on the edge of the Oxbow Marsh was new for this study; there was no comparable transect previously censused (Hink and Ohmart 1984, Hoffman 1990) in the RGVSP. Open water and a mix of habitats made this transect especially attractive to not only waterbirds, but also to terrestrial birds and especially to migrants. More species were recorded on this transect than any other and estimated densities were among the highest during both winter and the breeding season. Though it was often necessary to remove this transect from analysis so that comparisons of forest species were more accurate, the Oxbow Marsh is a unique habitat in the RGVSP and this transect should continue to be utilized to monitor for avian population changes in the future.

### **Winter River Birds**

This study demonstrated that counting waterbirds and raptors from a canoe on the Rio Grande is more effective than roadside (Hink and Ohmart 1984) or timed survey (Hoffman 1990) methods. Christmas Bird Count data (Table 9) documents a marked increase in Canada Goose, Wood Duck, and Sandhill Crane wintering populations in the RGVSP in the last decade. CBC data also shows how censusing from a canoe increased the reported Mallard population, even though the species wintered in the CBC circle throughout the period covered by counts. The only major species under counted from canoe was the Snow Goose; though about 2,000 were present below Rio Bravo for much of the winter, few were counted from the canoe. Apparently this species stayed in the fields throughout the day and only spent nights on the river.

Canada Geese showed a preference for the Alameda to Montano segment of the river; this probably is related to its close proximity to the fields of the Rio Grande Nature Center. Mallards and Common Mergansers showed no river segment preference. Wood Ducks prefer segments with overhanging Russian-olive. American Wigeons were significantly more abundant in the

Montano to Central river segment; there is no clear reason for this preference. It appears that food, rather than human disturbance, most effected waterfowl distribution.

Neither Red-tailed Hawks or Cooper's Hawk showed a preference for a particular river segment. Again, human disturbance is apparently not affecting these species at current levels. Bald Eagles, however, prefer those river segments farthest from the center of Albuquerque (see below).

### **Endangered Species**

Bald Eagles will not tolerate close approach by humans, especially on foot (Stahlmaster and Newman 1978). Thus it is not surprising that Bald Eagle sightings are more common north and south of downtown Albuquerque (Tables 15-17); the difference was significant ( $F=2.87$ ,  $p<0.05$ ). They are particularly intolerant of disturbance at their night roosts (Steenhof 1978). Not surprisingly, the two roosts found in 1996-97 were in that portion of the RGVSP with the least human traffic, especially during winter. The area south of Rio Bravo has few bridges across the drainage ditches. Eagles roosted in riverside trees that were more than one mile from any bridge across an adjacent drainage ditch.

Bald Eagle numbers on the southern wintering grounds normally begin to decline in February (Stahlmaster 1987; Table 17), but it is also possible that the onset of warmer weather in February 1997 increased human activity along the river and was a contributing factor to the lack of Bald Eagles along the river during the day during February Waterbird/Raptor censuses (Table 16).

## **RECOMMENDATIONS**

### **Emlen Transect and Waterbird/Raptor Counts**

Intermittent monitoring of bird populations in RGVSP continues to show that annual censusing is needed to begin to analyze long-term population trends (Hoffman 1990, this study). Though this may not be possible fiscally, we encourage the City of Albuquerque to decrease the period between monitoring efforts as much as possible.

### **Habitat Management**

Efforts to maintain and replace wetlands and old-growth cottonwood forests should be pursued. Russian-olive is an important food for wintering birds. Though it is an exotic, extensive efforts to remove it from the bosque should not be undertaken without efforts to provide a native food source approaching equal value. Salt cedar has little value to most wildlife, though it is utilized by Southwestern Willow Flycatchers as breeding habitat in wet areas lacking all other habitats (Soggy et al. 1997). No combination of salt cedar and water suitable for flycatchers was noted during this study.

## Endangered Species

*Bald Eagle* - The concentration of Bald Eagles in the southern portion of RGVSP was undocumented before this study. We recommend that monitoring of this wintering population be continued in the winter of 1997-98 and beyond. We also recommend against improving facilities south of Rio Bravo on either side of the Rio Grande and minimizing improvements between Bridge and Rio Bravo Streets to minimize human incursions into wintering Bald Eagle habitat. Because this is a federally listed species, the U. S. Fish and Wildlife Service must be consulted if any change in current conditions is being considered.

*Southwestern Willow Flycatcher* - Migrant Willow Flycatchers, probably of a different subspecies, utilized the Oxbow Marsh and likely stopover at other willow areas within the RGVSP. No evidence of residency by this species during the breeding season was documented from any Emlen Transect and documentation by Hoffman (1990) appears limited. One area with good potential is the willow stand at the mouth of the South Diversion Channel, on the east side of the Rio Grande between Rio Bravo Bridge and Transect 1. This and possibly other areas of potential habitat should be sought out and surveyed for this Endangered Species.

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Appendix A. Birds documented between December 1996 and June 1997, Rio Grande Valley State Park, Bernalillo County, New Mexico. Tr = Transect, Rv = River, Oth = Other.

Common Name	Scientific Name	Dec- Feb	May- Jun	Tr	Rv	Oth
Pied-billed Grebe	<i>Podilymbus podiceps</i>		Y	Y	Y	
Western Grebe	<i>Aechmophorus occidentalis</i>	Y	Y		Y	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Y	Y	Y	Y	
Great Blue Heron	<i>Ardea herodias</i>	Y	Y	Y	Y	
Snowy Egret	<i>Egretta thula</i>		Y		Y	
Green Heron	<i>Butorides striatus</i>		Y	Y	Y	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	Y	Y	Y	
Turkey Vulture	<i>Cathartes aura</i>		Y	Y	Y	
Greater White-fronted Goose	<i>Anser albifrons</i>	Y			Y	
Snow Goose	<i>A. caerulescens</i>	Y		Y	Y	
Canada Goose	<i>Branta canadensis</i>	Y	Y	Y	Y	
Wood Duck	<i>Aix sponsa</i>	Y	Y	Y	Y	
Gadwall	<i>Anas strepera</i>	Y	Y	Y	Y	
American Wigeon	<i>A. americana</i>	Y		Y	Y	
Mallard	<i>A. platyrhynchos</i>	Y	Y	Y	Y	
Cinnamon Teal	<i>A. cyanoptera</i>		Y		Y	
Northern Shoveler	<i>A. clypeata</i>		Y		Y	
Green-winged Teal	<i>A. crecca</i>	Y		Y	Y	
Ring-necked Duck	<i>Aythya collaris</i>	Y		Y	Y	
Common Merganser	<i>Mergus merganser</i>	Y		Y	Y	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Y		Y	Y	
Northern Harrier	<i>Circus cyaneus</i>	Y		Y	Y	
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Y	Y	Y		
Cooper's Hawk	<i>A. cooperii</i>	Y	Y	Y	Y	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Y	Y	Y	Y	
American Kestrel	<i>Falco sparverius</i>	Y	Y	Y	Y	
Ring-necked Pheasant	<i>Phasianus colchicus</i>	Y	Y	Y		
Gambel's Quail	<i>Callipepla gambellii</i>	Y	Y	Y		
Virginia Rail	<i>Rallus limicola</i>	Y	Y	Y		
Sora	<i>Porzana carolina</i>	Y		Y		
American Coot	<i>Fulica americana</i>	Y	Y	Y	Y	
Sandhill Crane	<i>Grus canadensis</i>	Y		Y	Y	
Killdeer	<i>Charadrius vociferus</i>	Y	Y	Y	Y	
American Avocet	<i>Recurvirostra americana</i>		Y	Y		
Spotted Sandpiper	<i>Actitis macularia</i>		Y	Y	Y	
Common Snipe	<i>Gallinago gallinago</i>	Y			Y	

Common Name	Scientific Name	Dec- Feb	May- Jun	Tr	Rv	Oth
American Woodcock	<i>Scolopax minor</i>	Y				Y
Ring-billed Gull	<i>Larus delawarensis</i>	Y	Y	Y	Y	
Rock Dove	<i>Columba livia</i>	Y	Y	Y		
White-winged Dove	<i>Zenaida asiatica</i>		Y	Y		
Mourning Dove	<i>Z. macroura</i>	Y	Y	Y		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>		Y	Y		
Greater Roadrunner	<i>Geococcyx californianus</i>	Y	Y	Y		Y
Western Screech Owl	<i>Otus kenicottii</i>	Y				Y
Great Horned Owl	<i>Bubo virginianus</i>	Y	Y	Y		
Black-chinned Hummingbird	<i>Archilochus alexandri</i>		Y	Y		
Belted Kingfisher	<i>Ceryle alcyon</i>	Y	Y	Y	Y	
Lewis' Woodpecker	<i>Melanerpes lewis</i>		Y	Y		
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	Y		Y		
Downy Woodpecker	<i>P. pubescens</i>	Y	Y	Y		
Hairy Woodpecker	<i>P. villosus</i>	Y		Y		
Northern Flicker	<i>Colaptes auratus</i>	Y	Y	Y		
Western Wood-Pewee	<i>Contopus sordidulus</i>		Y	Y		
Willow Flycatcher	<i>Empidonax traillii</i>		Y	Y		
Dusky Flycatcher	<i>E. oberholseri</i>		Y	Y		
Cordilleran Flycatcher	<i>E. difficilis</i>		Y	Y		
Black Phoebe	<i>Sayornis nigricans</i>	Y	Y	Y	Y	
Eastern Phoebe	<i>S. phoebe</i>		Y			Y
Say's Phoebe	<i>S. saya</i>	Y	Y	Y		
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		Y	Y		
Cassin's Kingbird	<i>Tyrannus vociferans</i>		Y	Y		
Western Kingbird	<i>T. verticalis</i>		Y	Y		
Warbling Vireo	<i>Vireo gilvus</i>		Y	Y		
Western Scrub-Jay	<i>Aphelocoma coerulescens</i>	Y		Y		
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	Y		Y		
Black-billed Magpie	<i>Pica pica</i>	Y	Y	Y		
American Crow	<i>Corvus brachyrhynchos</i>	Y	Y	Y		
Horned Lark	<i>Eremophila alpestris</i>	Y		Y		
Tree Swallow	<i>Tachycineta bicolor</i>		Y	Y		
Violet-green Swallow	<i>T. thalassina</i>		Y	Y		
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		Y	Y		
Bank Swallow	<i>Riparia riparia</i>		Y	Y		
Cliff Swallow	<i>Hirundo pyrrhonota</i>		Y	Y		
Barn Swallow	<i>H. rustica</i>		Y	Y		
Black-capped Chickadee	<i>Poecile atricapillus</i>	Y	Y	Y		

Common Name	Scientific Name	Dec- Feb	May- Jun	Tr	Rv	Oth
Mountain Chickadee	<i>P. gambeli</i>	Y		Y		
Bushtit	<i>Psaltriparus minimus</i>	Y		Y		
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Y	Y	Y		
Red-breasted Nuthatch	<i>S. canadensis</i>		Y	Y		
Brown Creeper	<i>Certhia americana</i>	Y		Y		
Rock Wren	<i>Salpinctes obsoletus</i>	Y		Y		
Bewick's Wren	<i>Thryomanes bewickii</i>	Y	Y	Y		
House Wren	<i>Troglodytes aedon</i>		Y	Y		
Marsh Wren	<i>Cistothorus palustris</i>	Y		Y		
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Y	Y	Y		
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>		Y	Y		
Hermit Thrush	<i>Catharus guttatus</i>	Y	Y	Y		
American Robin	<i>Turdus migratorius</i>	Y	Y	Y		
Gray Catbird	<i>Dumetella carolinensis</i>		Y	Y		
European Starling	<i>Sturnus vulgaris</i>	Y	Y	Y		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Y	Y	Y		
Virginia's Warbler	<i>Vermivora virginiae</i>		Y	Y		
Yellow Warbler	<i>Dendroica petechia</i>		Y	Y		
Yellow-rumped Warbler	<i>D. coronata</i>	Y	Y	Y		
Northern Waterthrush	<i>Seiurus noveboracensis</i>		Y	Y		
MacGillivray's Warbler	<i>Oporornis tolmiei</i>		Y	Y		
Common Yellowthroat	<i>Geothlypis trichas</i>		Y	Y		
Wilson's Warbler	<i>Wilsonia pusilla</i>		Y	Y		
Yellow-breasted Chat	<i>Icteria virens</i>		Y	Y	Y	
Summer Tanager	<i>Piranga rubra</i>		Y	Y		
Western Tanager	<i>P. ludoviciana</i>		Y	Y		
Spotted Towhee	<i>Pipilo maculatus</i>	Y	Y	Y		
Chipping Sparrow	<i>Spizella passerina</i>		Y	Y		
Brewer's Sparrow	<i>S. breweri</i>		Y	Y		
Fox Sparrow	<i>Passerella iliaca</i>	Y				Y
Song Sparrow	<i>Melospiza melodia</i>	Y	Y	Y		
Lincoln's Sparrow	<i>M. lincolnii</i>		Y	Y		
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Y	Y	Y		
Dark-eyed Junco	<i>Junco hyemalis</i>	Y		Y		
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>		Y			Y
Black-headed Grosbeak	<i>P. melanocephalus</i>		Y	Y		
Blue Grosbeak	<i>Guiraca caerulea</i>		Y	Y		
Lazuli Bunting	<i>Passerina amoena</i>		Y	Y		
Indigo Bunting	<i>P. cyanea</i>		Y	Y		

Common Name	Scientific Name	Dec- Feb	May- Jun	Tr	Rv	Oth
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Y	Y	Y		
Western Meadowlark	<i>Sturnella neglecta</i>	Y	Y	Y		
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	Y	Y	Y		
Brown-headed Cowbird	<i>Molothrus ater</i>		Y	Y		
Bullock's Oriole	<i>Icterus bullockii</i>		Y	Y		
Cassin's Finch	<i>Carpodacus cassinii</i>	Y		Y		
House Finch	<i>C. mexicanus</i>	Y	Y	Y		
Pine Siskin	<i>Carduelis pinus</i>	Y	Y	Y		
Lesser Goldfinch	<i>C. psaltria</i>		Y	Y		
American Goldfinch	<i>C. tristis</i>	Y	Y	Y		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>		Y	Y		
House Sparrow	<i>Passer domesticus</i>	Y	Y	Y		