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Evaluation of Pinyon Removal Effects Typical of a Wildland-Urban Interface Fuels Reduction Project, Mono County, California: Avian Monitoring Component at Rancheria Gulch, 2005.

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EXECUTIVE SUMMARY

In 2005, PRBO Conservation Science (PRBO) completed the first field season of avian studies associated with the Joint Fire Sciences Program funded study "Evaluation of Pinyon Removal Effects Typical of a Wildland-Urban Interface Fuels Reduction Project, Mono County, CA".

We determined avian use of the study plots during surveys conducted from May 7th through August 17th, 2005. We ranked breeding status for 73 species encountered in the study area. Eight of these are listed on one or more species of concern list.

Green-tailed Towhees (0.22 territories/ha) and Blue-gray Gnatcatchers (0.15 territories/ha) were the highest density breeders. We detected fewer sagebrush breeding birds and more pinyon breeding birds at sites with higher pinyon tree densities; the relationships were linear and significant. Three sagebrush-obligate species were detected on the plots: Sage Thrasher, Brewer's Sparrow, and Sage Sparrow. However, only the Brewer's Sparrow was confirmed breeding within study plot boundaries. Juniper Titmice, Black-throated Gray Warblers and Cassin's Vireos, all closely associated with pinyon woodlands in the Mono Basin, were confirmed breeders within study plots.

We found 25 nests for 10 species on the treatment plots and 31 nests for 12 species on the control plots. Proportional nest success for all species nests combined was 43% for both plots combined and 35% and 50% for treatment and control plots respectively. Mayfield estimate of nest survival for Blue-gray Gnatcatchers (7%) was low. Nest survival for Cassin's Finch (25%) and Green-tailed Towhee (30%) was moderate.

Nest predation and Brown-headed Cowbird activity were equally responsible for the majority of nest failures, accounting for 41% each. Blue-gray Gnatcatcher nests were nearly all parasitized (94%), accounting for all but one of our recorded parasitism events. One Black-throated Gray Warbler nest was also parasitized.

Peak nest initiation at Rancheria Gulch was 2nd week of May through June. First eggs were laid May 4. The last fledging event was August 5, and latest calculated fledge date (for a nest that did not fledge) was mid to late August. We recommend pinyon thinning and prescribed fire treatments be avoided from last week of April through August to avoid disturbance of breeding birds throughout their breeding cycle.

INTRODUCTION

The summer of 2005 marked the first field season of avian studies associated with the Joint Fire Sciences Program funded study "Evaluation of Pinyon Removal Effects Typical of a Wildland-Urban Interface (WUI) Fuels Reduction Project Mono Basin, CA" (Removal Study; USDI 2006). Managers from the Bureau of Land Management, Bishop Field Office, California (BLM) and research scientists from the U.S. Geological Survey, Western Ecological Research Center (USGS) collaborated with PRBO Conservation Science (PRBO) to conduct the avian component of the Removal Study.

Briefly, the Removal Study is designed to experimentally compare the effects of two different pinyon pine (*Pinus monophyla*) removal prescriptions on vegetation structure, potential and actual fire behavior, dominance by the invasive annual cheatgrass (*Bromus tectorum*), and dominance and diversity of native sagebrush vegetation. USGS and BLM established 48 1 ha (2.47 acre) plots. 16 of the plots will have no tree removal (control). 16 plots will be treated by workers on foot who will cut pinyons at ground level with chainsaws, pile the limbs and boles, and either burn the piles or leave them for fire-wood collection (cut treatment). Pinyons on the final 16 plots will be grounded to ground level with a tractor-mounted masticating head and the remaining mulch will be scattered throughout the study plots (mulch treatment). Each of the two treatment methods will leave approximately 11 trees on each 1 ha plot. Each group of 16 plots was further divided into 8 plots with high pinyon density and 8 plots with low pinyon density. For more details on study design, see USDI (2006) and Brooks et al. (2004).

The primary objective of the bird monitoring component of the Removal Study is to investigate the effects of the mosaic of pinyon pine thinning treatments on sagebrush and pinyon woodland breeding birds. We used standardized survey methods to determine avian use of the study site, including bird species abundance, territorial density, nest survivorship and vegetation characteristics associated with nest sites and breeding bird abundance. Data collected in 2005 and 2006 will serve as the baseline years, before thinning treatments are conducted, from which to compare future post-treatment data sets.

Where sagebrush and woodlands meet

The Removal Study lies at the transition between pinyon woodland and mountain big sagebrush (*Artemisia tridentata vaseyana*) habitat. Shifts in vegetation structure from sagebrush to woodland dominated landscapes result in different bird assemblages and densities. Woodland species tend to increase with increasing woodland cover while shrubland or grassland associated bird species tend to decrease (Medin et al. 2000, Barton and Holmes 2004, Knick et al. 2005).

Threats to sagebrush and woodland ecosystem structure and function (and subsequently bird populations) can be similar. Livestock grazing, chaining/logging, exotic species invasion, and altered fire regimes have led to the loss or degradation of both habitats and associated bird species (e.g. Neel 1999, CalPIF 2002, Knick et al. 2003, CalPIF 2005, Bock and Block 2005).

However, the extremely complex yet undeniable phenomenon of pinyon and juniper (*Juniperus* spp.) woodland expansion into sagebrush habitats is one area where the benefits to one habitat type can be detrimental to another and vice versa. Pinyon and juniper woodland expansion is considered one of the many threats to sagebrush ecosystems and sagebrush breeding birds (NDOW 2004, Knick et al. 2005, CalPIF 2005), while it has obvious benefits for woodland breeding birds (Sedgwick 1987, Neel 1999, Barton and Holmes 2004). Increased woodland *densities* can provide fuel for stand replacing fires, with devastating consequences for woodland birds (Bock and Block 2005). Catastrophic woodland fires can also replace woodlands with habitat-poor exotic grasslands, which offer nothing for sagebrush breeding birds that might otherwise benefit from shrubland succession (Knick et al. 2005). However, selective thinning can potentially have an impact on woodland breeding birds (Latta et al. 1999), and largescale woodland removal can be devastating (Neel 1999, Sedgwick and Ryder 1987).

Further complexities arise when causes of woodland expansion are targeted: there are many interacting factors that have led to woodland expansion, both human-management caused and as a result of long-term climatic fluctuations. Given the huge geographic distribution of pinyon and juniper woodlands and sagebrush, the causes of woodland expansion (and responses of woodlands and sagebrush to expansion limiters such as fire) also depend on a plethora of factors: season, rainfall, soil, vegetation community, elevation, aspect, and past and current land management practices to name a few. Deciphering or defining the complexities of these interactions is beyond the scope of this report, but we refer the reader to several sources as a starting point for information: Pieper and Wittie 1990, Miller and Wigand 1994, Nowack et al. 1994, Gedney et al. 1999, Miller and Rose 1999, Taush 1999, Miller and Tausch 2001, Hemstrom et al. 2002, Knick et al. 2005.

Sagebrush habitat and associated bird community

Sagebrush ecosystems represent over 62 million ha of western North America (CalPIF 2005). Human land management activities and shifts in disturbance regimes have resulted in significant losses of sagebrush since European settlement of western North America (West 1996, West and Young 2000). Decreases in sagebrush acreage and degradation of sagebrush ecosystem function have been attributed to numerous factors

that interact with each other in a complex manner. These include agricultural conversion, exotic plant invasions (Hann et al. 1997), damage from livestock (Fleischner 1994, Donahue 1999), and the expansion of pinyon and juniper woodlands (Miller and Rose 1999, Miller and Tausch 2001). One concomitant result of these land management activities is altered fire cycles that can have serious ramifications to sagebrush dependent bird populations (CalPIF 2005).

A number of bird species are primarily associated with sagebrush during at least part of the year and are considered sagebrush "obligate" species (Braun et al. 1976, Paige and Ritter 1999). These include Greater Sage-Grouse, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow. The Gray Flycatcher is considered a "near obligate" species (Sterling 1999) and several other species including Green-tailed Towhee, Loggerhead Shrike and Spotted Towhee rely on sagebrush for breeding habitat within the eastern Sierra Nevada /western Great Basin region. Species such as Vesper Sparrow, Western Meadowlark and Horned Lark are primarily grassland associated species, but occur throughout the sagebrush biome where habitat conditions are adequate to meet their needs (CalPIF 2005).

Several sagebrush associated bird species are exhibiting declining population trends in the Great Basin region (e.g. Loggerhead Shrike, Sage Thrasher, Green-tailed Towhee and Brewer's Sparrow; CalPIF 2005). Loggerhead Shrike and Greater Sage-Grouse are California Bird Species of Special Concern (CDFG and PRBO 2005), Greater Sage-Grouse is also a BLM sensitive species, and Sage Sparrow, Brewer's Sparrow and Loggerhead Shrike are US Fish and Wildlife Birds of Conservation Concern for the Great Basin Bird Conservation Region (USWFS 2002).

Despite continued dominance of sagebrush ecosystems in western North America, extensive degradation and loss across much of its range suggests that conservation measures are needed to ensure survival of sagebrush associated and obligate bird species (Allen-Diaz and Bartolome 1998, West 2000, Knick et al. 2003). Thus, an overarching goal, aimed at conserving sagebrush breeding bird populations, is "no net loss" of sagebrush habitats (Paige and Ritter 1999). Although conservation and restoration of sagebrush habitats have become top priorities of land management agencies (e.g. BLM 2002), little information is available on how non-game bird species respond to widespread land management activities in this habitat.

Pinyon woodland habitat and associated bird community.

Pinyon and juniper woodland currently occupy over 30 million ha of North America, including Intermountain and Southwestern states (Bock and Block 2005, Knick et al. 2005). Several factors have led to the expansion of pinyon and juniper woodlands (see

discussion above), despite intensive harvesting for charcoal and widespread chaining for livestock forage over the last century and a half (Neel 1999, Latta et al. 1999). A more recent threat to pinyon and juniper woodlands is the general shift in fire regime from low-severity stand maintenance burns, to high-severity stand replacement burns (Bock and Block 2005).

Pinyon Jays and Gray Vireos are considered pinyon and juniper woodland obligates (Neel 1999), though the latter does not occur in the Mono Lake Basin (Gaines 1992). Several other bird species are associated with pinyon juniper woodlands, including Juniper Titmouse, Black-throated Gray Warbler, Gray Flycatcher, Virginia's Warbler, Cassin's / Plumbeous Vireo, Chipping Sparrow, Western Tanager, Dark-eyed Junco and Mountain Bluebird (Neel 1999, Latta et al. 1999, CalPIF 2002). Blue-gray Gnatcatchers, Cassin's Finches and Bushtits also use pinyon and juniper woodlands regularly in the eastern Sierra (Gaines 1992, PRBO data).

One would expect pinyon breeding birds to benefit from recent woodland expansion. Juniper Titmice and Gray Flycatchers are demonstrating population trend increases in the Great Basin Conservation Region (CalPIF 2005), and Black-throated Gray Warblers appear stable or increasing range wide (Mark 2002). However, Chipping Sparrow is a California Department of Fish and Game Special Animal species and is listed on the World Conservation Union Special Survival Commission Red List (CDFG 2005).

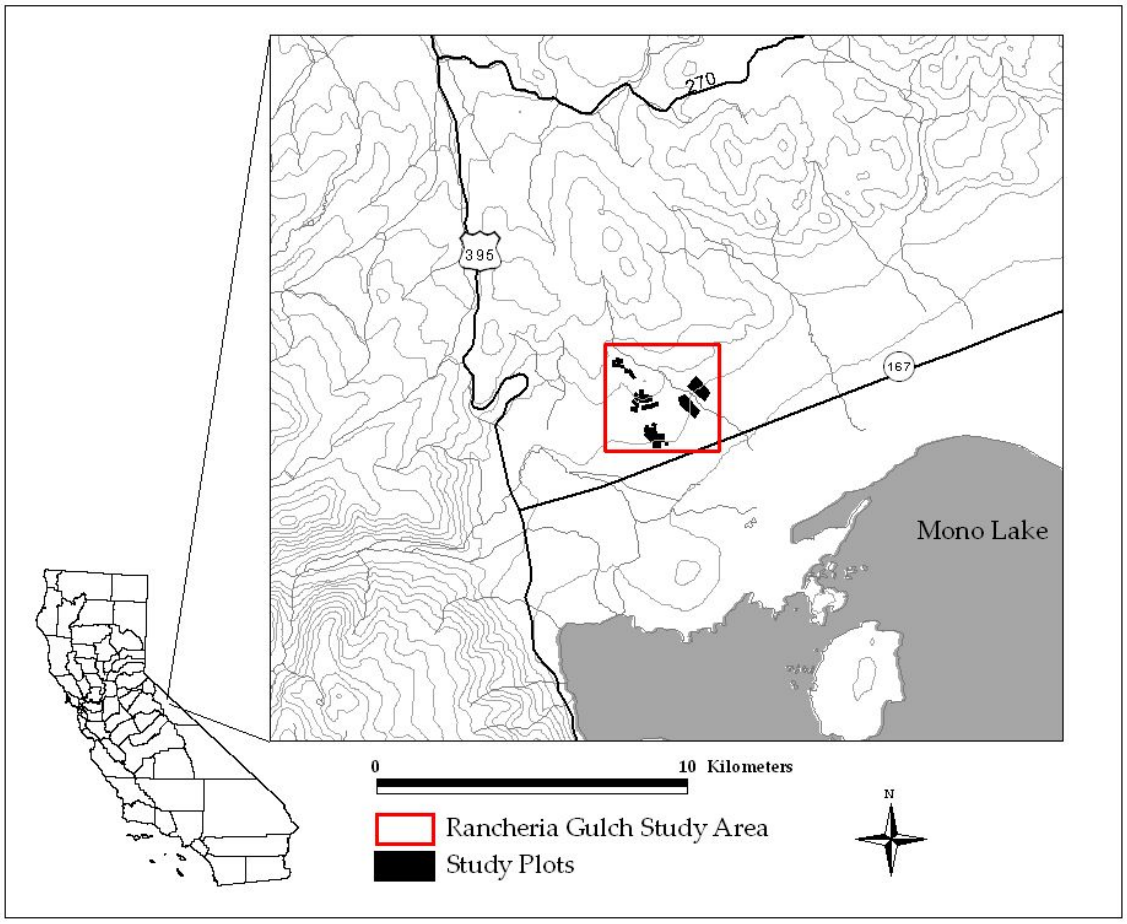
The primary issues facing coniferous forest habitats and associated birds in California (and pinyon habitats are no exception) can be classified by three key post-European settlement management practices: timber harvest, fire suppression, and livestock grazing (CalPIF 2002). The current conditions resulting from these management activities can include: increased forest edge, reduced amounts of large snags and dead and downed materials, fewer structurally diverse habitats, and reduced herbaceous layer (CalPIF 2002). These conditions are suboptimal for some pinyon breeding birds (including Dark-eyed Junco, Plumbeous / Cassin's Vireo, Western Tanager, Chipping Sparrow, Flammulated Owl, and Townsend's Solitaire; CalPIF 2002). Complete removal of woodland habitat as a result of mechanical clearing or stand replacement fires has obvious deleterious ramifications for woodland breeding birds (Neel 1999, Sedgewick and Ryder 1987, Bock and Block 2005). There is a near absence of information on fire effects on birds in pinyon woodlands (Bock and Block 2005) and little to no information on effects of selective pinyon thinning on woodland bird communities (but see Latta's reference to Balda and Masters 1980).

METHODS

Study Area

The study area is located at Rancheria Gulch, Mono County, California (38° 04′ 03″ N, -119° 06′ 37″ W, Figure 1). Located ca. 6 km north of Mono Lake and on the southern slopes of the Bodie Hills, this site is characterized by pinyon pine woodland with a few sporadic Utah juniper (*Juniperus osteosperma*). The woodland merges into sagebrush as elevation decreases. Dominant shrub species include mountain big sagebrush and bitterbrush (*Purshia tridentata*). Herbaceous cover is primarily bottlebrush squirreltail (*Elymus elymoides*), needlegrass (*Achnatherum* spp.), and basin wildrye (*Leymus cinereus*). Cheatgrass (*Bromus tectorum*) is distributed in low abundance throughout the site, primarily located under the shade of pinyon trees or shrubs.

Figure 1. Rancheria Gulch study area, 2005.



Study Design

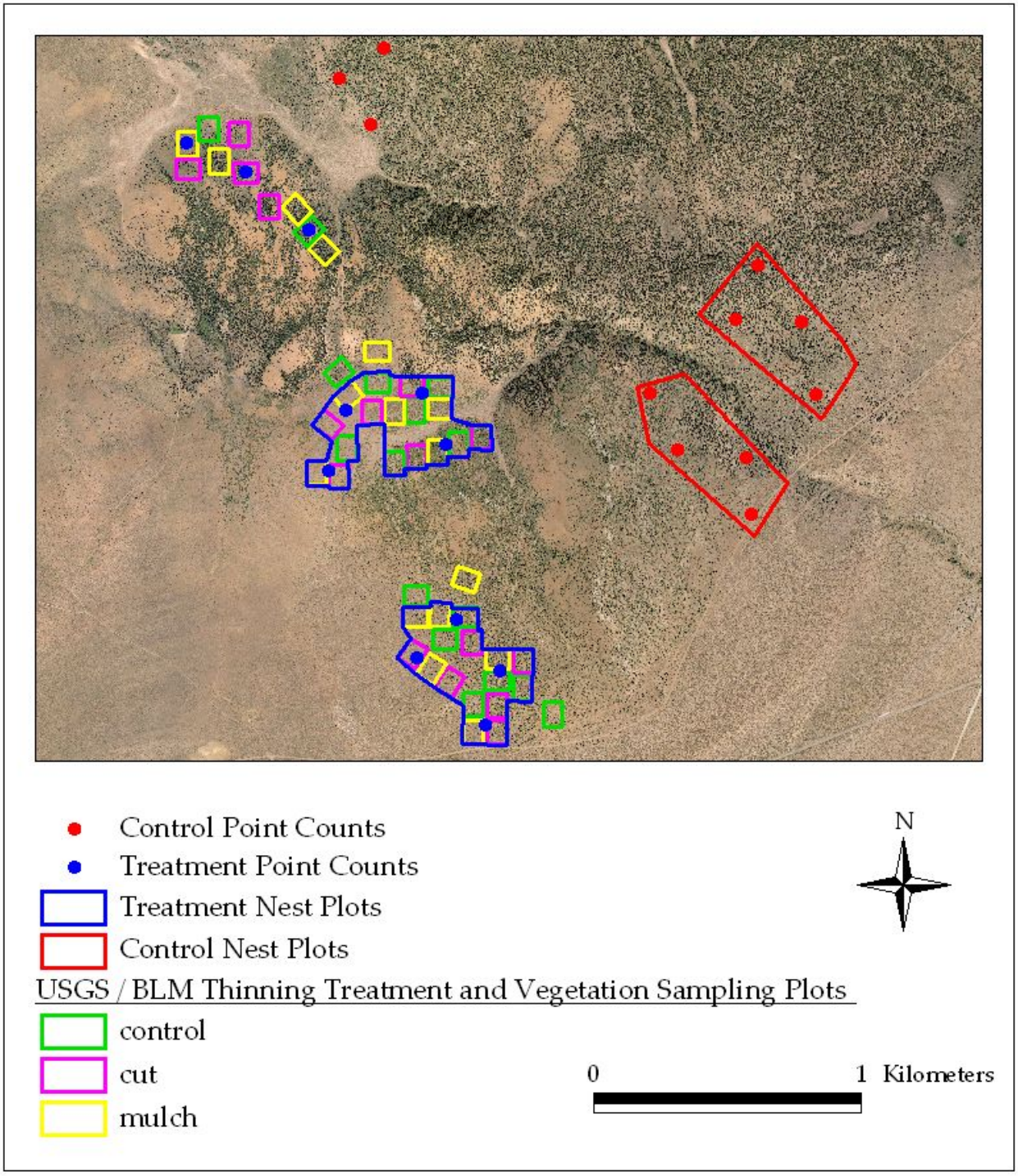
Objectives of the bird monitoring component of the original study proposal (Brooks et al. 2004) were to compare indices of bird abundance, species richness, diversity and nest density between various pinyon thinning treatments carried out by BLM, and between pre and post treatment years. In short, we were to place avian survey points within each of the 1 ha (2.47 acre) treatment and control plots (totaling 48 points). These would accompany vegetation surveys carried out by USGS within identical treatment and control plots.

During our pilot year in spring and summer of 2005, we quickly confirmed that the treatment plots (which were designed primarily for vegetation surveys) were too small and too close together to compare bird indices or nest densities between treatment types (for example a single Green-tailed Towhee territory easily encompassed multiple plots of different treatments and controls).

We therefore changed the avian monitoring component of the study by grouping nearby 1 ha treatment and control plots into single larger plots, allowing us to examine avian response to the treatment mosaic as a whole (Figure 2). The original treatment and control plots were geographically arranged in three separate clusters. We designated two nest searching treatment plots encompassing the two southern clusters and 11 treatment point count locations within all three clusters. We then designated two control nest plots and 11 control point counts of equivalent area and similar habitat composition located at minimum 550m east of the treatment plots. These plots will further be referred to as "treatment" and "control" plots / points respectively, not to be confused with the smaller 1 ha USGS / BLM plots that our treatment plots encompass.

The changes in study design during the 2005 pilot year led to censuses being conducted later than we would recommend under ideal conditions. During the 2006 year, we will begin nest searching and spot mapping during the first week of May and point counts will be conducted May 15 – June 15 (see details below).

Figure 2. Study Plots at Rancheria Gulch, 2005. Detail of area delineated by red box in Figure 1.



Nest Searching

PRBO biologists conducted all nest searching and monitoring, following specific guidelines described in Martin and Geupel (1993) and Breeding Bird Research and Monitoring Database (BBIRD) protocol (Martin et al. 1997). Nest searching on treatment and control plots began in late May and continued until breeding activity declined in early August (Table 1). Due to protocol changes during the 2005 pilot year, nest searching began later than ideal. We will begin nest searching during the first week of May in 2006.

Table 1. Nest searching plot names, codes, size, number of census days, hours and range of census dates at Rancheria Gulch, 2005.

Plot	Plot Code	Plot size (ha)	Census Dates	Number of Censuses	Number of Census Hours
Rancheria Gulch Treatment A	RATA	49	May 22 – Aug. 11	18	96
Rancheria Gulch Treatment B	RATB		May 29 – Aug. 7	14	67
Rancheria Gulch Control A	RACA	50	May 31 – Aug. 9	14	66.5
Rancheria Gulch Control B	RACB		May 30 – Aug. 11	18	83
Totals				64	312.5

Primarily through behavioral cues, PRBO biologists found as many nests as able within the 49 ha combined treatment plots and 50 ha combined control plots (Figure 2). Special care was taken to minimize human-induced predation probability and disturbance to the adults and nest site. Nests of all species were located at all stages (construction, egg laying, incubation, and nestling). Nest outcomes were determined by checking nests every 1 - 4 days until completion. Parasitism by Brown-headed Cowbirds and types of nest predators were determined when possible. Mirror poles and cavity checkers were used to check the contents of high nests and cavity nests respectively when possible.

All data from nest monitoring were recorded and entered in a format compatible with the BBIRD program of the Fish and Wildlife Service Cooperative Unit at the University of Montana (Martin et al. 1997). Basic measurements of the nest and nest substrate were also recorded after nest outcome was determined. See Martin et al. (1997) for a complete list of data variables.

Spot Mapping

A PRBO biologist conducted spot mapping at each nest plot (Table 1). The same biologist mapped all territorial individuals during each visit to the nest plot (see Nest

Searching section), following guidelines discussed in Ralph et al. (1993) and International Bird Census Committee recommendations (IBCC 1970). At the end of the field season, daily spot maps were combined into single territory maps for each breeding species at each nest plot and number of territories per plot was determined. Locations of transient species were noted to document their presence on the plots.

Nest Vegetation Assessment

We conducted nest vegetation assessments at all nest locations. Soon after the nesting attempt terminated, we measured the nest substrate and surrounding vegetation patch of each nest. A slightly modified version of the BBIRD method for vegetation measurements was used (Martin et al. 1997), which included variables for forb cover and average forb height by species. The basic units for vegetation sampling were a 5-meter radius plot (for shrubs, forbs and ground cover) and an 11.3-meter radius plot (for trees) centered on the nest. For a detailed description of measurements and estimations used see Martin et al. (1997).

Point Counts

PRBO biologists, trained in distance estimation and familiar with songs and calls of birds in the area, conducted all point count censuses. We censused one or two clusters of 3 -4 points per morning. Points were spaced at least 250m from one another. We visited all points two times between May 18 and July 1 and spaced each visit at least 10 days apart (Table 2). Due to the change in study design during the 2005 pilot year, we censused all points (except Treatment Upper) later than ideal and were not able to census Control Upper twice. We will conduct all census May 15 – June 15 in 2006, while peak territorial singing is occurring and birds are more detectable.

Table 2. Point count cluster names, 4-letter code, number of points, and dates of censuses at Rancheria Gulch, 2005. Point Count locations in Appendix A.

Transect	Code	Number of Points	Visit 1	Visit 2
Treatment A	RATA	4	10-Jun	29-Jun
Treatment B	RATB	4	10-Jun	29-Jun
Treatment Upper	RATU	3	18-May	1-Jul
Control A	RACA	4	9-Jun	30-Jun
Control B	RACB	4	9-Jun	30-Jun
Control Upper	RACU	3	--	1-Jul

We conducted censuses from within 30 minutes after local sunrise until approximately 3 hours later, and did not conduct counts in excessively windy or rainy conditions. We conducted 5-minute Variable Circular Plot (VCP) point counts and used a precision range finder to determine exact distances to each bird. We recorded exact distances to all birds detected and type of initial detection (visual, song or call); also recording when an individual was heard singing sometime during the 5-minute count. We recorded any breeding observations (e.g. nest material or food carries, fledglings). Point Count locations are presented in Appendix A.

Point Count Vegetation Assessment

We conducted a vegetation assessment at each of the 22 point count stations. We completed a site registration form, which included habitat type, distance to habitat edge, patchiness of shrubs, number of shrub and herb layers, slope, aspect, and presence or absence of roads, rock outcrops, utility lines, fence lines, cryptobiotic crust, cheatgrass and water within 100m radius.

We took an index of tree density by counting all trees, by size class (seedling, sapling, 8–23 cm, 24–35 cm, 36–70 cm, > 70 cm, snags 8–23 cm, snags 24–35 cm, snags > 35 cm) and species, that intersected four 1m wide transects extending 100 m from each point count location in four cardinal directions. We counted each tree if any part of the tree (branch, trunk etc.) crossed this transect, thereby providing an index of density rather than true density. In 2006, we will redo these counts, only counting a tree if the center of its trunk falls within the transect – therefore providing a true measure of density that will be comparable to other sites.

We also conducted a modified relevé vegetation assessments, as described in Ralph et al. (1993). We modified the protocol in order to more accurately meet the objective of assessing the amount of sagebrush shrub and herbaceous cover vs. woodland cover, and how these cover types were associated with bird numbers. Rather than estimating vegetation cover within vegetation height classes (as is done in the traditional relevé), we estimated absolute percent cover by vegetation type (e.g. true definition of herb, shrub, tree) within a 100m radius of point count locations. There were very few instances in which herbaceous vegetation exceeded 50 cm, and none where shrub vegetation exceeded 5 m. We were, however, able to capture trees of varying sizes because we separated tree counts into DBH size classes, saplings, and seedlings as described above. Within each general vegetation cover type, we also estimated the percent relative cover by species. We also estimated percent cover of cryptobiotic soil, litter, road/trail, rock and bareground and counted the number of species present

within each vegetation layer (to determine herb, shrub and tree species richness). See Appendix B for point count vegetation and site registration form.

Geographic Data

We collected location information at all nests and point count stations using a Garmin Global Positioning System (GPS II+) receiver. Positions were recorded in UTM (Universal Transverse Mercator), NAD83 datum. All coordinates and estimated accuracy (figure of merit; FOM) were recorded. FOM of these points ranges from 0 to 10 meters. All maps are represented in UTM coordinates, Zone 11, NAD83 datum.

Breeding Status

We determined breeding status for all species encountered on the study site in 2005. We used observations recorded before, during, and after project setup, all bird censuses and vegetation assessments. We ranked species by site following four criteria of the Riparian Habitat Joint Venture breeding scale, modified from breeding bird atlas criteria (see http://www.prbo.org/calpif/criteria.html.):

No evidence of breeding: Species not detected during breeding season, or species known not to breed within the general study area.

Possible breeding: Species encountered singing or acting territorial only once during the breeding season (in suitable habitat).

Probable breeding: Singing individual encountered on 2 or more different days of standardized censuses (at least one week apart); territorial behavior noted more than once at the same location; pair observed in courtship behavior.

Confirmed breeding: distraction display; nest building (except woodpeckers and wrens); nesting material or fecal sack being carried by adult; dependent juveniles with adults; active territory observed on at least three days (at least one week apart); active nest observed.

Data Summary and Statistical Analysis

Nest Survival

We calculated nest survival using two methods: Mayfield (1975), as recommended by Johnson (1979), and Proportion Successful (Martin 1992).

We calculated Mayfield nest survival for species with the highest sample of nests (Blue-gray Gnatcatchers, Green-tailed Towhees, and Cassin's Finches). The Mayfield method calculates the probability of nest success based on the daily survival rate of the given sample of nests. The method corrects for the fact that nests in any sample are likely to be found at various stages in the nest cycle, and that nests found during the later stages of the nesting cycle are more likely to be successful. We limited Mayfield nest survival calculations to nests we observed with at least one host egg or young and included nests with known or unknown outcomes (as recommended by Manolis et al. 2000).

Proportion Successful is the percentage of successful nests out of all nests for that species. A successful nest is defined as a nest that fledges at least one host young. We limited Proportion Successful calculations to nests we observed with at least one host egg or young, and to nests with known outcomes. Proportional nest success rates typically differ from Mayfield success rates as nests are located at different stages in their life cycles (Mayfield 1975). As such, proportional success often overestimates nest success (Martin 1992). With this in mind, proportional rates of nest success remain valuable for their insight into the breeding ecology of species with small sample sizes and/or difficult to monitor nests (such as cavity nesters).

We also calculated various factors influencing nest success, including nest predation, Brown-headed Cowbird activity, abandonment while building and egg or young desertion. Brown-headed Cowbird parasitism was calculated using only species that are potential cowbird hosts: Blue-gray Gnatcatcher, Black-throated Gray Warbler, Western Tanager, Green-tailed Towhee, Spotted Towhee, Chipping Sparrow, Brewer's Sparrow, and Cassin's Finch.

Relative Abundance

We summarized the number of birds detected by species within 100m of point count stations and summed over two visits at RATA, RATB, RACA and RACB. We did not use detections at points from the RACU or RATU transects because we were not able to visit RACU points twice, and could only accurately compare bird numbers between the treatment and control plots using the same number of points and visits. This discrepancy in visits was due to the late changes in study design and subsequent late start of control point counts.

Bird Habitat Relationships

We investigated relationships between detections of sagebrush and pinyon nesting birds and our pinyon density index (see above for description of index). We selected the four most abundant sagebrush breeding species (Brewer's Sparrow, Green-tailed Towhee, Sage Thrasher and Spotted Towhee) that also nested exclusively in sagebrush

as representative of our sagebrush nesting species. We selected the four most abundant pinyon breeding species (Black-throated Gray Warbler, Chipping Sparrow, Cassin's Finch and Juniper Titmouse) that also nested exclusively in pinyon or juniper as representative of our pinyon nesting species.

In order to assess sites with an even distribution of pinyon densities (including sites in which no pinyon or juniper were present), we used detections from 19 point count stations at Rancheria Gulch in addition to 8 other locations derived from a separate point count study in the southern Bodie Hills (see Heath 2005). We calculated the number of detections of each of the eight species within 100m of point count locations across 2 visits at each of the 27 point count locations. Because we only visited RACU points once, we left detections from those points out of the analysis. We summed detections from the four sagebrush species and detections from the four pinyon species into one sagebrush species variable and one pinyon species variable respectively.

We log-transformed sagebrush species detections, to normalize residuals. To avoid our inability to log-transform zeros, we added 1 to all sagebrush species detections. [Models built with sagebrush species detections were significant whether or not we log-transformed the variable or added 1 to the data, but non-transformed variables did not pass Skewness/Kurtosis tests]. We then built simple linear regression models with sagebrush species detections (+ 1, log-transformed) or pinyon species detections as the independent variable and pinyon density index as the explanatory variable. To account for possible non-independence between points within the same transect grouping of 3 – 4 points, we clustered data by transect and calculated robust standard errors using the Huber-White sandwich estimator.

Residuals from both models passed Skewness/Kurtosis tests for normality ($P>0.05$). Statistical calculations were performed using Stata 8.0 (Stata Corps. 2003). Significance was assumed at $P < 0.05$.

RESULTS AND DISCUSSION

Bird species composition and breeding status

We documented and determined breeding status for a total of 73 species on the treatment and control plots combined, with 71 species documented on the treatment plots and 57 species documented on the control plots (Appendix C). Surveys of the control plots did not start until June 3rd, after most of the transients and migrants had already passed through. In 2006, all surveys will start during the first week of May.

Special status species

We detected 8 species that occur on one or more of the following lists: California Department of Fish and Game Special Animals (CDFG SA; CDFG 2005), California Bird Species of Special Concern (CDFG and PRBO 2005), USFWS Birds of Conservation Concern for the Great Basin Conservation Region (USFWS 2002), or the World Conservation Union Special Survival Commission Red List (CDFG 2005; Table 3). We did not detect any state or federal threatened or endangered species, or any California BLM sensitive species. We will submit all CDFG SA species detected during 2005 to CDFG's Natural Diversity Database by December of 2006.

Table 3. Listed species detected at Rancheria Gulch, 2005. Scientific names listed in Appendix C. TL = species listed specifically for this time or location (r = rookery, n = nesting, c = colony, w = wintering, u = unspecified).

Common Name	TL	CDFG SA	CDFG BSSC	USFWS BCC BCR 9	IUCN
Golden Eagle	nw	X		X	X
California Gull	nc	X			X
Olive-sided Flycatcher	n	X	2nd		X
Loggerhead Shrike	n	X	2nd	X	X
Yellow Warbler	n	X	2nd		X
Chipping Sparrow	n	X			X
Brewer's Sparrow	n	X		X	X
Sage Sparrow	u			X	

CDFG SA = CDFG Special Animals, IUCN = The World Conservation Union Special Survival Commission Red List (CDFG 2005); CA BSSC = California Bird Species of Special Concern draft list, 2005 and priority # (CDFG & PRBO 2005); USFWS BCC BCR9 = U.S. Fish and Wildlife Service Birds of Conservation Concern, Great Basin Bird Conservation Region (9, USFWS 2002).

Golden Eagle. We detected two adults flying low over the treatment plots on July 4th.

California Gull. Detected soaring high overhead on most days, coming from nearby nesting colonies on the islands of Mono Lake.

Olive-sided Flycatcher. We detected a single individual on May 9, singing on the treatment plots and an individual June 15 on the control plots.

Loggerhead Shrike. Detected on several dates throughout the study period in sagebrush habitat adjacent to treatment plots, and within a treatment plot on July 15.

Yellow Warbler. We detected transient individuals May 23, 24 and June 3 on both the treatment and control plots. This species breeds in riparian habitat throughout the Mono Basin (Heath and Ballard 2003).

Chipping Sparrow. We found nests for Chipping Sparrow on both the treatment and control plots. One nest was placed in Utah juniper and the other in pinyon pine. Both nests fledged young. Chipping Sparrows were seen regularly throughout the breeding season.

Brewer's Sparrow. We found Brewer's Sparrow nests on both the treatment and control plots. Both nests were placed in big sagebrush (*Artimisia tridentata*) and each fledged Brewer's Sparrow young. We detected this species every day throughout the breeding season.

Sage Sparrow. We detected Sage Sparrows just off the treatment plots during nearly every census, but they did not hold territories within the plot boundaries. In July we observed adults with fledglings on the plots - probably representing family groups that bred off plot but moved on plot after fledging occurred.

<u>California Partners In Flight Bird Conservation Plan focal species</u>

We detected 9 sagebrush, 6 coniferous forest and 1 grassland California Partners In Flight (CalPIF) Bird Conservation Plan focal species within the study area (Table 4). Focal species are not necessarily sensitive or of concern, but are listed under the assumption that if a landscape is managed to meet the focal species' needs, other species will benefit. Several of the focal species are also still relatively common enough in California to provide adequate sample sizes for trend monitoring, determining habitat relationships or estimating demographic parameters – all factors that can assist

in the management of healthy bird populations (Chase and Geupel 2005, CalPIF 2000, CalPIF 2002, CalPIF 2005).

Breeding status of the focal species was submitted for inclusion into the CalPIF statewide database and in the SBCN regional database to assist in documenting the most current breeding distribution for these species. Distribution maps for the focal species are periodically updated by CalPIF and SBCN in order to incorporate the most current data. See http://www.prbo.org/calpif/livemaps.html for the most current and interactive California distribution maps for all CalPIF grassland and coniferous forest focal species and http://cain.nbii.gov/prbo/sbcn/ for sagebrush focal species. View http://cain.nbii.gov/prbo/calpifmap/ and http://cain.nbii.gov/prbo/sbcn/ for the study site databases in which Rancheria Gulch has been included.

Table 4. California Partners In Flight sagebrush, coniferous forest or grassland Bird Conservation Plan focal species detected within the study area, 2005.

Common Name	Sagebrush	Coniferous Forest	Grassland
Olive-sided Flycatcher		X	
Gray Flycatcher	X		
Loggerhead Shrike	X		
Juniper Titmouse	X		
Red-breasted Nuthatch		X	
Sage Thrasher	X		
Black-throated Gray Warbler		X	
MacGillivray's Warbler		X	
Western Tanager		X	
Green-tailed Towhee	X		
Brewer's Sparrow	X		
Vesper Sparrow	X		
Sage Sparrow	X		
Dark-eyed Junco		X	
Western Meadowlark	X		X

CalPIF 2000, CalPIF 2002, CalPIF 2005

Breeding species territory density and relative abundance

The densest breeding species on both treatment and control plots were Green-tailed Towhees and Blue-gray Gnatcatchers (Table 5). Other species densities were low. Overall, 12 and 16 species held territories on the treatment and control plots respectively.

Table 5. Number of territories per hectare for territorial birds, by plot (densities rounded to nearest hundredth of a hectare), and nest type, at Rancheria Gulch, 2005.

Species	Nest Type	Number Territories/ha	
		Treatment Plots	Control Plots
Mourning Dove	saucer	*	*
Common Nighthawk	no nest	*	*
Broad-tailed Hummingbird	cup	0.00	0.02
Gray Flycatcher	cup	0.00	0.02
Cassin's Vireo	cup	0.00	0.01
Mountain Chickadee	cavity	0.05	0.08
Juniper Titmouse	cavity	0.03	0.01
Bushtit	pendant	0.00	0.04
Blue-gray Gnatcatcher	cup	0.15	0.19
Black-throated Gray Warbler	cup	0.01	0.05
Western Tanager	cup	0.01	0.04
Green-tailed Towhee	cup	0.22	0.13
Spotted Towhee	cup	0.08	0.05
Chipping Sparrow	cup	0.02	0.04
Brewer's Sparrow	cup	0.12	0.11
Vesper Sparrow	cup	0.01	0.00
Cassin's Finch	cup	*	*
Lesser Goldfinch	cup	0.00	0.02
Territorial density for all species combined:		0.69	0.78

* Number of territories not determined (species was not territorial, held loose territories, or was colonial).

Green-tailed Towhees, Brewer's Sparrows, Spotted Towhees and Blue-gray Gnatcatchers were the most abundant species detected by point counts on Treatment plots, while Green-tailed Towhees, Brewer's Sparrows, Blue-gray Gnatcatchers and Mountain Chickadees were the most detected species on Control plots (Table 6).

Table 6. Total number of detections within 100m and summed over two visits at 8 treatment and 8 control point count stations, at Rancheria Gulch, 2005.

Species	Treatment	Control
Morning Dove	0	2
Western Wood-Peewee	1	2
Gray Flycatcher	2	2
Cassin's Vireo	1	3
Stellar's Jay	0	1
Mountain Chickadee	3	9
Juniper Titmouse	1	1
Bushtit	0	1
White-breasted Nuthatch	0	3
Blue-gray Gnatcatcher	10	13
Mountain Bluebird	0	2
American Robin	0	2
Sage Thrasher	1	0
Black-throated Gray Warbler	0	8
Wilson's Warbler	1	0
Western Tanager	0	4
Green-tailed Towhee	20	9
Spotted Towhee	14	8
Chipping Sparrow	6	2
Brewer's Sparrow	16	10
Oregon Junco	0	1
Brown-headed Cowbird	4	2
Cassin's Finch	5	6
House Finch	1	4
Lesser Goldfinch	0	1

Use of the study area by sagebrush obligate and pinyon associated species

While many species use sagebrush to some degree, four species are considered sagebrush obligates (Sage Thrasher, Sage Sparrow, Brewer's Sparrow, Greater Sage-Grouse; Paige and Ritter 1999, CalPIF 2005). We confirmed breeding on the treatment plots for only the Brewer's Sparrow. No other sagebrush-obligates were territorial on the plots. However, both Sage Thrashers and Sage Sparrows were observed on the plots

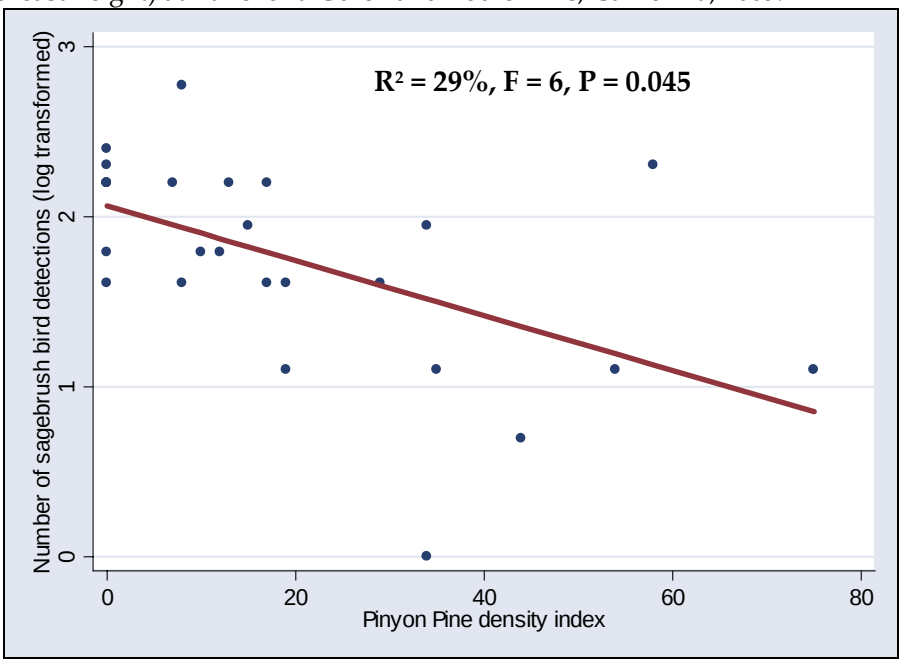
with fledglings in July. Both of these species bred nearby in the sagebrush habitat south of the plots. Greater Sage-Grouse were never detected on the plots. However, there was a female documented to be nesting ca. 1.5 km west of the treatment plots (Barbaree (USGS), pers. comm.).

Juniper Titmouse, Black-throated Gray Warbler, Cassin's Vireo and Pinyon Jay are closely associated with pinyon woodlands in the Mono Basin (Gaines 1992). We found nests for both the Juniper Titmouse and Black-throated Gray Warblers and observed Pinyon Jay fledglings within the study area. We recorded one Cassin's Vireo territory on our Control Plots and heard singing individuals upslope from our plots throughout the season. Gaines (1992) reported that Black-throated Gray Warblers "shun pure pinyon stands" and nest primarily in mixed pinyon and juniper groves. However our sites were almost pure pinyon stands: only 1 of 508 trees counted for our tree density index were juniper.

Sagebrush and pinyon breeding birds in relation to pinyon pine density

We found a negative linear relationship between sagebrush breeding birds and our index of pinyon density, whereas fewer sagebrush breeding birds were detected at sites with higher pinyon tree densities (Figure 3). This relationship was expected, and has

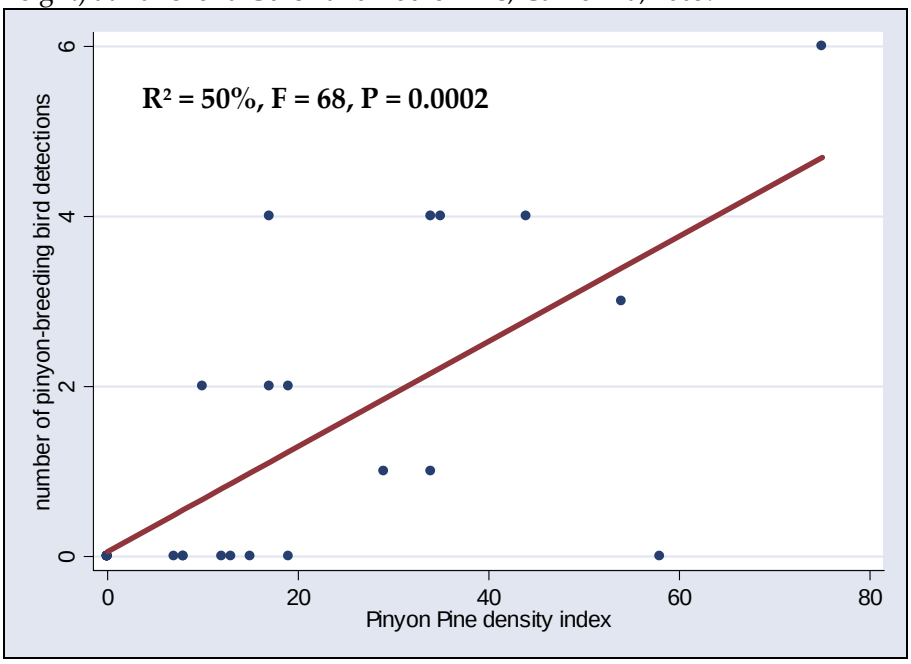
Figure 3. Number of sagebrush breeding bird species detections (+1, log transformed; Brewer's Sparrow, Sage Thrasher, Green-tailed Towhee, Spotted Towhee) in relation to pinyon pine density index (# trees > 8cm diameter at breast height) at Rancheria Gulch and Bodie Hills, California, 2005.



also been demonstrated in Western juniper habitats of Lassen County, California (CalPIF 2005, Knick et al. 2005).

We found the opposite relationship for pinyon nesting birds, where more pinyon nesting individuals were detected at sites with higher pinyon tree densities (Figure 4). This has also been found for Blue-gray Gnatcatchers, Mountain Chickadees and Oregon Juncos in Western Juniper habitats of Lassen County, California (CalPIF 2005).

Figure 4. Number of pinyon breeding bird species detections (Black-throated Gray Warbler, Juniper Titmouse, Chipping Sparrow, Cassin's Finch) in relation to Pinyon Pine density index (# trees > 8cm diameter at breast height) at Rancheria Gulch and Bodie Hills, California, 2005.



Nest Success

Proportional Success for all species

We found 25 nests for 10 species on the treatment plots and 31 nests for 12 species on the control plots (Table 7). Proportional nest success was 43% for both plots combined and 35% and 50% for treatment and control plots respectively. Nest sample sizes were low compared to number of territories. This was largely due to changes in protocol during early season, resulting in a late start for nest searching. We expect higher sample sizes for nests in 2006 as we will start nest searching earlier and will double the nest searching personnel.

Table 7. Total number of nests found, number of nests observed with at least one egg or young and for which outcomes were determined (in parenthesis), and proportion successful for treatment, control and combined plots at Rancheria Gulch, 2005.

	Treatment Plots		Control Plots		Plots Combined	
Species	Number of Nests	Proportion successful	Number of Nests	Proportion successful	Number of Nests	Proportion successful
Mourning Dove	1	0.00	1	0.00	2	0.00
Common Nighthawk	1	0.00	1	1.00	2	0.50
Mountain Chickadee	2	0.50	3	1.00	5	0.80
Juniper Titmouse	1	1.00	~	~	1	1.00
Blue-gray Gnatcatcher	6 (5)	0.20	16 (11)	0.00	22 (16)	0.06
Black-throated Gray Warbler	1	0.00	1	1.00	2	0.50
Western Tanager	~	~	1	1.00	1	1.00
Green-tailed Towhee	6	0.50	1	0.00	7	0.43
Spotted Towhee	~	~	1	1.00	1	1.00
Chipping Sparrow	1	1.00	1	1.00	2	1.00
Brewer's Sparrow	1	1.00	1	1.00	2	1.00
Cassin's Finch	5 (4)	0.00	3	1.00	8 (7)	0.43
Lesser Goldfinch	~	~	1	1.00	1	1.00
Total	25 (23)	0.35	31 (26)	0.50	56 (49)	0.43

Mayfield nest survival for select species

Total Mayfield nest survival for Blue-gray Gnatcatchers was very poor (7 %), while nest survival for Green-tailed Towhees (30%) and Cassin's Finches (25%) was moderate (Table 8).

Table 8. Mayfield nest survival for selected species; daily nest survival, standard error, and total nest survival, at Rancheria Gulch, 2005.

Species	Number of Nests	Daily Nest Survival	SE	Total Nest Survival
Blue-gray Gnatcatcher	17	0.909	0.022	7 %
Green-tailed Towhee	7	0.955	0.022	30 %
Cassin's Finch	7	0.951	0.024	25 %

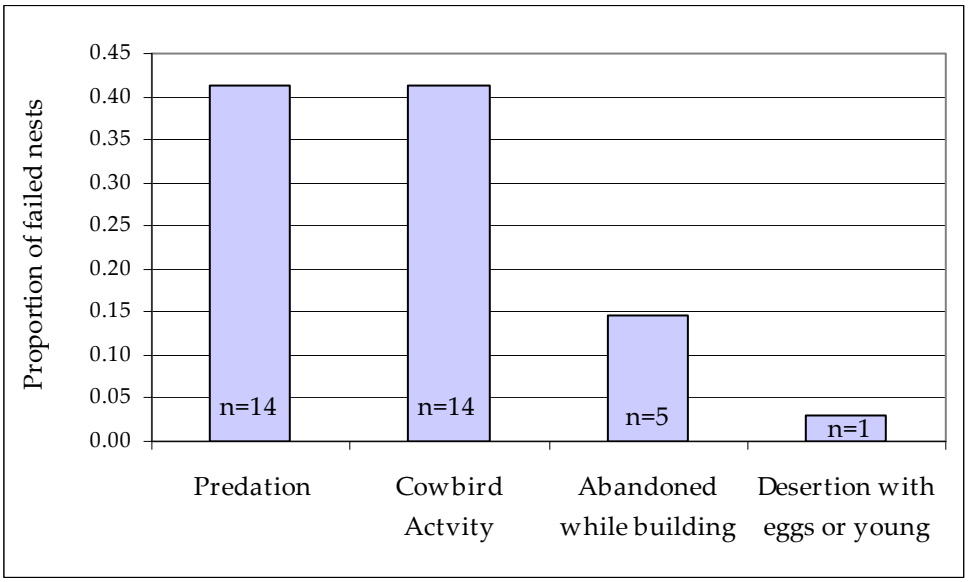
Factors Influencing Nest Success

Nest Mortality

Nest predation and Brown-headed Cowbird activity were equally responsible for the majority of nest failures, accounting for 41% each (Figure 5). This result is very different

from what Heath et al. (2004) found at Mono Basin riparian study plots, where predation accounted for most nest mortality in all years. However, only one species, the Blue-gray Gnatcatcher, accounted for nearly all parasitism events (see below).

Figure 5: Mortality factors for all failed nests at all plots combined, Rancheria Gulch, 2005.

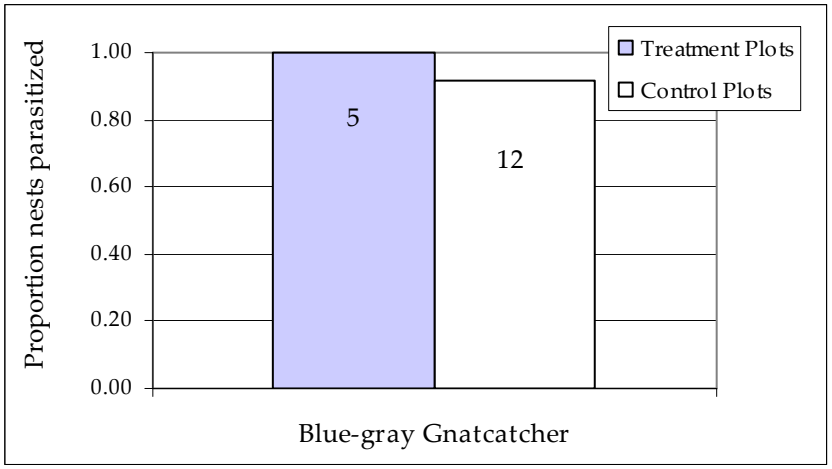


Brown-headed Cowbirds

For both plots combined, 44% of potential host species' nests were parasitized by Brown-headed Cowbirds. However, only two species were observed with parasitized nests: Blue-gray Gnatcatchers and Black-throated Gray Warblers. Of the seventeen Blue-gray Gnatcatcher nests found, all but one was parasitized (94%). The non-parasitized gnatcatcher nest failed due to predation. The one Blue-gray Gnatcatcher nest that successfully fledged host young was parasitized with a cowbird egg that never hatched.

Blue-gray Gnatcatchers were parasitized nearly equally on treatment and control plots (Figure 6). One of two Black-throated Gray Warbler nests was parasitized.

Figure 6. Parasitism rates for Blue-gray Gnatcatcher by plot. Nest numbers shown on bars.

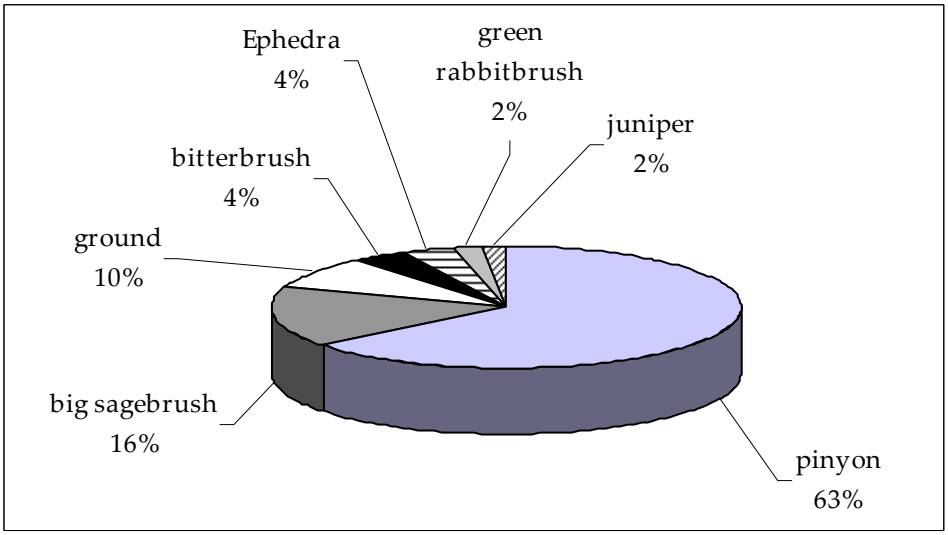


Nest Predators

Potential reptilian and mammalian nest predators observed on the plots included mule deer (*Odocoileus hemionus*), Pronghorn (*Antilocapra americana*), *Sceloporus* lizards, and rattlesnakes (*Crotalus spp.*). Potential avian predators included Common Raven, Clark's Nutcracker, Western Scrub-Jay, Steller's Jay, Pinyon Jay, American Magpie, American Kestrel, Red-tailed Hawk, Golden Eagle, Bewick's Wren, House Wren, California Gull, Great-horned Owl and Barn Owl. We did not observe any direct predation events. However, a fresh owl primary was found directly beneath a predated Cassin's Finch nest, along with numerous adult Cassin's Finch feathers.

Nest Substrate

Figure 7: Nesting substrate for all nests found on treatment and control plots combined, Rancheria Gulch, 2005.

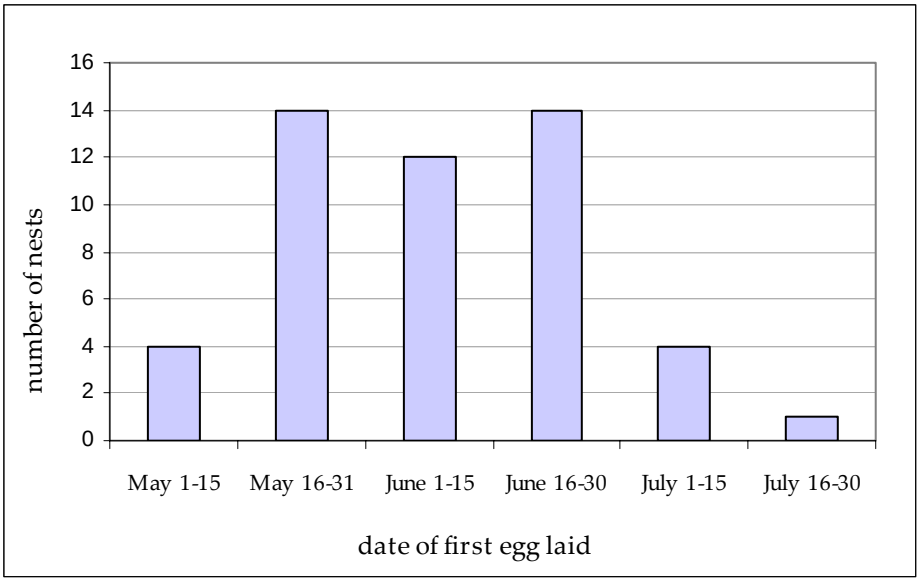


Birds used a variety of plants as nesting substrate, with pinyon pine as the most common for nests that we found (Figure 7). The high proportion of nests found in pinyon is mostly attributed to the high number of Blue-gray Gnatcatcher nests found (n = 22). Blue-gray Gnatcatchers nested in Pinyon in all but two cases. Ground nests were concealed by bitterbrush (n=2), big sagebrush (n=1), pinyon (n=1), and green rabbitbrush (*Chrysothamnus viscidiflorus*, n=1).

Nesting Phenology

Nest initiation ranged from early May until the third week of July, and peaked evenly from mid-May until the end of June (Figure 8). Juniper Titmice and Mountain Chickadees were the earliest nesters (first egg dates May 4th and May 5th, respectively), while Common Nighthawks and Blue-gray Gnatcatchers were the latest nesters (first egg dates July 5th and July 17th, respectively). The latest fledgling date was August 5. Based on first egg dates of the latest Common Nighthawk nest (whose nests did not succeed to fledgling), fledging dates could be as late as mid to late August.

Figure 8. Dates of first egg laid for all nests found on treatment and control plots combined, Rancheria Gulch, 2005.



The nesting cycle begins prior to egg laying, when pair bonding, nest location choices and nest building occur. Songbirds will take at least a month after the first egg is laid to fledge and care for young to independence. The nesting season at Rancheria Gulch should be considered to encompass the final week of April through September 1. We recommend pinyon thinning treatments be avoided during this time to minimize disturbance of breeding birds.

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Appendix A. Point Count Locations, UTM Nad83, Zone 11, Rancheria Gulch, 2005.

Garmin_ID	UTMe	UTMn
RACA01	315571.8	4216666
RACA02	315700.5	4216403
RACA03	316012.8	4216367
RACA04	316036.1	4216107
RACB01	316065.6	4217249
RACB02	315964.5	4217003
RACB03	316332.5	4216662
RACB04	316267	4216993
RACU01	314290.2	4217900
RACU02	314148.1	4218108
RACU03	314355.1	4218248
RATA01	314681.9	4215629
RATA02	314883.3	4215393
RATA03	314817.8	4215144
RATA04	314502.2	4215450
RATB01	314100.8	4216306
RATB02	314175.5	4216587
RATB03	314526.1	4216663
RATB04	314634.7	4216430
RATU02	313715.3	4217677
RATU03	314009.2	4217413
RATU01	313448.6	4217811

Appendix B. PRBO site registration and modified relevé form, Rancheria Gulch, 2005.

State	Region	Station	Point	Month	Day	Year (20__)

Surveyor's Name:

(Y / N): road ______ fence ______ utility line______ rock outcrop _______ water – running _____ -standing _____ shrub patchiness index_______ Habitat1__________ Hab1%_______ Habitat2________ Hab2%_______
shrub layers __________ # herb layers_________ cryptobiotic crust ___________ cheatgrass __________

TREES: Record number of trees, by species, within four, 100m X 1m transect in each DBH category.

Species	seedling	saplings	8-23 cm	23-35 cm	35-70 cm	>70cm	Snags 8-23 cm	snags 23-35cm	snags > 35 cm

Site/Habitat description & Notes (ie. Big sagebrush / bitterbrush mix with cheatgrass and poa understory**):**
Slope: **Aspect:**
Water Development Y / N Dist:
Distance to change in habitat (m) and type:

ABSOLUTE % COVER: $\leq$100m radius of point. For true herb, shrub, and tree classifications (e.g. not by layer / height class).

TREE	SHRUB	HERB	CRYPTO	LITTER	ROAD / TRAIL	ROCK	BARE

HERB RICHNESS	SHRUB RICHNESS	TREE RICHNESS

BY-SPECIES % RELATIVE COVER: $\leq$100m radius of point. Within true herb, shrub, and tree classifications.

Sublayer		Cover	Species
T	1		

Sublayer		Cover	Species
S	1		

Sublayer		Cover	Species
H	1		

Appendix C. Breeding status for all species detected on study plots at Rancheria Gulch, 2005. Treatment plots surveyed May 8th to August 15th. Control Plots surveyed June 3rd to August 15th. Confirmed Breeding- 1; Possible Breeding- 2; Probable Breeding- 3; No Evidence of Breeding / Transient / Migrant- 0; Not Detected- ~.

Common Name	Latin Name	Treatment Plots	Control Plots
Mountain Quail	*Oreortyx pictus*	0	~
Turkey Vulture	*Cathartes aura*	0	0
Red-tailed Hawk	*Buteo jamaicensis*	0	0
Golden Eagle	*Aquila chrysaetos*	0	~
American Kestrel	*Falco sparverius*	0	0
California Gull	*Larus californicus*	0	0
Mourning Dove	*Zenaida macroura*	1	1
Barn Owl	*Tyto alba*	0	~
Great Horned Owl	*Bubo virginianus*	0	0
Common Nighthawk	*Chordeiles minor*	1	1
Common Poorwill	*Phalaenoptilus nuttallii*	2	2
Anna's Hummingbird	*Calypte anna*	0	~
Broad-tailed Hummingbird	*Selasphorus platycercus*	2	1
Hairy Woodpecker	*Picoides villosus*	0	0
Northern "Red-shafted" Flicker	*Colaptes auratus*	0	0
Olive-sided Flycatcher	*Contopus cooperi*	0	~
Western Wood-Pewee	*Contopus sordidulus*	0	0
Hammond's Flycatcher	*Empidonax hammondii*	0	~
Gray Flycatcher	*Empidonax wrightii*	2	2
Dusky Flycatcher	*Empidonax oberholseri*	0	0
Ash-throated Flycatcher	*Myiarchus cinerascens*	~	0
Loggerhead Shrike	*Lanius ludovicianus*	2	2
Plumbeous Vireo	*Vireo plumbeus*	3	2
Cassin's Vireo	*Vireo cassinii*	2	3
Warbling Vireo	*Vireo gilvus*	0	~
Steller's Jay	*Cyanocitta stelleri*	0	0
Western Scrub-Jay	*Aphelocoma californica*	0	0
Pinyon Jay	*Gymnorhinus cyanocephalus*	0	1
Clark's Nutcracker	*Nucifraga columbiana*	0	0
American Magpie	*Pica hudsonia*	0	~
Common Raven	*Corvus corax*	0	0
Violet-green Swallow	*Tachycineta thalassina*	0	0
Cliff Swallow	*Petrochelidon pyrrhonota*	0	0

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Appendix C - continued. Breeding status for all species detected on study plots at Rancheria Gulch, 2005. Treatment plots surveyed May 8th to August 15th. Control Plots surveyed June 3rd to August 15th. Confirmed Breeding- 1; Possible Breeding- 2; Probable Breeding- 3; No Evidence of Breeding / Transient / Migrant- 0; Not Detected- ~.

Common Name	Latin Name	Treatment Plots	Control Plots
Barn Swallow	*Hirundo rustica*	0	~
Mountain Chickadee	*Poecile gambeli*	1	1
Juniper Titmouse	*Baeolophus ridgwayi*	1	1
Bushtit	*Psaltriparus minimus*	2	1
Red-breasted Nuthatch	*Sitta canadensis*	0	~
White-breasted Nuthatch	*Sitta carolinensis*	0	2
Rock Wren	*Salpinctes obsoletus*	0	0
Bewick's Wren	*Thryomanes bewickii*	~	1
House Wren	*Troglodytes aedon*	0	0
Ruby-crowned Kinglet	*Regulus calendula*	0	0
Blue-gray Gnatcatcher	*Polioptila caerulea*	1	1
Mountain Bluebird	*Sialia currucoides*	0	0
American Robin	*Turdus migratorius*	0	0
Sage Thrasher	*Oreoscoptes montanus*	0	0
Yellow Warbler	*Dendroica petechia*	0	0
Yellow-rumped Warbler	*Dendroica coronata*	0	0
Black-throated Gray Warbler	*Dendroica nigrecens*	1	1
Townsend's Warbler	*Dendroica townsendi*	0	0
MacGillivray's Warbler	*Oporornis tolmiei*	0	~
Wilson's Warbler	*Wilsonia pusilla*	0	0
Western Tanager	*Piranga ludoviciana*	1	1
Green-tailed Towhee	*Pipilo chlorurus*	1	1
Spotted Towhee	*Pipilo maculatus*	1	1
Chipping Sparrow	*Spizella passerina*	1	1
Brewer's Sparrow	*Spizella breweri*	1	1
Vesper Sparrow	*Pooecetes gramineus*	1	0
Sage Sparrow	*Amphispiza belli*	2	0
White-crowned Sparrow	*Zonotrichia leucophrys*	0	~
"Oregon" Dark-eyed Junco	*Junco hyemalis thurberi*	2	2
Black-headed Grosbeak	*Pheucticus melanocephalus*	2	0
Lazuli Bunting	*Passerina amoena*	0	~
Western Meadowlark	*Sturnella neglecta*	0	~
Brewer's Blackbird	*Euphagus cyanocephalus*	0	0

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Appendix C - continued. Breeding status for all species detected on study plots at Rancheria Gulch, 2005. Treatment plots surveyed May 8th to August 15th. Control Plots surveyed June 3rd to August 15th. Confirmed Breeding- 1; Possible Breeding- 2; Probable Breeding- 3; No Evidence of Breeding / Transient / Migrant- 0; Not Detected- ~.

Common Name	Latin Name	Treatment Plots	Control Plots
Brown-headed Cowbird	*Molothrus ater*	1	1
Bullock's Oriole	*Icterus bullockii*	0	~
Cassin's Finch	*Carpodacus cassinii*	1	1
House Finch	*Carpodacus mexicanus*	0	2
Pine Siskin	*Carduelis pinus*	0	~
Lesser Goldfinch	*Carduelis psaltria*	2	1
Evening Grosbeak	*Coccothraustes vespertinus*	0	~
Total species detected	All plots combined: 73	71	57