

2005 FIELD INVENTORY OF BREEDING BIRDS AT SEVEN RIPARIAN SITES
IN CIBOLA AND SANDOVAL COUNTIES, NEW MEXICO



Submitted to: Jessica Rubado
Bureau of Land Management
Albuquerque Field Office
435 Montano Rd NE
Albuquerque, NM 87107

Prepared by: Hawks Aloft, Inc.
P.O. Box 10028
Albuquerque, NM 87184
(505) 828-9455
www.hawksaloft.org
mstake@hawksaloft.org



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EXECUTIVE SUMMARY

Riparian corridors provide important habitat for breeding birds in arid regions of the western United States. The quality of riparian habitat depends on a variety of conditions, including vegetation composition and water flow. Between 1996 and 2001, the Bureau of Land Management (BLM), Albuquerque Field Office, established annual breeding bird surveys at seven riparian sites in Cibola and Sandoval Counties, New Mexico. We continued point count surveys in 2005 to determine detection rates and species richness at each site. Detection rates and species richness were highest at Rinconada Canyon, Rito Leche, and Bluewater Canyon, three sites with native vegetation and fairly consistent water flow. These sites also contained high species richness, including a diversity of riparian species and New Mexico Partners in Flight priority species. Although dominated by exotic vegetation (i.e., saltcedar, *Tamarix* spp., and Russian olive, *Elaeagnus angustifolia*), San Ysidro and Lost Valley hosted relatively many riparian species, including potential migrant Willow Flycatchers (*Empidonax traillii*). The dense structure of the exotic vegetation was perhaps beneficial for some riparian birds. Detection rates and number of riparian species were lowest at Seniorito Creek and Wilson Canyon, an indication that any benefits of restoration projects at these sites have not been realized for birds. We recommend that BLM maintain habitat quality at Rinconada Canyon, Rito Leche, and Bluewater Canyon, as well as continue restoration efforts at Seniorito Creek and Wilson Canyon. The small size of these sites limits our power to detect meaningful temporal changes in population size; nevertheless, continued monitoring, with an emphasis on riparian species richness, will help BLM evaluate site quality and future management needs.

INTRODUCTION

Riparian corridors provide important habitat for breeding birds in arid regions of the western United States (Knopf and Samson 1994). Although western riparian areas occupy less than one percent of the landscape, many support more breeding bird species than surrounding upland habitats (Knopf et al. 1988, Gates and Giffen 1991, Powell and Steidl 2000). Some species, such as the federally endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*) depend on quality riparian habitat for their continued existence (Sedgwick 2000). Because riparian areas provide breeding habitat for many bird species, including riparian obligate or dependent species, it is important to maintain them.

Management of riparian areas for birds is complicated by numerous competing land uses and environmental concerns. Grazing, recreation, water diversion, urban settlement, and exotic vegetation might affect breeding bird populations in riparian areas by changing the quality of habitat or by disrupting breeding activities (Szaro 1980, Knopf et al. 1988, Krueper 1993, Rich 2002). For example, riparian areas dominated by exotic vegetation (e.g., salt cedar, *Tamarix* spp.) often support fewer bird species than native riparian areas (Ellis 1995, Anderson et al. 1977, Cohan et al. 1978). The Southwestern Willow Flycatcher is strongly associated with the presence of water (Sedgwick 2000); therefore, lack of precipitation, or diversion of water away from a site, could impact abundance and distribution of this species, and others. Monitoring sites with a diversity of vegetation types and structure, as well as differences in water flow, can provide information on how local conditions affect bird populations, including riparian species and other species of conservation interest.

The Bureau of Land Management (BLM), Albuquerque Field Office, established annual breeding bird surveys at seven riparian sites in Cibola and Sandoval Counties, in central New Mexico. In 1996, we began conducting annual point count surveys at three of the sites (Rito Leche, Seniorito Creek, and San Ysidro). We began monitoring the other four sites (Wilson Canyon, Bluewater Canyon, Lost Valley and Rinconada Canyon) between 1997 and 2001. These sites varied greatly in water flow, vegetation type (i.e., native or exotic), and vegetation structure (e.g., density). Because these sites are small, containing only 5-12 survey points each, point count surveys provide little power for comparing abundance among sites or determining meaningful temporal changes. By supplementing abundance, derived from point counts, with annual site-specific species richness data, especially riparian or conservation concern species, we can improve our ability to evaluate site quality. For example, the appearance of Southwestern Willow Flycatcher at a site could indicate an improvement in conditions; the loss of one or more key riparian species at a site could indicate deteriorating conditions. Here, we report avian abundance and species richness at the seven sites in 2005, and identify potential trends during the last five years (2001-2005). Information on avian abundance and species richness will improve BLM's understanding of riparian conditions on lands they manage in the Albuquerque Resource Area.

STUDY AREA

We conducted surveys at Bluewater and Rinconada Canyons in Cibola County, New Mexico, and at Lost Valley, Rito Leche, San Ysidro, Seniorito Creek, and Wilson Canyon in Sandoval County, New Mexico (Fig. 1).

Bluewater Canyon

Breeding bird surveys have been conducted at Bluewater Canyon since 1998. We surveyed 12 points along approximately 4 km of Bluewater Creek, northwest of Grants, New Mexico, and south of Interstate 40. The creek flows through a narrow, steep-walled canyon and is lined with native vegetation. Riparian vegetation was dominated by coyote willow (*Salix exigua*), narrowleaf cottonwood (*Populus angustifolia*), cliffrose (*Cowania mexicana*), candelabra cholla (*Opuntia imbricata*), rubber rabbitbrush (*Chrysothamnus nauseosus*) and juniper (*Juniperus* spp.). Willow patches were dense in places, but relatively narrow (≤ 10 m wide). Beavers (*Castor canadensis*) have reduced the number of standing cottonwoods. Water flowed in Bluewater Creek during each year of our surveys, but the levels have fluctuated. Excessive water flow, and associated safety concerns, restricted access to some of the survey points during 2001. Water flow was also relatively high in 2005; however, we managed to access all survey points during that year, as well as during years of moderate flow from 2002-2004.

Lost Valley

Lost Valley included two separate sections covering approximately 2.5 km of the Rio Puerco, near San Luis, New Mexico. The first eight points were located in the northern section, whereas the last three points were located in the southern section of the river, about 2 km southwest of section one. Points were originally established in 1998 along the riverbank at the bottom of the Lost Valley Canyon. However, because high water flow or deep mud hindered access in some years, we relocated the survey points to the top of the canyon in 2001. Ten points, instead of the original eleven, were established

on top of the canyon, adjacent to riparian vegetation. Riparian vegetation was mostly exotic, including dense stands of saltcedar and Russian olive (*Elaeagnus angustifolia*), as well as patches of Fremont cottonwood (*Populus fremonti*), and willow (*Salix* spp.). Water levels in the Rio Puerco fluctuated greatly. In most years, water was present during at least part of the avian breeding season. In 2002 and 2004, the Rio Puerco was completely dry during the entire monitoring season.

Rinconada Canyon

We began surveys at Rinconada Canyon in 2001. Rinconada Canyon included five survey points along approximately 1 km of Rinconada Creek, about 5 km northwest of Acomita, New Mexico. Management boundaries prevented the establishment of more than five points. Like Bluewater, Rinconada Canyon contained mostly native vegetation with at least some water flow. Unlike all other sites, vegetation at Rinconada Canyon was dominated by alder (*Alnus* spp.), ponderosa pine (*Pinus ponderosa*), pinyon pine (*P. edulis*), and juniper.

Rito Leche

The Rito Leche site included five survey points, along approximately 1 km of the Rito Leche, about 1.5 km east of Cuba, New Mexico. Management boundaries prevented the establishment of more than five points. Rito Leche contained mostly native riparian vegetation with at least some water flow. Dominant vegetation along the streambed included willow, cottonwood, and New Mexico locust (*Robinia neomexicana*), whereas the surrounding upland was dominated by sage (*Artemisia* spp.) and four-winged saltbush

(*Atriplex canescens*). There was a broad-leaved cattail (*Typha latifolia*) marsh in the uppermost section of the stream. Beavers have gradually reduced the number of live trees at the site.

San Ysidro

San Ysidro included seven survey points along approximately 1.5 km of the Rio Salado, about 1 km before it empties into the Jemez River, near San Ysidro, New Mexico. San Ysidro contained considerable exotic vegetation. Half of the survey route was along the Perea Nature Trail, which was dominated by Russian olive and saltcedar. The western portion of the survey area was situated in a marsh area dominated by bulrush and Russian olive. Beavers have created dams in the upstream portions of the creek in at least three locations, altering water flow into the marsh. Therefore, there was little water in the Rio Salado and in the marsh from 2002 to 2004. Water levels increased somewhat in the marsh in 2005, and water or saturated soil were present when the surveys were conducted.

Senorito Creek

The Seniorito Creek site included ten survey points along approximately 2.5 km of Seniorito Creek, immediately east of the confluence with the Rio Puerco, south of Cuba, New Mexico. The creek flowed through a steep arroyo, similar to nearby Rito Leche. Seniorito Creek contained mostly exotic saltcedar; however, much of the saltcedar was dead due to an herbicide treatment in 1998. As a result, there was relatively less live riparian vegetation present at Seniorito Creek. The surrounding upland habitat was

dominated by greasewood (*Sarcobatus vermiculatus*). Water levels in Senorito Creek varied among years; however, in 2003 and 2004, little or no water was present.

Wilson Canyon

We began surveys at Wilson Canyon in 1997. This site included ten survey points along approximately 2 km of the Rio Puerco, about 10 km south of Cuba, New Mexico. Wilson Canyon contained mostly exotic vegetation, including saltcedar and Russian olive. Willows and cottonwoods also were present and allowed to regenerate inside two elk exclosures along the riverbank. Upland vegetation adjacent to the river consisted primarily of greasewood. Water levels along this section of the Rio Puerco varied between years. For example, there was no water flow in 2002, moderate water flow in 2003 and 2004, and water flow across the entire channel in 2005.

METHODS

We conducted point count surveys (see Bibby et al. 2000) at each of the seven sites (59 points) twice in June (a total of 12 survey mornings). We surveyed Rito Leche and Wilson Canyon during the same mornings because of their close proximity and the small size of Rito Leche. Consecutive surveys at a site were separated by at least two weeks. For example, we surveyed at Bluewater Canyon on June 2 and 18, 2005.

We established most survey points at 250 m intervals along the riparian corridors of each site. Some of the points at Lost Valley, San Ysidro, and Wilson Canyon were established at closer intervals. We visited the same points for every survey at a site. Points were marked with flagging tape, described in printed directions, and assigned

Universal Transverse Mercator (UTM) coordinates (North American Datum 27) (Appendix A), to assist with relocation.

A surveyor, experienced with avian identification by sight and sound, hiked to each point, and recorded all birds seen or heard for five minutes while standing at the point. Observers recorded birds at all distances and noted separately any birds flying overhead. From 2001-2005, we used three or four observers per year. We used the same observer for all surveys at San Ysidro from 2002-2005. Another observer conducted all surveys at Senorito Creek, Rito Leche, and Wilson Canyon from 2003-2005. The remaining sites were surveyed by different observers each year. Observers began each survey within a half-hour of sunrise and concluded within four hours.

We used detection rates as a measure of avian abundance. We calculated detection rates for each survey point (i.e., point detection rates) by adding the number of birds observed at a point during a given year and dividing by the number of surveys conducted at the point (usually two). For the number of birds observed, we did not include flyovers. We also did not include Cliff Swallows (*Petrochelidon pyrrhonota*), because unpredictable flocks of 100 or more birds skewed the data. These flocks were almost always associated with canyon walls rather than riparian vegetation. We calculated annual detection rates for each site by adding the point detection rates in a given year and dividing by the number of points at a site. We present detection rates with 95% confidence intervals. We did not calculate annual detection rates for all sites combined, because we considered that sites varied substantially. Some points were close enough to other points to allow individual birds to be observed at multiple points. Because observations at these points were not necessarily independent, we removed from

the analysis all points closer than 200 m from neighboring points. As a result, we calculated point detection rates for only 5 of the 10 Lost Valley points, 4 of the 7 San Ysidro points, and 5 of the 10 Wilson Canyon points. We used all points at the remaining four sites.

We determined detection rates and species richness for riparian species, using classifications provided by the Bureau of Land Management (1998). BLM identified species that might be indicators of riparian habitat condition. They defined riparian obligates as species for which >90% of their abundance occurs within riparian habitat during the breeding season, or which place >90% of their nests in riparian vegetation (Bureau of Land Management 1998). BLM defined riparian dependents as species for which 60-90% of their abundance occurs in riparian habitat during the breeding season, or which place 60-90% of their nests in riparian vegetation (Bureau of Land Management 1998). For example, they list Willow Flycatcher as a riparian obligate, and suggest that this species will not likely occur in an area if riparian vegetation is in poor ecological condition. They list Blue Grosbeak (*Guiraca caerulea*) as a riparian dependent, and suggest that this species might occur if riparian vegetation is seriously degraded, but that populations would be reduced. We calculated site-specific annual detection rates for riparian species in the same way that we calculated the rate for all species; however, for riparian species, we only included observations of riparian obligates and dependents. We identify all riparian obligates and dependents encountered from 2001-2005 (Appendix B), and present the number of riparian species at each site per year.

We identified species of relatively high conservation concern at each site, based on classifications provided by New Mexico Partners in Flight (2003). Partners in Flight

is an association of ornithological organizations whose strategy is to conserve bird species before they become endangered, and thereby subject to federal regulation under the Endangered Species Act. New Mexico Partners in Flight (2003) evaluated all species breeding in the state and assigned scores for eight categories (e.g., abundance, distribution, and threats), reflecting the level of conservation concern. Although all species received a conservation score, they classified species with a combined score ≥ 21 as a “priority” species. For example, the Gray Flycatcher (*Empidonax wrightii*) is a migrant songbird that inhabits open pinyon-juniper woodlands (Sterling 1999). New Mexico Partners in Flight (2003) assigned a score of 24 (i.e., priority status) to Gray Flycatcher; although not an endangered species, the high score reflects their concern over limited distribution and abundance. We identify all priority species encountered from 2001-2005 (Appendix C), and present the number of priority species at each site per year. We also list all species encountered at our sites in 2005 (Appendix D).

RESULTS

In 2005, we observed the highest detection rates at Rinconada Canyon (9.8 birds/point ± 3.6), Rito Leche (8.2 ± 1.4), and Bluewater Canyon (7.8 ± 1.0), the three sites with mostly native vegetation (Fig. 2). We observed the lowest detection rates at Seniorito Creek (4.6 ± 1.1) and Wilson Canyon (2.7 ± 1.5). This pattern was similar to the five-year average from 2001-2005, except that the average rates at San Ysidro and Lost Valley were among the highest, along with Rinconada Canyon and Rito Leche. The five-year average for Bluewater Canyon was among the lowest, along with Seniorito Creek and Wilson Canyon.

Annual detection rates from 2001-2005 indicate that declines might be occurring at some sites (Fig. 2), although our sample is small, resulting in considerable overlap in most confidence intervals (which we omit from the figure for clarity). Sites possibly experiencing a decline from 2001-2005 include Lost Valley, San Ysidro, Seniorito Creek, and Wilson Canyon.

In 2005, the detection rates for riparian species were similar among sites, except at Seniorito Creek and Wilson Canyon, which had somewhat lower rates (Fig. 3). Annual detection rates for riparian species have been among the lowest at Seniorito Creek in every year from 2001-2005, whereas the rates at Wilson Canyon dropped considerably in both 2004 and 2005 (Fig. 3).

We observed 71 species during point count surveys at the seven sites in 2005, consistent with totals from previous years (Table 1). As in 2003 and 2004, Rinconada Canyon contained the highest species richness (N=30 species), despite containing only five survey points. As in 2004, we observed the fewest number of species at Rito Leche (N=18), Seniorito Creek (N=16), and Wilson Canyon (N=18).

Table 1. Number of species observed during point count surveys at seven Bureau of Land Management sites in Cibola and Sandoval Counties, New Mexico from 2001-2005. We include species detected at all distances, as well as flyovers.

Site	2001	2002	2003	2004	2005	Total
Bluewater Canyon	26	27	24	25	26	49
Lost Valley	27	20	23	24	25	37
Rinconada Canyon	26	23	29	30	30	56
Rito Leche	23	26	19	19	18	42
San Ysidro	20	25	23	24	22	45
Seniorito Creek	20	21	18	16	16	38
Wilson Canyon	26	17	27	16	18	37
Total – All Sites	68	65	71	68	71	106

We observed 16 riparian species (i.e., obligates and dependents) at the seven sites in 2005, consistent with totals from previous years (Table 2). Unlike previous years, we recorded the highest number of riparian species at Lost Valley and San Ysidro. We observed one or more Willow Flycatchers, perhaps migrants, at these sites during the first week of June. Since 2001, we have observed the fewest riparian species at Rito Leche, Senorito Creek, and Wilson Canyon (Table 2). The number of riparian species at Wilson Canyon dropped from three in 2004 to just one in 2005 (Table 2). We did not observe Yellow-breasted Chat (*Icteria virens*) or Lesser Goldfinch (*Carduelis psaltria*) at Wilson Canyon in 2005; the remaining riparian species, Blue Grosbeak, dropped from 12 observations in 2004 to 9 in 2005. Notably absent at all sites in 2005 was Black-chinned Hummingbird (*Archilochus alexandri*), a riparian species observed at one or more sites every year from 2001-2004 (Appendix B). Cordilleran Flycatcher (*E. occidentalis*) was another riparian species absent at our sites in 2005.

Table 2. Number of riparian obligate and dependent species observed during point count surveys at seven Bureau of Land Management sites in Cibola and Sandoval Counties, New Mexico from 2001-2005. We include species detected at all distances, as well as flyovers.

Site	2001	2002	2003	2004	2005	Total
Bluewater Canyon	8	7	7	8	4	15
Lost Valley	7	5	8	7	7	11
Rinconada Canyon	5	5	4	8	4	14
Rito Leche	6	3	4	3	5	8
San Ysidro	6	6	5	9	7	14
Senorito Creek	3	3	2	2	4	6
Wilson Canyon	5	3	3	3	1	6
Total – All Sites	18	17	17	15	16	25

We observed 8 New Mexico Partners in Flight (2003) priority species in 2005, slightly fewer than in previous years (Table 3). In all years from 2001-2005, Rinconada

Canyon contributed the most priority species. Virginia’s Warbler (*Vermivora virginiae*), Grace’s Warbler (*Dendroica graciae*), and Gray Flycatcher are regularly observed at Rinconada Canyon, but not at the other sites. Absent at all sites in 2005 were Black-throated Gray Warbler (*Dendroica nigrescens*), Cordilleran Flycatcher, and Western Bluebird (*Sialia mexicana*), three priority species observed at one or more sites every year from 2001-2004 (Appendix C).

Table 3. Number of New Mexico Partners in Flight (2003) priority species observed during point count surveys at Bureau of Land Management sites in Cibola and Sandoval Counties, New Mexico from 2001-2005. We include species detected at all distances, as well as flyovers.

Site	2001	2002	2003	2004	2005	Total
Bluewater Canyon	3	4	2	3	2	5
Lost Valley	1	0	0	0	1	2
Rinconada Canyon	6	6	8	8	5	16
Rito Leche	2	3	3	1	2	4
San Ysidro	0	1	0	0	1	1
Senorito Creek	5	2	2	1	2	5
Wilson Canyon	1	1	3	1	1	2
Total – All Sites	12	12	14	10	8	22

DISCUSSION

Researchers have suggested that riparian areas with native vegetation support more birds than riparian areas with exotic vegetation (e.g., Anderson et al. 1977, Cohan et al. 1978, Ellis 1995). Although our power to detect meaningful population differences is limited by the size of our sites, our results indicate higher abundance at sites with native riparian vegetation than at sites dominated by exotic vegetation. Annual detection rates from 2001-2005 were among the highest at Rinconada Canyon and Rito Leche, two sites with fairly consistent water flow and little or no saltcedar or Russian olive

encroachment. Bluewater Canyon also contained native riparian vegetation, but detection rates were relatively low in some years. Detection rates at Bluewater Canyon were likely moderate because of the relatively small area (i.e., narrow patches) of habitat sampled between canyon walls, and the difficulty detecting subtle vocalizations over the sound of swift, flowing water. Despite inconsistent detection rates at Bluewater Canyon, all three sites with native vegetation contained high species richness from 2001-2005, especially for riparian and priority species, thereby demonstrating their value for birds.

Lost Valley and San Ysidro contain a substantial amount of exotic vegetation, but these sites are not necessarily poor. From 2001-2005, these sites hosted many riparian obligate or dependent species, and detection rates for these riparian species were similar to or higher than the rates for riparian species at sites with native vegetation. Exotic riparian vegetation is suitable for some species, because it simulates the dense structure of native vegetation (Fleishman et al. 2003). Abundance for some species might depend more on the density of vegetation (Powell and Steidl 2000, 2002), and less on the type of vegetation. We observed potential migrant Willow Flycatchers at Lost Valley and San Ysidro during some years. Increasing water availability and maintaining vegetation structure, even if that vegetation is exotic, might improve occupancy of these sites by Willow Flycatchers, including the federally endangered southwestern subspecies. Lost Valley and San Ysidro also contribute to regional diversity among the sites. For example, we have observed the most (44 of 50 since 2001, 88%) Bullock's Orioles (*Icterus bullockii*) at Lost Valley, likely because of the dense vegetation at the site. We have observed the most (15 of 16 since 2001, 94%) Common Yellowthroats (*Geothlypis trichas*) at San Ysidro, likely because of the marsh habitat at this site.

In 2005, we observed low detection rates and species richness, especially for riparian species, at Senorito Creek and Wilson Canyon. The presence of only one riparian obligate or dependent (i.e., Blue Grosbeak) at Wilson Canyon, along with the apparent absence of Yellow-breasted Chats for the first time since monitoring began in 1998, is reason for concern. Riparian restoration projects have been attempted at both sites, but our observations indicate that benefits to the avian community have not been realized. Riparian restoration projects that kill or remove exotic vegetation probably will not improve avian abundance and species richness until that vegetation structure is replaced. Where exotic vegetation has been controlled at Senorito Creek and Wilson Canyon, detection rates and species richness might remain low until native vegetation replaces the structure of the treated vegetation. We encourage BLM to be mindful of apparently low avian abundance at Senorito Creek and Wilson Canyon, and not abandon efforts to improve the quality of those sites.

Annual detection rates from 2001-2005 appear consistent at some sites and declining at others. Our sample sizes do not provide enough power for us to determine meaningful temporal trends over such a short period; however, reduced detection rates in most years at San Ysidro, Senorito Creek, and Wilson Canyon might indicate that local changes are occurring. Many factors influence breeding bird populations (Peterjohn et al. 1995), such as the availability of nesting habitat (Willson 1974, Martin 1988). At Senorito Creek and Wilson Canyon, sparse vegetation might limit nesting for some species (e.g., Yellow-breasted Chat), but it is unclear if habitat has changed greatly since 2001. Observer differences can also affect detection rates (Sauer et al. 1994), but we have used the same observer at San Ysidro, Senorito Creek, and Wilson Canyon since

2003. Local avian abundance is subject to natural variation, and our detection rates lack the context that longer term studies provide for population trends. Continued monitoring over a number of years would place apparent highs and lows at these sites in proper perspective and improve our understanding of any trends that might be occurring.

SUMMARY OF RECOMMENDATIONS

1. Continue point count surveys at the seven sites, using the same observers whenever possible. Document the persistence of riparian species, especially those notably absent in 2005 (e.g., Black-chinned Hummingbird, Cordilleran Flycatcher, and at Wilson Canyon, Yellow-breasted Chat).
2. Continue or intensify riparian restoration projects at sites dominated by exotic vegetation. Monitor the effectiveness of animal exclosures. Accompany any clearing or treatment of dense exotic vegetation with native plantings to replace the structure of habitat removed.

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Figure 1. Location of Bureau of Land Management breeding bird survey sites in Cibola and Sandoval Counties, New Mexico in 2005.

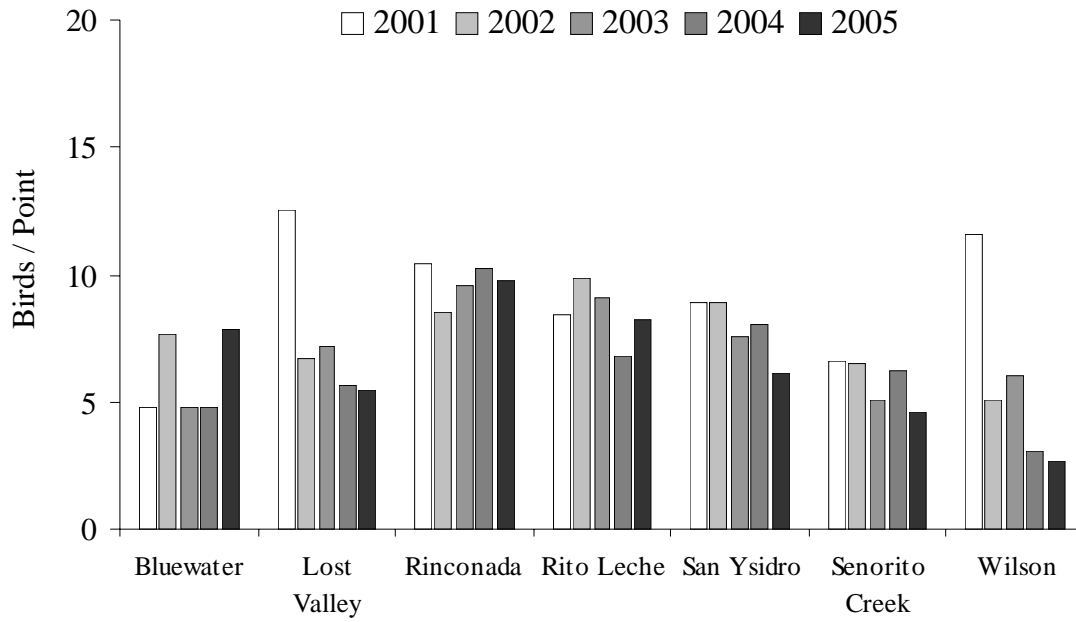


Figure 2. Annual detection rates for breeding bird point count surveys at seven Bureau of Land Management sites in Cibola and Sandoval Counties, New Mexico from 2001-2005.

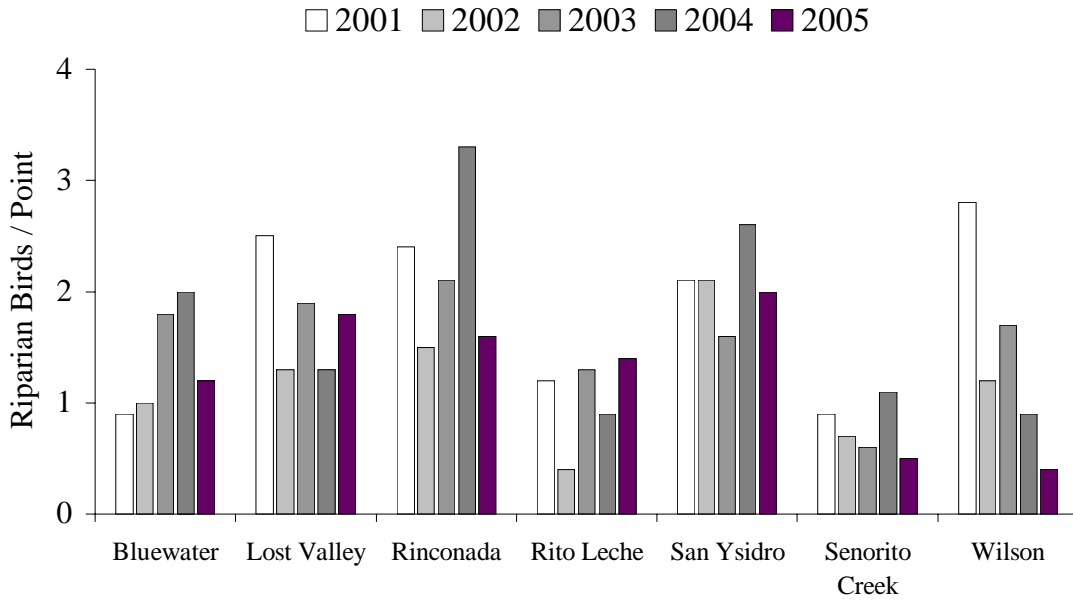


Figure 3. Annual detection rates for riparian obligate and dependent species at seven Bureau of Land Management sites in Cibola and Sandoval Counties, New Mexico from 2001-2005.

Appendix A. Universal Transverse Mercator coordinates (North American Datum 27) of point count surveys at seven sites in the Bureau of Land Management Albuquerque, New Mexico Resource Area from 2001-2005.

Site	Point	Easting	Northing
Bluewater Canyon	1	770561	3909401
Bluewater Canyon	2	770355	3909552
Bluewater Canyon	3	770199	3909666
Bluewater Canyon	4	770296	3909808
Bluewater Canyon	5	770054	3909861
Bluewater Canyon	6	769971	3910102
Bluewater Canyon	7	769732	3910048
Bluewater Canyon	8	769534	3909932
Bluewater Canyon	9	769348	3909999
Bluewater Canyon	10	769130	3909881
Bluewater Canyon	11	768874	3909906
Bluewater Canyon	12	768637	3909929
Lost Valley	1	313666	3948905
Lost Valley	2	313619	3948830
Lost Valley	3	313564	3948724
Lost Valley	4	313469	3948683
Lost Valley	5	313467	3948558
Lost Valley	6	313473	3948421
Lost Valley	7	313469	3948284
Lost Valley	9	310952	3946194
Lost Valley	10	311088	3946276
Lost Valley	11	310850	3946018
Rinconada	1	257786	3893063
Rinconada	2	257807	3893306
Rinconada	3	257964	3893560
Rinconada	4	258095	3893710
Rinconada	5	258198	3893932
Rito Leche	1	325598	3987691
Rito Leche	2	325433	3987428
Rito Leche	3	325344	3987317
Rito Leche	4	325145	3987244
Rito Leche	5	324880	3987280
San Ysidro	1	338507	3934934
San Ysidro	2	338414	3935040
San Ysidro	3	338139	3935100
San Ysidro	4	337998	3935086
San Ysidro	5	337856	3935069
San Ysidro	6	337805	3935072
San Ysidro	7	337959	3935216
Senorito Creek	1	322769	3979364

Site	Point	Easting	Northing
Senorito Creek	2	322448	3979255
Senorito Creek	3	322202	3978869
Senorito Creek	4	322091	3978675
Senorito Creek	5	322105	3978313
Senorito Creek	6	321885	3978229
Senorito Creek	7	321728	3978039
Senorito Creek	8	321644	3977643
Senorito Creek	9	321440	3977472
Senorito Creek	10	321299	3977271
Wilson Canyon	1	321816	3972337
Wilson Canyon	2	321683	3972479
Wilson Canyon	3	321671	3972658
Wilson Canyon	4	321683	3972788
Wilson Canyon	5	321656	3972889
Wilson Canyon	6	321714	3972921
Wilson Canyon	7	321776	3972988
Wilson Canyon	8	321754	3973086
Wilson Canyon	9	321735	3973179
Wilson Canyon	10	321706	3973305

Appendix B. List of riparian obligate and dependent species, as determined by the Bureau of Land Management (1998), observed during point count surveys at seven riparian sites in the Albuquerque, New Mexico Resource Area from 2001-2005. We indicate observations of riparian obligate and dependent species at one or more sites in a given year with an “X”.

BLM Riparian Species	Designation	2001	2002	2003	2004	2005
Bank Swallow	Dependent	X	-	-	-	-
Black-chinned Hummingbird	Dependent	X	X	X	X	-
Bewick’s Wren	Dependent	X	X	X	X	X
Black-headed Grosbeak	Dependent	X	X	X	X	X
Blue Grosbeak	Dependent	X	X	X	X	X
Bullock’s Oriole	Dependent	X	X	X	X	X
Cooper’s Hawk	Dependent	X	X	-	-	X
Common Yellowthroat	Obligate	X	X	X	X	X
Cordilleran Flycatcher	Dependent	X	X	X	X	-
Gray Catbird	Dependent	-	-	X	-	X
House Wren	Dependent	X	-	-	-	-
Indigo Bunting	Dependent	-	-	X	-	X
Lazuli Bunting	Dependent	X	-	-	X	X
Lesser Goldfinch	Dependent	X	X	X	X	X
Lewis’ Woodpecker	Dependent	X	X	X	-	X
MacGillivray’s Warbler	Dependent	-	X	X	-	-
Red-naped Sapsucker	Dependent	-	X	-	X	-
Song Sparrow	Obligate	X	-	X	X	-
Summer Tanager	Obligate	-	X	-	-	-
Warbling Vireo	Dependent	X	-	X	-	X
Western Wood-Pewee	Dependent	X	X	X	X	X
Willow Flycatcher	Obligate	-	X	-	-	X
Wilson’s Warbler	Obligate	X	X	X	X	X
Yellow Warbler	Obligate	-	-	-	X	-
Yellow-breasted Chat	Obligate	X	X	X	X	X
Number of Riparian Species		18	17	17	15	16

Appendix C. List of New Mexico Partners in Flight (2003) priority species (score ≥ 21) observed during point count surveys at seven Bureau of Land Management riparian sites in the Albuquerque, New Mexico Resource Area from 2001-2005. We indicate observations of priority species at one or more sites in a given year with an “X”.

Species	Score	2001	2002	2003	2004	2005
Willow Flycatcher	30	-	X	-	-	X
Summer Tanager	25	-	X	-	-	-
Virginia's Warbler	25	X	X	X	-	X
Black-throated Gray Warbler	24	X	X	X	X	-
Dusky Flycatcher	24	-	-	X	-	-
Gray Flycatcher	24	X	-	-	X	X
Grace's Warbler	24	-	-	-	X	X
Lewis' Woodpecker	24	X	X	X	-	X
Peregrine Falcon	24	-	-	X	-	-
Olive-sided Flycatcher	23	-	-	X	-	-
Red-naped Sapsucker	23	-	X	-	X	-
Bank Swallow	22	X	-	-	-	-
Cordilleran Flycatcher	22	X	X	X	X	-
Gambel's Quail	22	X	-	X	-	-
Plumbeous Vireo	22	X	X	X	X	X
Scott's Oriole	22	X	-	-	-	-
Western Bluebird	22	X	X	X	X	-
Green-tailed Towhee	21	X	X	X	X	X
MacGillivray's Warbler	21	-	X	X	-	-
Pinyon Jay	21	X	X	X	X	X
Rufous-crowned Sparrow	21	-	-	-	X	-
Sage Thrasher	21	-	-	X	-	-
Number of Priority Species		12	12	14	10	8

Appendix D. List of 71 bird species observed during point count surveys at Bluewater Canyon (BC), Lost Valley (LV), Rinconada Canyon (RC), Rito Leche (RL), San Ysidro (SY), Seniorito Creek (SC), and Wilson Canyon (WC), New Mexico in 2005.

Species	BC	LV	RC	RL	SY	SE	WC	Total
Acorn Woodpecker	-	-	2	-	-	-	-	2
American Crow	-	-	-	5	-	-	-	5
American Kestrel	-	2	-	1	2	-	-	5
American Robin	5	-	-	-	-	-	-	5
Ash-throated Flycatcher	10	8	5	-	8	5	1	37
Bewick's Wren	-	4	-	-	-	-	-	4
Black Phoebe	9	-	-	-	-	-	-	9
Black-headed Grosbeak	2	-	6	-	-	-	-	8
Blue Grosbeak	-	5	-	8	16	3	9	41
Brewer's Blackbird	-	-	-	7	-	-	-	7
Brewer's Sparrow	-	-	-	6	-	10	4	20
Broad-tailed Hummingbird	3	-	3	-	-	1	-	7
Brown-headed Cowbird	-	2	-	-	5	-	2	9
Bullock's Oriole	-	9	-	1	-	-	-	10
Bushtit	17	-	-	-	4	-	-	21
Canyon Towhee	3	-	-	-	-	-	-	3
Canyon Wren	10	-	3	-	-	-	-	13
Cassin's Kingbird	-	5	2	-	2	2	-	11
Chipping Sparrow	-	-	6	-	-	-	-	6
Cliff Swallow	106	6	-	-	11	-	49	172
Common Nighthawk	-	-	-	-	-	-	1	1
Common Raven	11	17	1	5	-	1	2	37
Common Yellowthroat	-	-	-	-	3	-	-	3
Cooper's Hawk	-	-	1	-	-	-	-	1
European Starling	-	-	-	14	-	-	-	14
Grace's Warbler	-	-	3	-	-	-	-	3
Gray Catbird	2	-	-	-	-	-	-	2
Gray Flycatcher	-	-	2	-	-	-	-	2
Great Blue Heron	-	-	-	-	1	-	-	1
Greater Roadrunner	-	1	-	-	-	-	-	1
Green-tailed Towhee	-	-	-	5	-	6	1	12
Hairy Woodpecker	-	-	1	-	-	-	-	1
Hepatic Tanager	-	-	3	-	-	-	-	3
House Finch	34	12	2	-	3	-	8	59
Indigo Bunting	-	-	-	-	-	1	-	1
Juniper Titmouse	5	-	5	-	-	-	-	10
Killdeer	-	-	-	-	1	-	-	1
Lark Sparrow	-	5	-	-	2	-	-	7
Lazuli Bunting	-	-	-	-	2	-	-	2
Lesser Goldfinch	-	8	-	-	4	-	-	12
Lewis' Woodpecker	-	-	-	1	-	-	-	1

Species	BC	LV	RC	RL	SY	SE	WC	Total
Mallard	2	-	-	-	-	-	-	2
Mountain Chickadee	-	-	2	-	-	-	-	2
Mourning Dove	5	8	1	3	4	-	2	23
Northern Flicker	-	4	1	11	-	2	4	22
Northern Mockingbird	-	8	-	-	-	2	3	13
Northern Rough-winged Swallow	-	-	-	3	-	-	-	3
Pine Siskin	7	2	4	-	-	-	-	13
Pinyon Jay	13	-	3	-	-	10	-	26
Plumbeous Vireo	16	-	8	-	-	-	-	24
Red-tailed Hawk	3	-	-	-	-	-	-	3
Red-winged Blackbird	-	-	-	-	1	-	5	6
Rock Wren	2	9	-	-	-	3	2	16
Say's Phoebe	2	-	-	1	1	-	-	4
Spotted Towhee	-	12	6	-	-	-	13	31
Steller's Jay	-	-	1	-	-	-	-	1
Vesper Sparrow	-	-	-	7	-	8	1	16
Violet-green Swallow	18	9	10	-	-	-	-	37
Virginia's Warbler	-	-	3	-	-	-	-	3
Warbling Vireo	-	2	5	-	-	-	-	7
Western Kingbird	-	-	-	-	-	-	1	1
Western Meadowlark	-	13	-	19	4	39	5	80
Western Scrub-Jay	-	2	-	-	-	-	-	2
Western Tanager	8	-	7	-	-	-	-	15
Western Wood-Pewee	21	-	4	-	2	1	-	28
White-throated Swift	17	-	12	-	-	-	-	29
White-winged Dove	-	-	-	-	1	-	-	1
Willow Flycatcher	-	2	-	-	2	-	-	4
Wilson's Warbler	-	-	-	1	-	-	-	1
Yellow-breasted Chat	3	15	-	4	11	5	-	38
Yellow-rumped Warbler	-	-	2	-	-	-	-	2
	334	170	114	102	90	99	113	1022