

Comprehensive Thrasher Surveys in the California Mojave Desert

2021 Season Summary Report to the Bureau of Land Management



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Table of Contents

Introduction and Background.....	2
Methods.....	3
Site Selection.....	3
Area-search Survey Protocol.....	5
Integrated Monitoring of Bird Conservation Regions (IMBCR) test protocol.....	6
Habitat Evaluation Protocol.....	6
Data Entry and Management.....	7
Results.....	9
Area-searches.....	9
Nesting Behavior.....	9
IMBCR	10
Dome Fire	10
Regional Results by BLM District.....	13
Needles District.....	13
Barstow District.....	15
Ridgecrest and Bakersfield Districts and Death Valley NP.....	16
Discussion	17
Acknowledgements.....	18
Literature Cited.....	20
Appendices.....	23
Appendix A: Example Datasheets.....	23
Appendix B: Plot locations.....	26
Appendix C: Site Driving Directions.....	28
Appendix D: Bird species and numbers of individuals detected	33

Introduction and Background

The Desert Thrasher Working Group (DTWG) was formed in 2011 with the goal of addressing knowledge gaps to advance effective conservation action by land managers. Specifically, the group designed standardized inventory, monitoring, and centralized data management protocols that address basic needs for driving conservation of these species forward (GBBO 2019, BADC 2020). Of particular concern are Bendire's Thrasher (BETH, *Toxostoma bendirei*) and LeConte's Thrasher (LCTH, *Toxostoma lecontei*) that have been identified among the fastest declining bird species of arid lands (NABCI 2014). Both BETH and LCTH have been recently listed by Partners in Flight as 'Red Watch List' species – species with an extremely high vulnerability to extinction due to multiple factors – with a need to recover populations well above current levels (Rosenberg et al. 2016). From 1970 to 2014, LCTH lost 67% of its global population and is estimated to decline by an additional 50% over the next 27 years (i.e., its 'half-life'; Rosenberg et al. 2016). BETH has been found to be at greater risk, with a global population loss of 86% over the same time period and a 'half-life' of only 18 years (Rosenberg et al. 2016). The California Bureau of Land Management (BLM) has listed BETH as a sensitive species and both thrasher species are again listed by the U.S. Fish and Wildlife Service (USFWS) updated Birds of Conservation Concern 2021 (USFWS 2021). The Sonoran Joint Venture (SJVC 2006) designates both as species of continental concern requiring management attention. In California, BETH is considered a California State Bird Species of Special Concern throughout its range, whereas LCTH has this designation for the San Joaquin population only (Shuford and Gardali 2008, CDFW 2018).

Long-term monitoring programs such as Breeding Bird Survey (BBS) report range-wide population declines for both thrasher species (Sauer et al. 2017). However, conventional bird monitoring protocols such as point count surveys (including BBS and Integrated Monitoring in Bird Conservation Regions (IMBCR: Pavlacky et al. 2017) do not effectively sample desert thrasher populations for a variety of reasons including: low densities, secretive behavior, ventriloquial vocalizations, and early breeding season phenology (Bear Sutton et al. 2017, Weigand and Fitton 2008). To fill resultant data gaps, the DTWG developed and implemented a standardized area search protocol targeted at desert thrashers that allows observers to detect secretive non-vocal birds (McCreedy et al., in prep.). Sites were randomly selected throughout the study area, which included all of the known U.S. breeding ranges of both thrashers, stratified by likelihood of thrasher occupancy using MaxEnt models (GBBO 2019).

Our specific goals in 2021 were to: 1) survey sites in California where historical data and our previous surveys had found BETH recently and to monitor those populations for persistence; 2) survey sites with recent historical sightings along the western edge of their range in the Mojave NP to monitor for range contraction; 3) survey sites within, along and around the recent (August 2020) Dome Fire footprint to evaluate the fire's effects on BETH and habitat within the core of California's population; and 4) survey sites in the western Mojave Desert where we have detected LCTH and monitor their populations. 5) Test IMBCR

methodology (Pavlacky et al. 2017), and its effectiveness at detecting tharshers on a subset of arera search survey sites.

Methods

Site Selection

In 2021, we focused our survey site selection within the Mojave Desert at sites where we have had recent sightings of BETH and LCTH on survey. Of the 46 sites (2-9 plots per site) we have surveyed from 2017-2019, we selected 18 sites that had at least one detection of BETH or LCTH. Eight of these sites were within the Mojave National Preserve, while others were located outside the preserve to the north and south where we have also detected BETH, and several were located in the western Mojave Desert, where we had detected LCTH. The sites in the western Mojave Desert are within the BETH Areas of Critical Environmental Concern (ACEC), and our results may assist the BLM with habitat protection, restoration, and management decisions (pers. comm., C. Otahal). In addition to the sites, we chose to resurvey, we also selected nine new sites (all within the Mojave N.P.), and we extended our site at the Chemehuevi Wash. For sites not previously surveyed, we gridded UTM coordinates for nine 300 m x 300 m plots, with all plots at least 300 m apart. In the field, we selected 2 to 9 plots of the total gridded for the actual survey. At each site, we selected plots that we believed to have the highest habitat suitability for BETH, which meant an experienced observer did an on-site assessment of the presence of appropriate vegetation (e.g., Joshua tree, cholla, yucca) and slope (i.e., not too steep).

To increase our coverage of the upper reaches of the Chemehuevi Wash, we added five plots which straddle Turtle Mountain Road, two plots downstream and three plots upstream. The thick stands of blue palo verde (*Parkinsonia florida*) along the lower stretches of the Chemehuevi Wash (between Hwy 95 and the Colorado River) have many historical sightings of BETH from this project, eBird sightings, and from previous Point Blue projects showing that BETH breed there nearly annually (McCreedy et al. 2015). However, bird data from the upper reaches of the wash were limited to just a few plots on this project which detected two individuals in March of 2017 just upstream of the bridge that crosses Hwy 95. The palo verde coverage diminishes as the plots go upstream, so this variable could help our models better predict the occurrence of BETH in this habitat.

We established three sites in the western region of the Mojave N.P. where there were historical occurrences of BETH, one in Cottonwood Basin of the Granite Mountains Reserve, and the other two along Kelbaker Road in Joshua tree habitat three km east of the Aiken Mine Road intersection. In the 1980's, surveys for BETH in the western Mojave Desert found small, isolated populations at a few scattered locations in suitable habitat (England and Laudenslayer 1989). In 2001, Jones and Stokes conducted surveys at many of the same locations but found only two

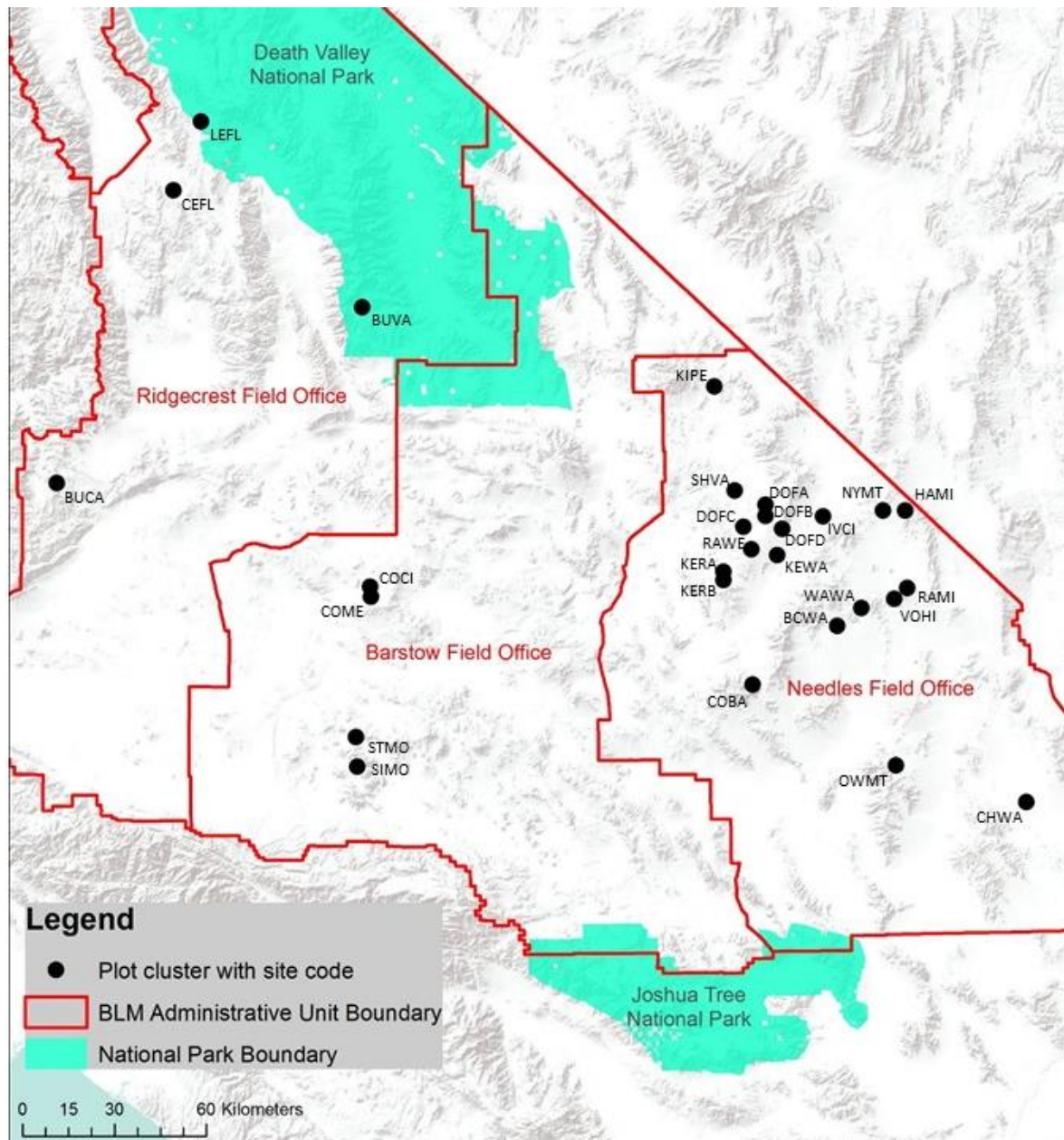
individuals at just one of the western sites (i.e., Copper City; Jones and Stokes 2001). Sterling (2008) surmised the difference in detectability may be related to differences in rainfall between the wet years of the 1980 surveys and the drought conditions of the 2001 surveys. In 2019, we surveyed many of these sites again during a year with above average precipitation but did not confirm any detections in the western Mojave. Given the general downward trend in the species' population, it is possible that the lack of recent BETH observations from the western Mojave is due to a range contraction (Tietz et al. 2020). Thus, monitoring sites at the western edge of their current range may help us detect further range contractions.

Two other sites surveyed this year for the first time were located near the Nevada border, one is near the New York Mountains, while the other is in the Castle Mountain National Monument. These were actually established in 2017 but were never surveyed. There is a historical observation from 1976 of five BETH seen approximately 1.5 km southeast of the New York Mountain site, but no recent observations.

In August of 2020, a lightning-caused wildfire, called the Dome Fire, burned 43,273 acres of Joshua tree habitat on Cima Dome. Based on our observations at sites located near the fire in similar habitat and on historical eBird sightings located in the fire footprint, we believed that this was likely the core of the California population. To evaluate the impacts of the wildfire, vegetation loss, and habitat change on BETH, we selected four sites from a total of 12 randomly generated sites, two entirely within the fire footprint and two overlapping the fire's perimeter. These four sites were selected for logistical reasons because they had relatively easy access. All nine plots from each of the four new sites were surveyed at least twice.

In total, we surveyed 176 plots at 27 different sites during the 2021 field season (Fig. 1, Appendices B and C), a 76% increase in the number of plots surveyed compared to 2019. This number includes four sites with 29 plots first surveyed in 2017, eight sites with 44 plots first surveyed in 2018, six sites with 32 plots first surveyed in 2019, and nine sites of 71 plots that Point Blue biologists had never surveyed before.

Figure 1. Plot cluster locations by BLM Field Office Districts in California. Each cluster consists of 2-13 plots that were surveyed in 2021 for Bendire's and LeConte's Thrashers.



Area-search Survey Protocol

Our survey protocol was based and modified (increased size and amount of time) from methods developed by Point Blue for LeConte's Thrasher surveys conducted in the BLM Carrizo Plain National Monument since 2010 (Jongsomjit et al. 2013, 2014; Tietz et al. 2016, DTWG 2018, McCreedy et al., in review). Surveys consisted of a 40-minute area search on each 300 m

x 300 m plot. To maintain a consistent search pattern, the surveyor walked systematically through the plot in transects spaced approximately 50 m apart but were free to pursue individual birds upon detection. We recorded birds only if they were within the plot and within the 40-minute search window. We recorded detections of all avian species, with additional information collected on target species: BETH, LCTH, and Loggerhead Shrike (*Lanius ludovicianus*; LOSH), a Species of Special Concern in California (Humple 2008). Any target species detections that fell outside of the plot area and/or survey timing window were still recorded on a target species datasheet. See Appendix A for an example survey datasheet and target species datasheet. Surveys began on March 12th and continued through May 25th. Plots were visited once (59 plots), twice (110 plots) or three times (7 plots) over the season for a total revisit rate of 1.69.

Integrated Monitoring of Bird Conservation Regions (IMBCR)

In 2021, we conducted IMBCR point counts to compare their effectiveness at detecting thrashers against the plot area searches we have been conducting. Point counts were set up on the same grid system already designed for our area searches, such that we used the corners of the plots so that our points were 300 m apart. At four sites on the Mojave N.P. where we had detected BETH in previous years, we conducted 16 point counts per site. The points counted were in one of the arbitrarily chosen site corners. The four sites were Shadow Valley, Rainbow Wells, Kelso Wash, and Rattlesnake Mine. The surveys were conducted from 28 Apr-2 May, which is generally the peak singing period for most bird species in the Mojave, including BETH. Each point count was six minutes long. Multiple detections of the same individual were noted so a total number of individuals per site could be obtained.

Habitat Evaluation Protocol

To inform relationships between thrasher presence/absence and habitat characteristics, we completed a vegetation survey for each plot used by DTWG research teams across all five states (Arizona, California, Nevada, New Mexico, and Utah; DTWG 2018). These habitat evaluations were conducted once during the season at each plot surveyed for birds that had not been surveyed in a prior year. We used the Point-Center Quarter method (Krebs 1989), in which the plot is divided into quadrants (northeast, southeast, southwest, northwest) extending outward from the center point in the four cardinal directions. We used a rangefinder to measure distances from the center point to each of the following within each quadrant: woody shrubs (<0.5m), shrub/trees (0.5 to 2m), cholla and yucca (>0.5 m), and trees (>2m).

Additionally, we recorded the following for each habitat evaluation:

- 1. Mistletoe density**

Desert Mistletoe (*Phoradendron californicum*) clumps within 50 m of center-point, counted by rounding to the nearest 10 (i.e., 0, 10, 20, 30, etc.)

- 2. Fruit-bearing shrub density**

Count of fruit-bearing shrubs, separated by species, within 50 m of center-point, excluding mistletoe.

3. **Yucca density**

Count of yucca individuals >2 m in height, separated by species, within 100 m of center-point. Joshua trees were counted as trees, not yuccas.

4. **Grass and forbs groundcover**

Proportion of ground covered by grass or forbs along a 50 m transect extending north from plot center-point, separated into native and non-native.

5. **Ground cover composition**

Describes the dominant ground cover within 100 m of the plot center-point, with cover-types defined as boulder, cobble, pebble, sand, silt, or other.

6. **Physical attributes and invasive plant presence**

Describes the presence/absence of various invasive plants and anthropogenic impact from livestock grazing, OHV use, water tanks, rural sprawl, and more. See example datasheet in Appendix A for the full list.

Additionally at our sites in or near the Dome Fire, we collected plot-level habitat data to monitor the fire's effects on thrasher occupancy. These data consisted of an estimate of each plot that was burned and counts of Joshua trees within 100 m of the plot center that were alive (>50% of vegetation green) or dead (<50% of vegetation green). DeFalco et al. (2010) showed that survivorship of Joshua trees declined rapidly after the first year for trees with >30% scorching of above ground vegetation. Hence, it is possible that we slightly overestimated the numbers of live trees on our plots. We compare results from three unburned sites on or near Cima Dome (distances from the fire varied between 0.7 and 7.7 km), two sites on the periphery of the fire, and two sites entirely within the fire.

Data entry and management

All bird and related plot and weather data from the 'Area Search surveys' has been entered and curated in the California Avian Data Center (<http://data.prbo.org/cadc/>), a node of the Avian Knowledge Network (<http://www.avianknowledge.net/>). Additional bird data from sites identified as a Sonoran Joint Venture 'Avicaching Location' (<https://sonoranjv.org/avicaching/>), which overlapped with our area search locations, were also entered into eBird (<https://ebird.org/home>). Checklists of all birds encountered from survey sites and at incidental sightings were entered into eBird. The 'Target species data' for incidental sightings of the three target species (BETH, LCTH, and LOSH) and all plot vegetation data are

currently stored on Point Blue servers for CA and combined with the other participating states (the latter currently residing on Great Basin Bird Observatory servers).

Results

Area-searches

During surveys, we detected 20 adult BETH on 12 plots of 5 sites, 10 adult LCTH on seven plots of six sites, and 24 adult LOSH on 15 plots of 10 sites. In some cases, these may have been the same individuals sighted more than once on repeat visits. Incidentally (either outside of the plot or survey timing window), we detected an additional 57 BETH, 25 LCTH, and 39 LOSH. We prioritized recording incidental sightings in the following order: BETH, LCTH, and LOSH; hence, not every incidental shrike sighting was recorded, which led to the disproportionately low number of incidental sightings for that species. Overall of our area-search surveys, we detected a total of 2,561 individuals of 71 avian species (Appendix D). In addition, we detected 116 individuals of five mammal species: white-tailed antelope squirrel (67), panamint chipmunk (1), desert cottontail (3), black-tailed jackrabbit (43), and coyote (2).

Nesting Behavior

We located nests opportunistically during area-search surveys (Table 1). We found one BETH nest, one LCTH nest, and five LOSH nests. The BETH nest was discovered in a *Yucca brevifolia* on May 5th in the nestling stage, but because the contents could not be checked easily due to the density of the foliage and the observer's presence was illiciting distress calls from the adults, the clutch size could not be determined. On May 16th, a fledgling with a full-grown tail was discovered ~720 m east of the nest accompanied by two adults, one of which was carrying food. The LCTH nest was discovered in a *Yucca schidigera* on March 17th with a chick and an egg. On March 31st, the nest was found to be empty, and although an adult LCTH was seen on the plot, it was apparently not feeding fledglings, thus indicating that the nest may have failed. A total of five LOSH nests were discovered this year, one found on plot STMO6, while the other four were off plot. Two of the LOSH nests were in *Yucca brevifolia*, one was in *Lycium cooperi*, one was in *Yucca schidigera*, and one was in a *Purshia tridentata*. The outcome of these LOSH nests was not determined.

Table 1. Bendire's Thrasher, LeConte's Thrasher, and Loggerhead Shrike nest locations, contents, and substrate. Coordinates in NAD83 Zone 11.

Species	Date found	Nest contents	UTM easting	UTM northing	Site	District	Substrate
BETH	5 May	Nestlings	627502	3912969	Dome Fire A	Needles	<i>Yucca brevifolia</i>
LCTH	17 March	1 egg, 1 nestling	494743	3836333	Stoddard Mountain	Barstow	<i>Yucca schidigera</i>
LOSH	31 March	4 eggs	494321	3836989	Stoddard Mountain	Barstow	<i>Yucca schidigera</i>
LOSH	13 April	building	398103	3916670	Butterbrecht Canyon	Bakersfield	<i>Purshia tridentata</i>
LOSH	27 April	3 eggs	499241	3885981	Copper City	Barstow	<i>Lycium cooperi</i>
LOSH	12 May	5+ nestlings	617907	3917704	Shadow Valley	Needles	<i>Yucca brevifolia</i>
LOSH	14 May	4+ eggs	622999	3898804	Rainbow Wells	Needles	<i>Yucca brevifolia</i>

IMBCR Results

We had ten BETH detections at seven points (eight individuals) at three of the four sites (Table 2). Seven detections were by song, and three were visual detections. Estimated distances to the birds ranged from 43-405 m with a mean of 225.3 m $\pm$ 119.6 (SD). No LCTHs were detected during the point counts.

Table 2. Comparison of BETH detections in 2021 using IMBCR point counts and plot area searches at four sites at the Mojave National Preserve. PC = point count and AS = area search.

Site	PC date	# of PC individuals	Avg PC distance	# AS visits	# AS plots occupied	# incidental AS sightings
SHVA	4/29/2021	3	198.6	2	3	16
RAWE	4/30/2021	4	213.8	2	3	6
KEWA	5/1/2021	1	405.0	2	0	1
RAMI	5/2/2021	0	.	2	0	0

Dome Fire Results

The two sites entirely within the Dome Fire footprint, sites DOFB and DOFD, (Table 3 and Fig. 2) were an average distance of 2.3 km from the fire perimeter. All 18 plots from these two sites had some amount of burn, with an average of 97.5% of each plot burned. Furthermore, these two sites averaged 211 Joshua Trees per plot, with an average of 92.5% of those having been killed by the fire. None of the plots surveyed on these two sites had BETH

detections. However, there was one incidental detection of a bird singing from a Joshua tree (80% burned) 100 meters north of plot 7 on the D site, which was the only plot with a significant sized island of unburned habitat; as I approached the bird, it flushed towards the unburned habitat.

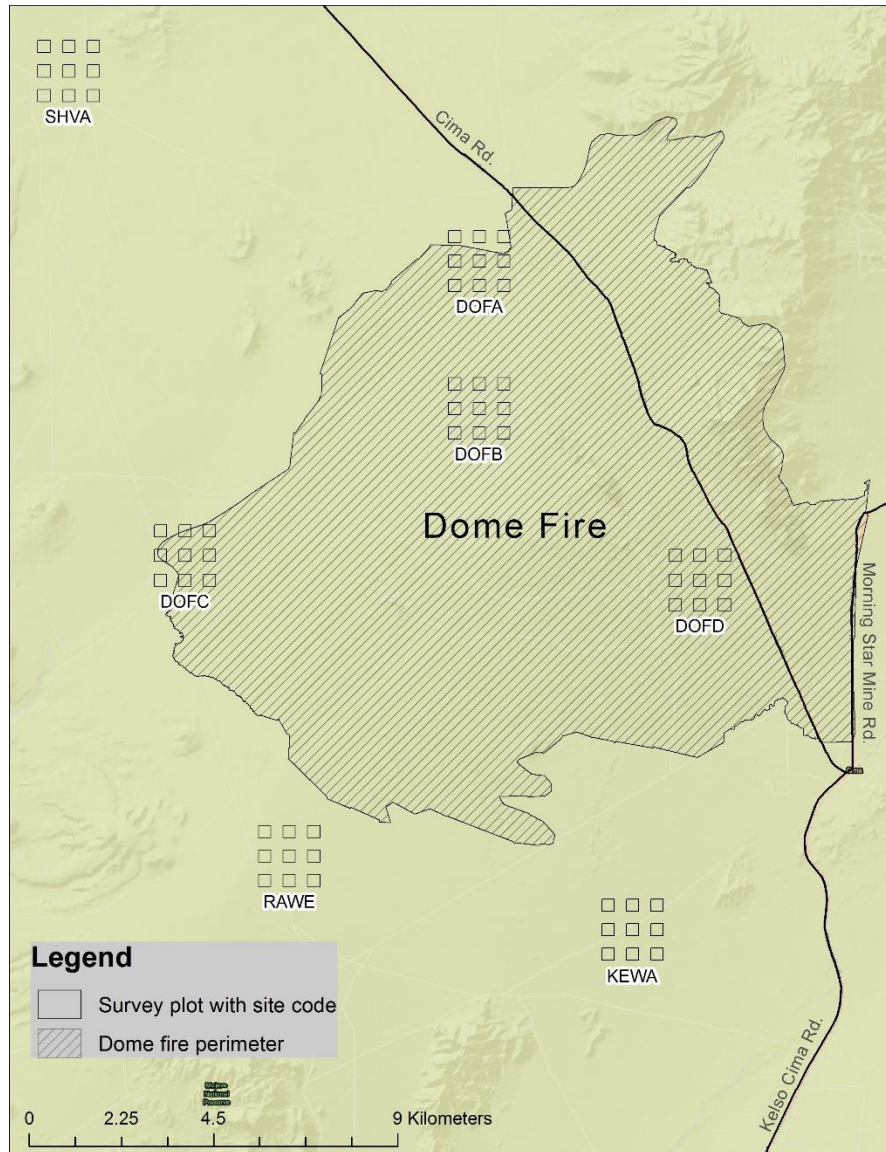
The two sites straddling the edge of the fire footprint, sites DOFA and DOFC (Table 3 and Fig. 2), had 6 and 7 plots respectively with some degree of burn on them, while the remaining plots (4 on A and 3 on C) were completely unburned. Of the burned plots, site A had 4 plots with >90% burned habitat, while site C had 3 plots with >90% burned habitat. Of the partially burned plots, site A had two plots with an average of 72.5% burned habitat, while site C had 4 plots with an average of 43.8% burned habitat. None of the plots on these sites that were >90% burned had any BETH detected on them. At the A site, three birds were detected on two partially burned plots (85% and 60% burned) and another bird was detected on an unburned plot, while on the C site, one bird was detected on a partially burned plot (60% burned) and another on an unburned plot. The only nest found on this project was on

Prior to the Dome Fire in 2020, we surveyed three sites (RAWE, KEWA, and SHVA; Table 3 and Fig. 2) in 2018 and 2021 in Joshua tree habitat outside the Dome Fire footprint, but on or near the Cima Dome. The average distance of these sites to the fire footprint was 3.5 km. In 2018, all of these sites had BETH detections (SHVA = 5 birds on 3 plots, RAWE = 2 individuals on 2 plots, KEWA = 2 individuals on 2 plots). The number of plots occupied by BETH was similar in 2018 and 2021; the average # of plots occupied (standardized by number of surveys per site per year) equaled 0.18 in 2018 and 0.15 in 2021. We did not detect any birds on the KEWA site during a survey in 2021, but we did detect two individuals incidentally that were just off the plots.

Table 3. Comparison of sites within, straddling the perimeter, or outside of the Dome Fire, which occurred in Aug 2020 on the Cima Dome, Mojave N.P. Resurvey rate = # plots/# surveys. Dist to fire perimeter is positive going out and negative going in. # plots burned counts plots with any amount of burn. JT = Joshua Tree

Site	Plots surveyed	Resurvey rate	Dist (km) to fire perimeter	# plots burned	Avg % plot burned	Avg # JT/plot	Avg % JT dead/plot	# plots occupied by BETH
DOFB	9	2.0	-2.7	9	100	243	100	0
DOFD	9	2.0	-1.9	9	95	180	85	0
DOFA	9	2.0	0	6	60	235	59	3
DOFC	9	2.0	0	7	52	153	52	2
RAWE	7	2.0	0.7	0	0	171	0	3
KEWA	6	2.0	1.8	0	0	86	0	0
SHVA	7	1.7	7.9	0	0	71	0	3

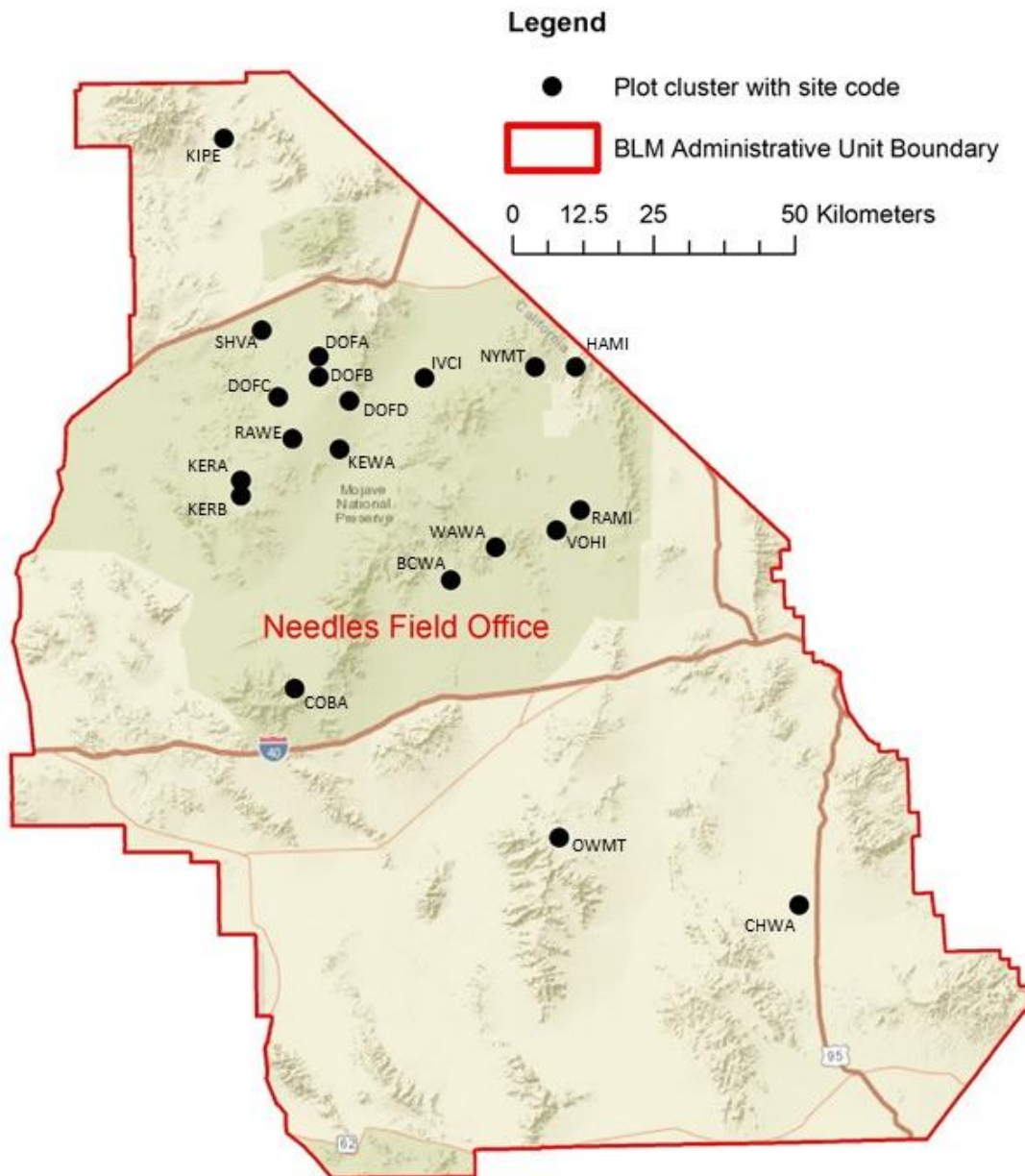
Figure 2. The Dome Fire perimeter and the survey sites used to monitor the fire's effects on thrasher occupancy at the Mojave National Preserve. The sites entirely outside the perimeter (KEWA, RAWE, SHVA) were first surveyed in 2018, while the sites on the perimeter (DOFA, DOFC) or entirely inside the perimeter (DOFB, DOFD) were created in 2021.



Regional Results by BLM District

Needles District

Figure 2. Site locations in the Needles Field Office District

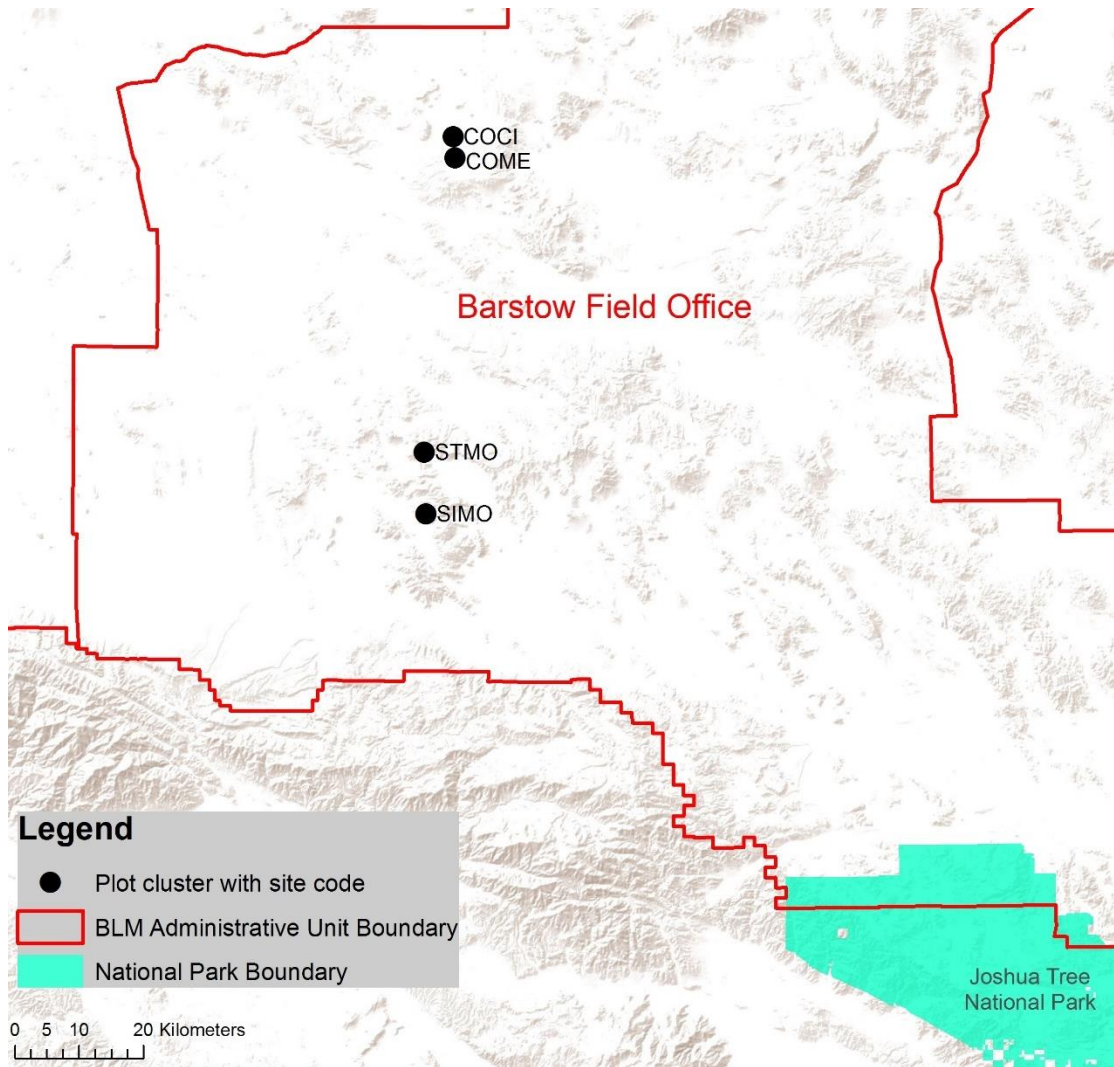


In the Needles Field Office District, we surveyed 20 site clusters consisting of 143 plots (Fig. 3). Fifteen of the site clusters were within the Mojave N.P., which had a resurvey rate of 1.87. In addition, we surveyed one site north of the Mojave N.P. along Excelsior Mine Road, one site in the Old Woman Mountains, one site along the Chemehuevi Wash, one site in the Granite Mountain Reserve, and one site in the Castle Mountain N.M. (Appendix B and C).

On survey, we detected 18 adult BETH, 4 LCTH, and 11 LOSH; all of the thrashers were found within the Mojave National Preserve. 57 incidental BETH sightings were detected within this district, all of which were within the Mojave N.P. We also found one BETH nest on 5 May in a 2.4 m tall Joshua tree, which was on the edge of the Dome Fire footprint (site = DOFA). On 16 May, a fledgling was observed 720 meters east of the nest accompanied by its parents, one of which was carrying food. We detected 13 adult LCTH incidentally on this district, all of which were within the Mojave N.P. We also detected 25 LOSH adults and 2 nests, both in Joshua trees, one with 4+ eggs and one with 3+ nestlings (nests too high to ascertain complete nest contents). At the two new sites at Kelbaker Road (KERA and KERB), we did not detect any thrashers, but one LOSH was detected on survey at KERB, and single incidental LOSH were found at both sites. The new sites at Hart Mine (HAMI) and New York Mountains (NYMT) did not have any thrasher or shrike detections. The new site at Cottonwood Basin did not have any thrashers on survey, but a BETH was detected 50 m outside of a plot perched on a creosote shrub (*Larrea tridentata*) in a desert wash. We did not detect any shrikes in Cottonwood Basin.

Barstow District

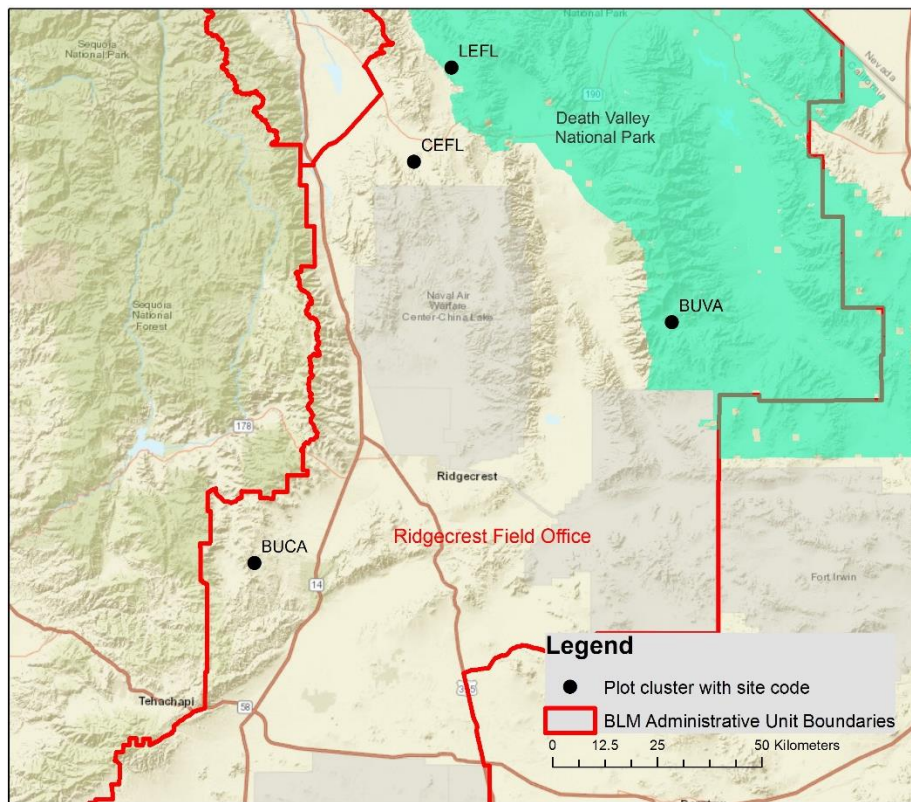
Figure 3. Site locations in the Barstow Field Office District



In the Barstow Field Office District, we surveyed four site clusters consisting of 23 plots (Fig. 4) with a resurvey rate of 1.43. On survey, we detected zero BETH, 6 LCTH, and 11 LOSH. The six LCTH detections were all adults and were found at three of the four site clusters. Incidentally, we detected 17 adult LCTHs and zero fledglings. We also found one LCTH nest in this district at the Stoddard Mountain site on 17 Mar. The nest was in a *Yucca schidigera* that was 1.8 m high. This nest was found to be empty on 31 Mar, and the observer was unable to find any fledglings or food carries. In addition, we found 7 incidental LOSH and two nests: one with four eggs at our Stoddard Mountain site in a 1.8 m tall *Yucca schidigera*, and one with three eggs near the Copper City site in a 1.4 m tall *Lycium cooperi*.

Ridgecrest District and Death Valley National Park

Figure 4. Site locations in the Ridgecrest Field Office District and at Death Valley National Park.



In the Ridgecrest Field Office District, we surveyed three site clusters consisting of 10 plots total (Fig. 5) with a resurvey rate of 1.0 (i.e., these plots were only surveyed once). We did not encounter any BETH or LCTH on survey or confirm any sightings incidentally in these field office districts. We intended to survey Butterbredt Canyon (BUCA), but persistent winds exceeded protocol for official surveys. Two of the sites we surveyed were within Death Valley National Park: Lee Flat and Burro Valley. On a survey, we found one LOSH at Lee Flat, and incidentally we found four other individuals. Furthermore, we incidentally found a nest being built at Butterbredt Canyon in a 2 m tall *Purshia tridentata*.

Discussion

In 2021, all of our Bendire's Thrasher detections were on the Mojave National Preserve, while the LeConte's Thrasher and Loggerhead Shrike detections were more widespread. Importantly, 86% of our Bendire's Thrasher detections were on or in the vicinity of the Cima Dome. In 2018, three of Point Blue's survey sites in Joshua tree habitat within the vicinity of the Cima Dome (Shadow Valley, Rainbow Wells, and Kelso Wash) had BETH detections, but none of the sites were within the fire perimeter (distance from fire perimeter range = 0.67-7.87 km); in 2021, these three sites continue to be occupied by Bendire's Thrashers. Furthermore, both new sites plotted on the periphery of the Dome Fire had Bendire's Thrashers in unburned habitat, while no detections occurred on the plots that were completely burned or on any plots at sites within the interior of the fire footprint. Incidentally, a few Bendire's Thrashers were detected in small islands of unburned habitat near our sites in the interior of the fire footprint. Based on our surveys in the Dome Fire, it appears that BETH cannot persist in areas with >90% of the vegetation burned, but can persist, and even successfully nest, in unburned habitats right at the edge of the fire footprint.

The Mojave N.P. estimates that the 43,273 acres burned in this fire killed ~25% of the contiguous Joshua tree forest in the area (NPS.gov website). Unfortunately, the way this fire burned, it consumed most of the vegetation in its path and left few patches of unburned vegetation. The natural recruitment of Joshua trees into large areas of denuded vegetation is a slow process (Vamstad and Rottenberry 2010, Esque et al. 2015). Even if Joshua tree recruitment is augmented through the planting of seedlings, it will take several decades for the trees to grow tall enough to become suitable nesting habitat for BETH (Esque et al. 2015). Furthermore, exotic annual vegetation left unchecked will decrease the fire-return interval and retard succession within this fire footprint thus preventing a Joshua tree forest from reoccurring here (Vamstad and Rottenberry 2010, Maloney et al. 2019). To increase the likelihood that the Dome Fire footprint is restored to Joshua tree forest, herbicide applications may be necessary to remove exotics. Moreover, considering how important the Joshua tree forest in the Cima Dome region seems to be for BETH, the National Preserve and State of California need to make it a priority to extinguish all fires in Joshua tree forest as soon as they are spotted.

The number of black-tailed jackrabbits and desert cottontails detected on our surveys declined greatly between 2018 and 2021 (Table 4), with a percentage decrease of 87.7% and 97.3% respectively. Although the surveys in 2019 also showed a large decrease from the numbers in 2018, many of the sites surveyed that year were in the far western and northern sections of the Mojave Desert, whereas many of the sites in 2018 and 2021 were at the same locations, and they were located farther to the east. There are two reasons that may explain this sizeable decline. First, Rabbit Hemorrhagic Disease was first identified in California in May 2020 (CDFW News 2020). Both BTJR and DECO are susceptible to this highly contagious and fatal disease. However, the length of time that the disease has been present in California may

not have been long enough to explain this major decline. The second possible factor explaining the decline may be the extreme drought experienced from summer 2020 to summer 2021 (Fig. 5) which caused a severe shortage in new growth of annual vegetation and shrubs used for forage.

Table 4. Numbers of Black-tailed Jackrabbits (BTJR) and Desert Cottontails (DECO) detected during area searches from 2018-2021. Numbers are standardized by numbers of surveys conducted by year.

Year	# surveys	BTJR	BTJR/survey	DECO	DECO/survey
2018	201	229	1.14	75	0.37
2019	194	78	0.40	6	0.03
2021	298	43	0.14	3	0.01

The 2020-2021 water-year was one of the driest ever recorded in the Mojave and was ranked in the bottom 90th percentile for precipitation (Fig. 5). The lack of moisture meant that many plants remained dormant (e.g., *Atriplex*, *Grayia*) through the breeding season or died (e.g., *Opuntia basilaris*). Prior research in the region has shown that during severe drought many bird species either forgo or delay nesting, and that delayed nesting can lead to declines in nest success due to increased nest predation or parasitism (McCreedy and van Riper 2015). Over the course of the season, we only found two thrasher nests, one BETH and one LCTH and five LOSH nests. During our 2021 surveys, no LeContes Thrasher fledglings were detected, even on plots known to have had successful broods in previous years. Singing LeConte males were encountered infrequently with most sightings being of quiet pairs showing no sign of nesting. A few suspected females were followed for over 30 minutes suggesting they were not attending active nests (Martin and Geupel 1993). Other locally breeding landbirds did not appear to be breeding as observers encountered little evidence of breeding behavior (e.g., nesting material or food carries) or incidental nests. For example, some Black-throated Sparrows normally with fledglings by May were still observed flocking.

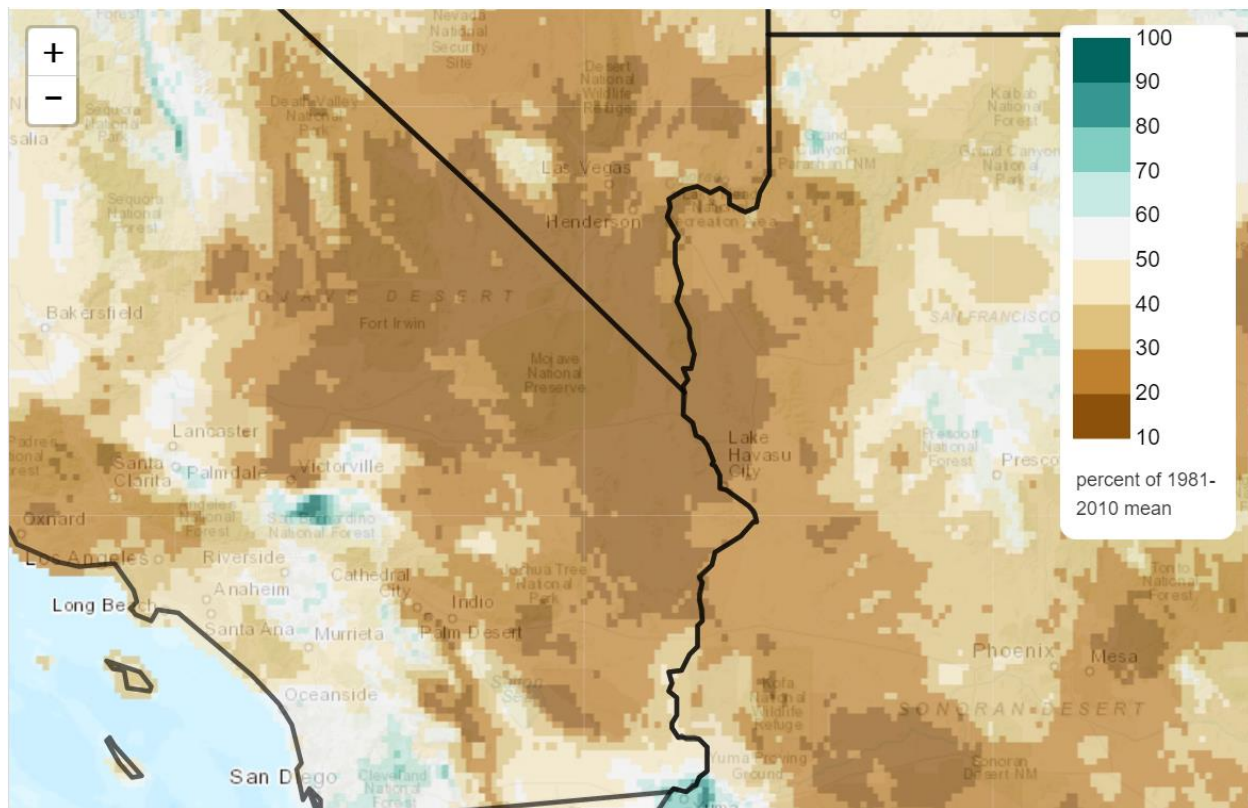


Figure 5. Precipitation anomaly for the southwestern United States from 1 Oct 2020-15 Apr 2021 showing the percentage deviation from the 1981-2010 mean (U.C. Merced 2021).

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Appendix A - Survey Forms

[illegible]

Target Species Sighting Form - 2017

Record sightings of Le Conte's Thrasher, Bendire's Thrasher, and Loggerhead Shrike

Observer Name and Contact Information

Plot ID: _____

Date: _____

Detection Time: _____

UTM: E: _____

N: _____

Species: _____

Within Survey

Within Plot Y N Time Y N (circle one)

Location Information (land ownership, habitat type, etc.) _____

Perch Substrate (species): _____

Perch Height (0.1 m) _____

Highest breeding code: _____

Singing Calling Foraging Flying Flushing Running

Activity (circle all that apply): Perching

Nest found: Y N (circle one)

(NAD83) E: _____ N: _____

Nest Substrate: _____

Nest Height (0.1 m) _____

Plant Height (0.1 m) _____

Nest Stage (circle one)

Building Eggs young/eggs # _____

Additional comments or notes:

Thrasher Habitat Evaluation Form					
Plot ID:	mE(NAD83):		Surveyor:		
	Avg. Elev:	Zone:	Date:		
Point-Center Quarter: Measure distance to the first visible vegetation.					
Northwest	Distance	Species			
Cholla (>0.5m)					
Yucca (>0.5m)					
Shrub sp. (≤0.5m)					
Shrub/tree(>0.5 to 2m)					
Tree (>2 m)					
Northeast					
Cholla (>0.5m)					
Yucca (>0.5m)					
Shrub sp. (≤0.5m)					
Shrub/tree(>0.5 to 2m)					
Tree (>2 m)					
Southeast					
Cholla (>0.5m)				Evaluation of ENTIRE plot:	Mark X for presence
Yucca (>0.5m)					
Shrub sp. (≤0.5m)				Tank w/ standing water	
Shrub/tree(>0.5 to 2m)				Burned habitat	
Tree (>2 m)				OHV use evidence < 1 yr	
Southwest				Livestock evidence < 1 yr	
Cholla (>0.5m)				Rural sprawl within 5km	
Yucca (>0.5m)				Sahara mustard	
Shrub sp. (≤0.5m)				Red brome	
Shrub/tree(>0.5 to 2m)				Bufflegrass	
Tree (>2 m)				Arab. Mediterranean grass	
				Bermuda grass	
Mistletoe (estimate # of mistletoe clumps within 50 m radius)				Fountain grass	
Estimate to the nearest 10: 0, 10, 20, 30, etc.				Russian thistle	
Mistletoe clumps:				live grass	
				dead grass	
Fruit-bearing shrub (estimate # of fruiting shrubs within 50 m radius)				Fruit-bearing shrub	
Estimate to the nearest 10: 0, 10, 20, 30, etc.					
Fruiting shrubs		species:		Ground Composition w/i 100 m (>50% presence):	Mark X for presence
Fruiting shrubs		species:			
Fruiting shrubs		species:		silt/clay	
				sand	
Joshua Tree (Count all Joshua trees within 100 m radius)				rock	
Branches		No Branches		other:	
Grass/forb ground cover (live/dead) (at veg. pt. along 50 m line N					
# of meters				% of Wash Cover (entire plot)	

Appendix B – Plot Locations

All coordinates given in NAD83 UTM zone 11.

PLOT ID	EASTING	NORTHING	PLOT ID	EASTING	NORTHING
BUCA.2	395250	3920050	KIPE.2	610650	3952150
BUCA.3	395250	3920650	KIPE.3	611250	3952150
BUCA.4	395850	3919450	KIPE.4	610050	3951550
BUCA.5	395850	3920050	KIPE.5	610650	3951550
BUCA.7	396450	3919450	KIPE.6	611250	3951550
CEFL.2	433950	4016350	KIPE.7	610050	3950950
CEFL.5	433950	4015750	KIPE.8	610650	3950950
CEFL.6	434550	4015750	KIPE.9	611250	3950950
CEFL.7	433350	4015150	LEFL.2	442950	4038850
CEFL.8	433950	4015150	LEFL.3	443550	4038850
COCI.5	498150	3886150	LEFL.5	442950	4038250
COCI.6	498750	3886150	LEFL.6	443550	4038250
COCI.8	498150	3885550	MEMO.5	611550	3945850
COCI.9	498750	3885550	MEMO.6	612150	3945850
COME.4	498450	3882250	MEMO.8	611550	3945250
COME.5	498450	3882850	MEMO.9	612150	3945250
COME.6	498450	3883450	RAMI.2	673800	3886300
COME.7	499050	3882850	RAMI.3	674400	3886300
COME.8	499050	3883450	RAMI.5	673800	3885700
DORO.1	517950	3807250	RAMI.6	674400	3885700
DORO.2	518550	3807250	RAMI.9	674400	3885100
DORO.4	517950	3806650	SAVA.1	442650	4036750
DORO.5	518550	3806650	SAVA.2	443250	4036750
DORO.7	517955	3806050	SAVA.3	443850	4036750
DORO.8	518550	3806050	SAVA.6	444450	4035150
EXMI.5	613650	3943050	SHVA.3	618000	3918100
EXMI.6	614250	3944050	SHVA.4	616800	3917500
EXMI.7	613050	3943450	SHVA.5	617400	3917500
EXMI.8	613650	3943450	SHVA.7	616800	3916900
EXMI.9	614250	3943450	SHVA.9	618000	3916900
KECR.1	387150	3942550	SIMO.1	490950	3828250
KECR.2	387150	3941950	SIMO.2	491550	3828250
KECR.3	387150	3941350	SIMO.4	494050	3827350
KEWA.5	631200	3896500	SIMO.5	494250	3827350
KEWA.6	631800	3896500	SIMO.7	493650	3825550
KEWA.7	630600	3895900	SJMI.10	385650	3921550
KEWA.8	631200	3895900	SJMI.3	388650	3923350
KEWA.9	631800	3895900	SJMI.4	388350	3922750
KIPE.1	610050	3952150	SJMI.5	388350	3922150

PLOT ID	EASTING	NORTHING	PLOT ID	EASTING	NORTHING
SJMI.6	388950	3922150	SRMI.9	520350	3803350
SJMI.8	387750	3921850	STMO.3	493950	3837550
SOMO.2	389250	3871450	STMO.5	493650	3836950
SOMO.3	388650	3870850	STMO.6	494250	3836950
SOMO.4	389250	3870850	STMO.8	494250	3836350
SOMO.5	389850	3870550	STMO.9	494850	3836350
SOMO.5	389850	3870550	SUVA.10	487350	3897550
SRMI.3	520350	3804550	SUVA.13	486150	3896950
SRMI.5	519750	3803950	SUVA.15	487350	3896950
SRMI.6	520350	3803950	SUVA.8	486150	3897550
SRMI.8	519750	3803350	SUVA.9	486750	3897550

Appendix C

Driving Directions by Site

These driving directions are intended to be used in addition to map resources such as USGS quad maps, California Atlas and Gazetteer, Google Earth or other sources. Roads in the southern California deserts are often unmarked and may not appear on maps or may be rough and impassible for most vehicles. These directions may be useful for biologists and volunteers in future seasons. We specify where 4wd or high clearance is recommended and offer specific help in accessing field sites.

Black Canyon Wash (BCWA): In Mojave Preserve, from Black Canyon Wash Rd., turn east onto dirt road at UTM 647150, 3877130. This road is about 1.1 miles south of the turnoff for Hole-in-the-Wall Campground. This road goes all the way to the plots. Road is sandy, high clearance and 4wd necessary.

Butterbrecht Canyon (BUCA): From CA highway 14, take Jawbone Canyon Rd to the west, go about 4.7 miles. At UTM 400110, 3907870, turn right to stay on Jawbone Canyon Rd (sign for Kelso). The road winds uphill and along ridge for a while. Turn right at UTM 398550, 3916490, there is a sign for Butterbrecht Springs Preserve and a cattle guard. Continue past Butterbrecht Springs to get to the plots. There are several primitive camping pullouts near the plots, we recommend the one near the springs at UTM 398670, 3916050 and there is another just south of the plots. 4wd recommended but it is possible to get at least to Butterbrecht Springs with 2wd.

Butte Valley (BUVA): This site is within Death Valley National Park in the shadow of scenic Striped Butte. Recommended access is from the east side (road in Coyote canyon and Goler Canyon can be washed out and impassable). Go approximately 2 miles north of the town Shoshone, CA (be sure to bird the Amargosa River nature trail in downtown Shoshone) on Hwy 127, head west on CA-178 – Jubilee Pass Road. Turn Right on Badwater Rd towards Asford Junction, a few miles past Ashford Mill Ruins' turn left on West Side Road then approximately a dozen miles left on Warm Springs Rd. Long slow bumpy ride past Warm Springs Camp/ruins. At Junction of Goldhill Road go left on Butte Valle Rd for about 5.2 miles. Study plots on the left side of Road. Watch out for rutting wild burros. The access road is extremely rough and slow going – 4WD with high clearance is required.

Note: GRG April 19, 2021: The drive in is on 20 miles of extremely rough road and slow going. The habitat in Butte Valley (DVNP) is marginal at best for thrashers. I highly recommend this sight be dropped indefinitely. It is not worth the wear and tear on vehicles.

Centennial Flat (CEFL): From I-395, head east on CA-190 for 24.6 miles. Turn right on Centennial Rd and head south 1.5 miles, then left at the Y and head south another 1 mile to site. Camping is possible on any of the side roads.

Chemehuevi Wash (CHWA 1-8): From Needles, head south on highway 95. Just north of crossing the wash, there is a jeep trail that goes east from highway 95 at 715790, 3813390. Use this to head

east along the north side of wash. Road is very sandy in places, 4wd necessary but you could park a 2wd vehicle on the side of Hwy 95 and plan on a longer walk.

Chemehuevi Wash Upper (CHWA 9-13): From Needles, head south on highway 95 for 21.5 miles. Turn right onto Turtle Mountain Road and head southwest for 5.3 miles to where the road crosses Chemehuevi Wash. Drive across the wash and take a left on the far side of the wash on an unmarked dirt road. Park off the road. This is a good place to camp. 4WD and high clearance recommended.

Dome Fire A (DOFA): From Cima Rd exit on I-15, head SE for 7.2 miles and turn right on Deer Spring Road (an unmarked dirt road) and head south for 1 mile to where the road crosses a dry wash. Park in the dry wash and hike to the site. You can camp in the wash or camp at the Valley View Ranch (if it is still abandoned), which is 2.2 miles south of the wash. 4WD and high clearance recommended.

Dome Fire B (DOFB): From Cima Rd exit on I-15, head SE for 10.1 miles. Turn right on unmarked dirt road and head SW for 1.7 miles and park at abandoned ranch. 4WD and high clearance unnecessary.

Dome Fire C (DOFC): From Cima Rd exit on I-15, head SE for 0.4 miles and turn right on unmarked dirt road and head SW toward Rock Tank (Shadow Valley site). Drive past Rock Tank. heading SW. In 2 miles bear left at the fork. Head south for another 5 miles until you get to the Aiken Mine Road intersection. There is an abandoned ranch here. Park here. 4WD and high clearance recommended.

Dome Fire D (DOFD): From Cima Rd exit on I-15, head SE for 15 miles. Turn right on unmarked dirt road and head west for 0.3 miles. You can camp here at the clearing. You can either hike from here to the site, or drive the dirt road north and park closer if you have 4WD.

Coolgardie Mesa (COME): From I-15, exit in Barstow at E. Main St and head NW for 0.4 miles. Take a right on Yucca Ave and head NNE for 0.5 miles. Turn left as road becomes Riverside Dr. and continue west for 1.1 miles. Turn left onto Lawrence Dale Dr. and then turn right on N 1st Ave and head NE 0.2 miles. Turn left onto Irwin Rd and head north for 6.9 miles. Turn left onto Copper City Rd and head north 6 miles. Turn left onto Coolgardie Rd. and head NW 1.8 miles to pullout on left by large Joshua tree. This spot can be used for parking or camping.

Copper City (COCI): From I-15, exit in Barstow at E. Main St and head NW for 0.4 miles. Take a right on Yucca Ave and head NNE for 0.5 miles. Turn left as road becomes Riverside Dr. and continue west for 1.1 miles. Turn left onto Lawrence Dale Dr. and then turn right on N 1st Ave and head NE 0.2 miles. Turn left onto Irwin Rd and head north for 6.9 miles. Turn left onto Copper City Rd and head north 9.3 miles. Turn left on unmarked dirt road and head SW 0.2 miles, where you will see a pullout on the left that can be used for parking or camping. Copper City Road is bumpy, but 2WD should suffice.

Cottonwood Basin (COBA): This site is within the Sweeney Granite Mountains Reserve, a University of California reserve. From I-40, head north for 9.9 miles. Turn left on unmarked dirt road (just beyond the Tortoise Warning sign and before the Soft Shoulder sign) and head SW for ~1.7 miles. Don't take immediate left. Head straight and slightly to the left toward the gate just 120 meters

from the first fork. Use gate code (request code from Granite Mts) to access Yucca Bajada camp road. Drive SW 0.5 miles to Yucca Bajada camp. You could camp outside the gate.

Hart Mine (HAMI): This site is located within the Castle Mountain National Monument on the west side of the Castle Mountain Range. From Searchlight, NV, drive 7.0 miles WNW on Hwy 164. Turn left onto Walking Box Ranch Rd and drive SSW for 13.5 miles. Turn left on unmarked dirt road and drive 0.5 miles (DO NOT DRIVE FARTHER UP THIS ROAD) and turn left. The road will immediately fork. You can camp at this fork, but don't block the road going left (north). This road leading north from camp will take you to plot 2. Camp coordinates are E673313, N3910379).

Ivanpah Cima (IVCI): From I-15, take exit 296 and head southeast on Nipton Rd and go 3.6 mi. Turn right (south) onto Ivanpah Rd and go 3.2 mi. Turn right (southwest) onto Morning Star Mine Rd and go 8.5 mi. Turn left at abandoned corral (Sixmile Tank) and head east on rugged dirt road for 3 miles to abandoned ranch. Abandoned corral (Tenmile Tank) is on plot 7. 4WD and high clearance recommended.

Kelbaker Road A (KERA): From Baker, drive ESE ~22.5 miles to site which is a long road. See KERB for camping location.

Kelbaker Road B (KERB): From Baker, drive ESE ~23.5 miles and turn right on Powerline Road and drive SW 0.95 miles. Turn right on power tower access road to good camping spot. This camp is just north of the west side of plot 3.

Kelso Wash (KEWA): From I-15, take exit 272 and head southeast on Cima Rd for 17.6 miles. Turn right on Kelso Cima Rd and head southwest for 4.6 miles. Turn right on Mojave/Old Government Rd and head west for 4.6 miles. Plot 7 will be a 1 km hike to the north of road. There are some small pullouts along road to camp, or you can camp 3 miles west of site by large hill. 4WD and high clearance are recommended.

Kingston Peak (KIPE): From I-15, exit on Cima Rd and head north 0.4 miles. Continue straight onto Excelsior Mine Rd for another 12 miles. At Y, keep left and head another 6.8 miles to site. Park along roadside, and make sure vehicle is completely off the road. For camping, I recommend staying a good distance from the paved road due to the mining trucks making frequent trips at night. A good spot to camp is west of the Excelsior Mine-Kingston Rd Y (located 3.2 miles south of the MEMO site). From the Y, head north on Excelsior Mine Rd 50 meters and turn left on gravel road and head west for ~350 meters to a gate where there is parking for camping (E 614260, N 3941347).

Lee Flat (LEFL): From I-395, head east on CA-190 for 31.5 miles. Turn left and head north on Saline Valley Rd for 13.3 miles. At the Y intersection, keep left to turn onto White Mountain Talc Rd and head NNW for 1.8 miles. Turn right and head east for ~100 m and camp in pullout on left. Once you leave the pavement of CA-190, the dirt roads are bumpy, but should be passable with 2WD.

New York Mountains (NYMT): From Searchlight, NV, drive 7.0 miles WNW on Hwy 164. Turn left onto Walking Box Ranch Rd and drive SSW for ~12 miles. Turn right on unmarked dirt road and head ~3.8 miles. Turn right and go uphill ~2 miles until you see a large camping spot on the left just north

of plot 5. You can also access this site from Ivanpah and Hart Mine Road, but they are rugged and slow.

Old Woman Mountains (OWMT): From Essex, take Sunflower Springs Rd southeast out of town. Stay on Sunflower Springs Rd all the way to the plots. There are a number of other roads, marked and unmarked, but Sunflower Springs Rd is well-signed. Sunflower Springs Rd gets within about 2.5-3 km of the plots, the more direct road is closed due to wilderness area designation. Park (and camp) at 672450, 3829160 and walk in along closed access road. The drive in is almost an hour from Essex, 4wd and high clearance necessary.

Rainbow Wells (RAWE): From I-15, take exit 272 for Cima Rd and head southeast for 17.6 miles. Turn right on Kelso Cima Rd and head south for 4.6 miles. Turn right on Mojave/Old Government Rd and head west for 7.4 miles. Turn right on unmarked dirt road and head north for 3 miles. This road bisects plot 7. There is a good camp site at Rainbow Wells 1 km southeast of plot 7. 4WD and high clearance are recommended.

Rattlesnake Mine (RAMI): From I-40, take exit 133 and head north on US-95 for 6.4 miles towards Searchlight/Las Vegas. Turn left on Goffs Rd and head west for 14 miles. Turn right on Lanfair Rd and head north for 16.3 miles. Turn right on dirt road and head east for 3.7 miles. Veer right at fork in road and continue 2.1 miles. Turn right at unmarked dirt and head south for 0.6 miles. This road will bisect plot 3 of this site. There is a good camp spot in the center of the plot where road crosses dry wash. 4WD and high clearance are recommended.

Shadow Valley (SHVA): From I-15, take exit 272 for Cima Rd and head 0.3 miles south. Turn right on Aiken Mine Rd and head southwest for 4 miles to the abandoned Rock Tank Ranch. This road bisects plots 3, 6, and 9. Camp at Rock Tank Ranch. 4WD and high clearance are recommended.

Sidewinder Mountain (SIMO): From Barstow, head south on I-15 for ~21 miles and get off on Dale Evans Pkwy and head SE for 2.4 miles. Turn left on Quarry Rd and head east 2 miles. Turn right onto Central Rd and head south 1 mile. Turn left onto Johnson Rd and head east ~6 miles to T intersection (a road in Google Maps that turns off Johnson Rd and heads SSE directly to plots 1 & 2 should be avoided). Turn right at the T intersection at end of Johnson Rd and head SE for ~50 meters and turn right again. Head SW ~200 meters and take next right. Continue SW for ~400 more meters (do not take any intermediate turns) to a T intersection. Turn right and go ~400 meters west to get to plots 1 & 2. Or turn left and head east ~1.3 miles to plots 4 & 5. From plot 2, poorly defined roads head south for ~1.7 miles where a crossroad can take you to plots 6-8. 4WD and high clearance vehicle required for this site to get thru sand and rocks. Reviewing unmarked dirt roads in Google Earth/Maps before you arrive is recommended as cell service is limited.

Stoddard Mountain (STMO): From I-15 in Barstow, head south on CA-247 for 21.7 miles. Turn right on Lucerne Valley Cutoff and head northwest for 6.6 miles to survey site. Camping is available behind a large rock that is a few hundred meters SE of site at these coordinates (E494897, N3835779). Lucerne Valley Cutoff is a bumpy dirt road, but should be passable with 2WD.

Vontrigger Hills (VOHI): From I-40, take exit 133 and head north on US-95 for 6.4 miles towards Searchlight/Las Vegas. Turn left on Goffs Rd and head west for 14 miles. Turn right on Lanfair Rd

and head north for 12.4 miles. Turn right on unmarked road and head northeast for 760 meters to large pullout on right. This is a good camping site. Plot 1 is ~1 km southeast of pullout. 4WD and high clearance are recommended.

Watson Wash (WAWA): From I-40, take exit 133 and head north on US-95 for 6.4 miles towards Searchlight/Las Vegas. Turn left on Goffs Rd and head west for 14 miles. Turn right on Lanfair Rd and head north for 16.3 miles. Turn left onto Cedar Canyon Rd and head west for 6.1 miles. Turn left on unmarked dirt road where Cedar Canyon Rd makes 90 degree turn to right. Follow this road for 5.4 miles to gate designating wilderness boundary. Hike south from gate ~2 km along sandy road to site. Road bisects plot 4. Good camping at gate. Or 600 meters to east of gate is a turn to south that goes to a nice camp too. 4WD and high clearance are required.

Appendix D

Bird species and numbers of individuals detected during area-search surveys in 2021. Site specific lists and numbers available in the California Avian Data Center.

Species	Number	Species	Number	Species	Number
Gambel's Quail	26	Black Phoebe	1	Phainopepla	51
White-winged Dove	6	Say's Phoebe	15	House Finch	274
Mourning Dove	30	Ash-throated Flycatcher	90	Pine Siskin	9
Greater Roadrunner	3	Western Kingbird	11	Lesser Goldfinch	7
Lesser Nighthawk	2	Loggerhead Shrike	33	Grasshopper Sparrow	1
Vaux's Swift	4	Common Raven	45	Chipping Sparrow	13
White-throated Swift	11	Horned Lark	204	Brewer's Sparrow	218
Broad-tailed Hummingbird	1	Tree Swallow	7	Black-throated Sparrow	756
Turkey Vulture	14	Violet-green Swallow	46	White-crowned Sparrow	167
Northern Harrier	1	N. Rough-winged Swallow	4	Bell's Sparrow	88
Cooper's Hawk	3	Cliff Swallow	18	Green-tailed Towhee	1
Red-tailed Hawk	11	Barn Swallow	10	Western Meadowlark	1
Great Horned Owl	4	Verdin	14	Scott's Oriole	18
Ladder-backed Woodpecker	78	Rock Wren	1	Brown-headed Cowbird	6
Gilded Flicker	3	Bewick's Wren	5	Lucy's Warbler	1
Northern x Gilded Flicker	1	Cactus Wren	32	MacGillivray's Warbler	2
American Kestrel	22	Blue-gray Gnatcatcher	8	Yellow Warbler	4
Merlin	1	Black-tailed Gnatcatcher	16	Yellow-rumped Warbler	27
Peregrine Falcon	1	Ruby-crowned Kinglet	12	Townsend's Warbler	2
Prairie Falcon	1	Bendire's Thrasher	21	Wilson's Warbler	16
Western Wood-Pewee	1	LeConte's Thrasher	11	Western Tanager	9
Hammond's Flycatcher	2	Sage Thrasher	12	Black-headed Grosbeak	4
Gray Flycatcher	5	Northern Mockingbird	5	Lazuli Bunting	2
Dusky Flycatcher	2	Swainson's Thrush	1	Unidentified birds	29