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THE RESOURCES AGENCY  
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**REVIEW OF THE STATUS OF BENDIRE'S THRASHER  
IN CALIFORNIA**

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Wildlife Management Division  
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**ABSTRACT**

We used taped recordings of the territorial advertisement song of Bendire's Thrasher (Toxostoma bendirei) to locate populations of these birds in the deserts of southern California. Our surveys were conducted along transects in the Mojave Desert in 1986 and 1987 and in the Colorado Desert in 1986. In 1987, we measured potentially influential habitat characteristics at points supporting and lacking Bendire's Thrashers. The results were combined with a thorough literature review to delineate the distribution of this thrasher in California and to characterize seasonal movement patterns and habitat preferences.

The most widespread California population of Bendire's Thrashers is found in the eastern Mojave Desert. Our results from this region considerably expand the historically documented distribution to the north, east, and south, including the Old Woman Mountains south of Interstate 40. Elsewhere, the population in Joshua Tree National Monument appears to be larger and more widely distributed than previously suspected. Away from these two primary areas, small populations of Bendire's Thrashers can be found as far west as Kelso Valley and Butterbread Canyon on the eastern slope of the Sierra Nevada and as far north as Lee Flat, approximately 40 km east of Lone Pine, Inyo Co.

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Most records of Bendire's Thrasher in the Colorado Desert are apparently of early spring migrants. However, one record of breeding birds has been documented there. All records from the Colorado Desert are relatively close to the boundary between the Colorado and Mojave deserts. We conducted few surveys in the Colorado Desert, and the distribution of Bendire's Thrasher there remains poorly described.

Bendire's Thrashers generally leave breeding areas from late June to the end of July. Most migrants move to wintering grounds in the south. However, a small number move north and west, and a few may winter in coastal habitats in California. Spring movements begin in February and March and singing birds generally begin to appear on the breeding grounds in mid-March.

During our surveys, we always found either Joshua trees (*Yucca brevifolia*), Mojave yucca (*Y. baccata*), or Spanish bayonet (*Y. schidigera*) at sites supporting Bendire's Thrashers. Columnar cholla cactus (*Opuntia* sp.) also was present at most sites. Populations of perennial shrubs at sites with this thrasher were significantly denser than at sites lacking the bird, otherwise, the species composition and physiognomy of perennial shrubs within the habitat of Bendire's Thrasher was highly variable. We found that this thrasher occurs infrequently on either hard, rocky soils or loose sandy soils.

Our results suggest several important habitat characteristics that may prevent Bendire's Thrashers from breeding in the Antelope Valley despite the presence of Joshua trees: (1) soils within Joshua tree habitats in the Antelope Valley had significantly softer or more sandy soils than areas supporting the thrasher; (2) Mojave yucca and Spanish bayonet do not occur in the western Mojave Desert; (3) columnar cholla cactus are relatively rare in the western Mojave Desert; and (4) perennial vegetation in the western Mojave Desert is significantly less dense and has a lower cover coefficient than areas supporting the thrasher.

## RECOMMENDATIONS

Based on the results of our status review, we conclude that: (1) breeding populations of Bendire's Thrasher are more widely distributed in California than previously documented, and (2) we have an inadequate understanding of Bendire's Thrasher ecology and populations to draw conclusions about population trends. Therefore, we recommend conducting a long-term research and monitoring program. The results from this study would greatly increase our understanding of the biology and ecology of Bendire's Thrasher. We have chosen the five topics that follow because they are the minimum needed to answer questions about population status, factors affecting distribution, and future management actions.

1. Monitor isolated populations in the southern, western, central, and northern Mojave Desert. This program will confirm breeding and must be designed to determine: (1) population size; (2) whether the breeding occurs every year; and (3) if intermittent, the factors limiting breeding. The monitoring program must be relatively long-term (10+ years) to make these determinations.
2. Survey apparently suitable habitat lacking breeding records. The goal of this project will be to locate additional breeding populations. If done over several years, the results will indicate whether some areas are used irregularly. Effort should be concentrated in the southern, western, and northern Mojave Desert.
3. Conduct an extensive survey of the Colorado Desert. This survey will investigate the distribution of Bendire's Thrasher in the Colorado Desert. Existing records suggest that this thrasher may breed regularly in small numbers. The survey would identify breeding locations and document the habitats used by the species in this desert.
4. Investigate breeding biology. Little is known about reproductive phenology, food habits, nesting ecology, and foraging habits. The study would record basic information that could be used later either to help prepare management recommendations or to predict the impacts of desert projects on Bendire's Thrasher.
5. Study the impacts of desert land uses on Bendire's Thrasher. One or more studies should investigate the effects of urbanization, grazing, off-road vehicle use, or removing yucca, Joshua trees, and columnar cholla cactus on populations of this thrasher. Joshua tree/yucca/cholla vegetation is one of the more mesic and diverse lowland desert habitats and in many areas simultaneously receives several types of land use. Many wildlife species found in this habitat could be affected by these uses, and the study could easily be adapted to incorporate other species.

# REVIEW OF THE STATUS OF BENDIRE'S THRASHER IN CALIFORNIA

## INTRODUCTION

As with many southwestern desert species, the ecology and distribution of Bendire's Thrasher (Toxostoma bendirei) are little studied and poorly understood. In southern California, this thrasher is a fairly common but local summer resident (Garrett and Dunn 1981) and is known primarily from two regions of the Mojave Desert. In the eastern Mojave Desert, Bendire's Thrashers have been reported regularly from the southern edge of Lanfair Valley north to Clark Mountain. In the southern Mojave Desert, they are best known from scattered locations in and around Joshua Tree National Monument (Johnson et al. 1948, Miller and Stebbins 1968, Remsen 1978, Garrett and Dunn 1981). These two areas are relatively well-known because they are frequently visited by bird-watchers and naturalists. However, records from other parts of the Mojave Desert and from the Colorado Desert suggest that breeding populations of Bendire's Thrasher may be more widely distributed than currently known.

The preferred habitat of Bendire's Thrasher in California is generally described as Mojave desert scrub with a significant number of either Joshua trees (Yucca brevifolia), Spanish bayonet (Y. baccata), Mojave yucca (Y. schidigera), columnar cholla cactus (Opuntia acanthocarpa, Q. echinocarpa, Q. ramosissima), or other succulents (Grinnell and Miller 1944, Bent 1948, Garrett and Dunn 1981). Yet within these habitats, it is believed to be spottily distributed, and the number of confirmed breeding records in California is extremely low.

The population status of Bendire's Thrasher in California is unknown, but has been estimated to be in the range of a few hundred pairs (Remsen 1978). Due to this small estimated population size, it has been classified as a Third Priority Bird Species of Special Concern by the California Department of Fish and Game (Remsen 1978). Third priority species are birds "not in any present danger of extirpation and their populations within most of their range do not appear to be declining seriously; however, simply by virtue of their small populations in California, they are vulnerable to extirpation should a threat materialize" (Remsen 1978).

Our study was designed and conducted to accomplish two major objectives:

1. To more accurately document the breeding distribution of Bendire's Thrasher in the Mojave Desert of southern California.
2. To (describe habitats occupied and not occupied by breeding Bendire's Thrashers and to describe habitat characteristics that may be used to identify other potential suitable habitat.

The study and products resulting from the study also were designed to serve as a baseline data set that can easily be adapted to become a monitoring program to detect long-term changes in the distribution of Bendire's Thrasher.

## METHODS

### Historical Distribution, Abundance, and Seasonal Movements

Our first task was to assemble and analyze existing information on the historical distribution, abundance, and seasonal movements of Bendire's Thrashers in California. We conducted a thorough literature review to compile the information needed to accomplish this task. Records were extracted

from four primary sources: (1) Middle and Southern Pacific Coast regional reports in Audubon Field Notes/American Birds volumes 1-41; (2) Vertebrate Species Distribution Data and museum records on file with the Desert District Office of the Bureau of Land Management (BLM); (3) scientific literature on Bendire's Thrasher (e.g., Pierce 1921, Grinnell and Miller 1944, Garrett and Dunn 1981); and (4) the field notes of several ornithologists including the authors. The BLM Vertebrate Species Distribution Data were gathered by BLM employees and contractors working on the California Desert Plan Program between 1975 and 1979, and most of these observations were never published. The BLM records also included location information recorded by BLM employees from the collection tags on specimens in major ornithological collections in California.

## Thrasher Survey Techniques

Bendire's Thrashers have a spotty distribution even in apparently suitable habitats on Cima Dome and in Joshua Tree National Monument. Therefore, we chose a survey technique that would allow extensive coverage of large areas. Our technique consisted of a series of sample points on a transect along an existing dirt or paved road. Each transect consisted of a series of survey points at 0.4 to 4.8 km intervals. The exact distance between points depended on habitat type, local topography, and presence or absence of Bendire's Thrashers. Sample points were placed further apart in obviously unsuitable habitat lacking Joshua trees, yuccas, and cholla and in areas previously known to support Bendire's Thrashers.

At each point on a transect, we played a taped recording of a Bendire's Thrasher song to elicit responses from nearby birds. Each playback session was approximately five minutes long and consisted of 60 seconds of song followed by 60 seconds of silence, 30 seconds of song, 60 seconds of silence, 30 seconds of song at low volume, and ending with 60 seconds of silence. This playback protocol had been proven to be effective by Jay M. Sheppard (Pers. Comm.) for locating LeConte's Thrashers (Toxostoma lecontei) (Sheppard 1970).

At each sample point, we recorded the detections of all species in the family Mimidae: Northern Mockingbird (Mimus polyglottos), Bendire's Thrasher, California Thrasher (Toxostoma redivivum), Crissal Thrasher (T. dorsale), and LeConte's Thrasher. Detections were denoted as either visual or auditory, and the total number of individuals located was recorded.

We conducted surveys for Bendire's Thrashers during the documented breeding period, early April to mid-June. On each survey, our sampling began approximately 1/2 hour after dawn, and we usually continued playbacks until mid-afternoon. At each point, we recorded time and temperature, and noted dominant plants, presence or absence of wash vegetation, and types of human disturbance. The location of the point was marked on a U.S. Geological Survey topographic map (scale 1:24,000 or 1:62,500), and the elevation was interpolated from the map.

## Habitat Measurements

We used three techniques to characterize aspects of Bendire's Thrasher habitat that were potentially important in describing the distribution of this species. The methods selected were based on our analysis of the literature and on previous experience with this species. Measurements of perennial vegetation were designed to quantify plant species composition, percent cover by perennials, vegetation density, and plant height. However, the distribution of Bendire's Thrasher appeared to be tied closely to succulent plant species that occurred in relatively low densities. A general technique for sampling perennial vegetation would miss or inadequately quantify these species without exceedingly large sample sizes. Therefore, we used a separate method to sample succulents and arborescent plant species. Lastly, we gathered coarse data on soil surface texture and hardness. These data were collect-

cd because this thrasher forages primarily on the ground, and we believed soil characteristics could be an important component in the ecology of Bendire's Thrashers.

We collected habitat data on all transects where we found Bendire's Thrashers. On most transects, the thrasher was found at only a few points, and we took habitat measurements at all locations where the bird was found. When birds were located at many points along a long transect, measurements were taken at up to eight points. Our thrasher survey technique was not adequate to ensure that birds were absent from a site. Therefore, habitat measurements representing unsuitable habitat could not be collected at all sites where we failed to detect a Bendire's Thrasher. The criterion we used to select these samples was based on our observation that points with Bendire's Thrashers were clumped along a transect. On all transects where thrashers were found at more than one point, the occupied points would be grouped with only a few intervening points lacking the bird. Therefore, sample points representing habitat unsuitable for Bendire's Thrasher were drawn from outside these clumps and from transects totally lacking the thrasher.

### Perennial Vegetation

Shrubs, trees, succulents, and perennial grasses were sampled using the point-centered quarter method developed by Cottam and Curtis (1956) and described in Mueller-Dombois and Ellenberg (1974) and Barbour et al. (1980). Each sample of perennial vegetation consisted of eight point-centered measurements spaced at least 15.0 m apart. Points were spaced further apart in areas with sparse vegetation to ensure that the same plants were not measured more than once. At each point, the plant species, distance from the point, height, and two perpendicular diameters were recorded for the nearest shrub in each quarter of a circle centered on the point. We measured all perennial vegetation with this method, including those succulent and arborescent plant species sampled with the technique described below for Joshua trees and other succulents.

From the eight point-centered quarter samples at each thrasher sample site, we calculated the following variables:

- AVGHGT - Average height of all species
- ABSDENS - Absolute density (number of plants/hectare)
- PCTCOV - Percent cover of all species

### Succulent and Arborescent Species

Selected succulents and arborescent plant species were sampled with a point-centered, fixed-radius technique. A calibrated sighting-rod held at arm's length was used to visually circumscribe a circle with a 20.0 m radius. Within this circle, we counted all Joshua trees, Mojave yucca, Spanish bayonet, columnar cholla cacti, junipers, and large catclaw (*Acacia greggii*). Because Mojave yucca and Spanish bayonet reproduce vegetatively and form large clumps, we defined an individual of these species as a vertical stem or trunk. Thus, a large clump of either species would be counted as several individuals. This definition avoided the problem of counting either a large clump or a small seedling as one individual.

In each quarter of the circle, we recorded the height of the nearest plant to the center point. Heights were measured to the nearest 0.1 m for plants less than 2.0 m tall; to the nearest 0.5 m for plants 2.0-3.0 m tall; and estimated to the nearest 1.0 meter for plants >3.0 m tall.

We conducted the point-centered fixed radius technique at five points spaced 40.0 m apart. Arborescent and succulent species were sampled in the general area where perennial vegetation

measurements were recorded, but the two methods were not centered on the same points. From these data we calculated the following variables for each Bendire's Thrasher transect point where we collected habitat data:

- TOTPLNTS - Total number of plants counted
- AVGHG TSA - Average height of succulents and arborescent species
- OPSPNUM - Number of columnar cholla cactus
- OPSPHGT - Average height of columnar cholla cactus
- YUBRNUM - Number of Joshua trees
- YUBRHGT - Average height of Joshua trees
- YUSPNUM - Number of Mojave yucca and Spanish bayonet
- YUSPHGT - Average height of Mojave yucca and Spanish bayonet

## Soil

We described the soil texture in a circle 10.0 cm in diameter at the eight randomly located points sampled for perennial vegetation and the centers of the five circles sampled for Joshua trees and succulents. Texture observations also were recorded at another five points located midway between circles sampled for Joshua trees and succulents. We identified soil texture based on the dominant substrate cover and classified it according to the following definitions.

- DIRT - firm soil with little obvious loose sand
- GRAVEL - any soil covered with a loose layer of small pebbles
- PAVEMENT - any soil with a nearly continuous cover of flat stones, firmly packed into the soil
- ROCK - any soil covered with a dense layer of protruding or loosely packed stones >5.0 cm in diameter.
- SAND - loose sandy soil

We used a soil penetrometer to measure the hardness of the soil surface. The tip of the penetrometer was a cone 3.5 cm long and 2.0 cm in diameter at the base. The cone was pushed into the ground with a steady force by a 70 kg investigator until either 9.5 cm of the penetrometer was in the soil or the cone could not be forced into the soil any deeper. Penetration measurements were taken at the ten Joshua tree and succulent sampling points where soil texture descriptions were recorded.

## RESULTS AND DISCUSSION

The data base we compiled on Bendire's Thrasher observations in California includes over 300 records from our literature review and the results of surveys on 44 transects established in 1986 and 1987. In 1986, we used the song playback technique at 445 points on 38 transects in the Mojave Desert and at 27 points on four transects in the Colorado Desert. The 1986 samples were collected between 26 April and 4 May and between 31 May and 8 June. In 1987, we collected data between 8 May and 23 May and surveyed 325 points on 27 transects in the Mojave Desert. The locations of all 44 transects are illustrated in Figure 1. Detailed maps and route descriptions of each transect and the unanalyzed thrasher detection data are presented in England and Laudenslayer (1987).



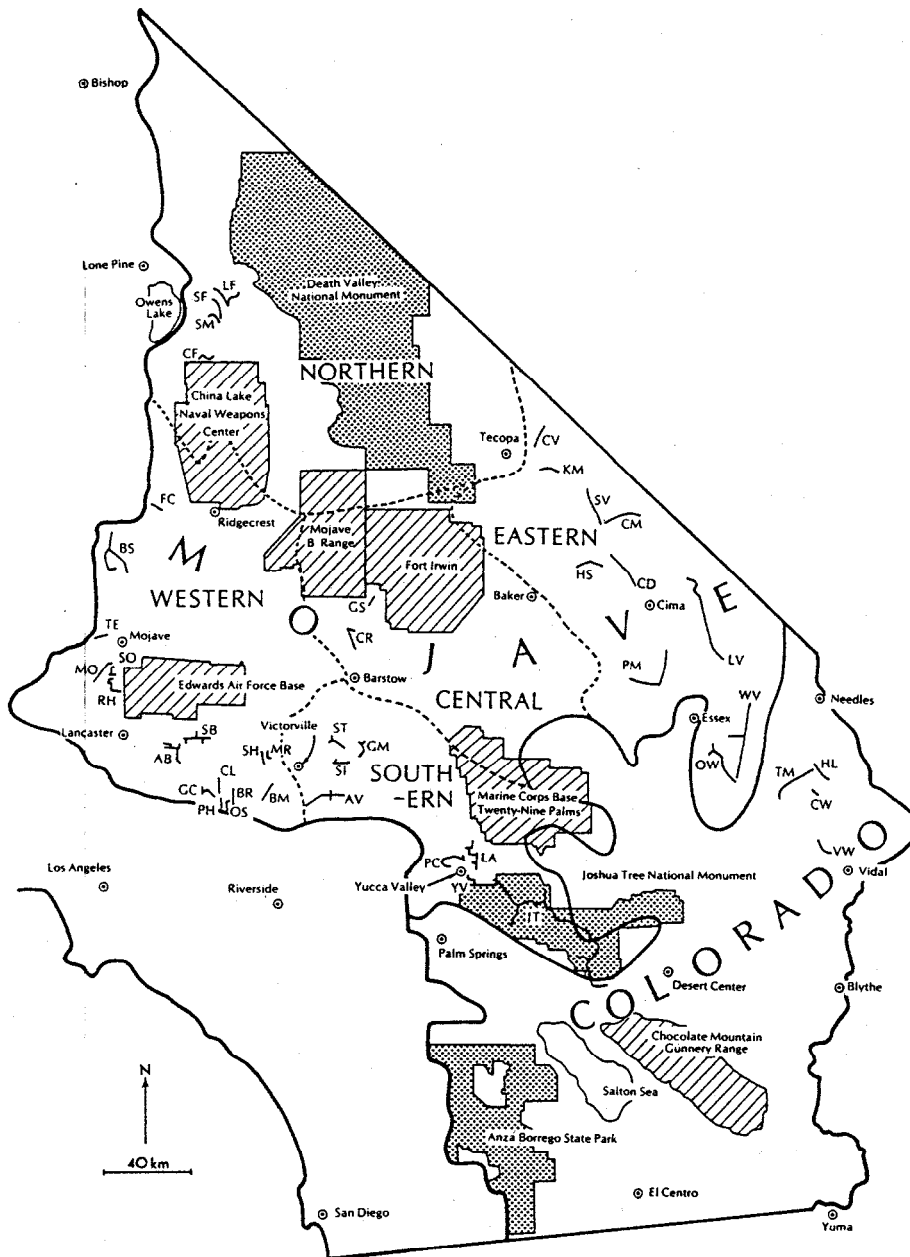


FIGURE 1 - Locations of Bendire's Thrasher transects surveyed in 1986 and 1987. Transects are identified with two-letter initials; these initials correspond to abbreviations in Tables 4, 6, and 3. The Mojave-Colorado Desert boundary is indicated by a solid black line (—). Subdivisions of the Mojave Desert are indicated by a dashed line (---).

Bendire's Thrasher is primarily a summer visitor to California that breeds in the Mojave Desert. However, it also is a rare migrant and winter visitor primarily west of the deserts (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981). Therefore, we present our results in two major sections reflecting the dual status of this species: (1) breeding season distribution in the deserts of California; and (2) movement patterns and distribution during the non-breeding season.

## Breeding Season Distribution in the Deserts of California

We define the breeding season for Bendire's Thrasher as extending from mid-March through July. Several early spring records (Table 1) indicate that reproductive activities may begin in mid- to late March when the birds first return from wintering areas. Bendire's Thrashers in California have been reported on eggs as early as 1 April (San Bernardino County Museum specimen #1632 - egg set), and Pierce (1921) collected egg sets on 11 April and 26 April. Johnson et al. (1948) observed two adult birds with fledged young on 15 May, and R. McKernan (Pers. Comm.) observed an adult feeding three fledglings on 5 May (Table 1). Many Bendire's Thrashers may still be migrating in April and May. Thus, their presence in suitable habitat during the breeding season may only indicate the passage of migrants.

We were able to locate only 13 records for Bendire's Thrasher in either the Mojave or Colorado Desert between 1 August and 31 March (Table 2). These reports included observations of single individuals on 13 August and 8 October. The remainder were between 8 October and 2 March. Thus, this species appears to leave breeding areas in the California deserts by the end of July.

Our results and analysis of Bendire's Thrasher breeding season records are presented by geographical subdivisions of the Mojave Desert and for the entire Colorado Desert. The locations of the boundary between the Mojave and Colorado deserts and of the subdivisions of the Mojave Desert are illustrated in Figure 1.

### Eastern Mojave Desert

Historically, the best known breeding area has been Joshua tree habitat (Laudenslayer 1988) in the eastern Mojave Desert. We found nearly 200 records for this region (Table 3). The existence of this population was first documented by Johnson et al. (1948), and field ornithologists and bird-watchers continue to return to this area in search of this species. Nearly all historical observations are in the area extending from the south side of Clark Mountain, over Cima Dome, through a few canyons in the Mid Hills, and into Lanfair, Gold, Round, and Pinto Valleys on the south side of the New York Mountains and Mid Hills (Figure 2). A few records also are from the area near Granite Pass between the Granite and Providence Mountains (Figure 2). One noteworthy observation is of a pair of Bendire's Thrashers on the north side of Clark Mountain on 29 May 1978 (Table 3).

We conducted surveys on ten transects in the eastern Mojave Desert in 1986 and on seven transects in 1987 (Table 4). Bendire's Thrashers were common on transects within the traditionally well-known breeding range of the species. However, on the Lanfair Valley transect we also found them in southern Ivanpah Valley on the north side of the New York Mountains and considerably further south toward Goffs along Lanfair Road than previously recorded. Bendire's Thrashers were found at most sample points in suitable habitat along the Providence Mountains transect and appeared to be common along the northeast and southwest flanks of these mountains.

TABLE 1 - Confirmed Bendire's Thrasher breeding records from the deserts of southern California. Subdivisions and boundaries of the Mojave and Colorado deserts are illustrated in Figures 1 and 2. Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer, therefore, elevations and distances are expressed in English units. References to observations in American Birds (AB) include volume, page number, and year, and do not appear in the literature cited.

DATE	CO.	LOCALITY	LEGAL DESCRIPTION	ELEV	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
EASTERN MOJAVE DESERT								
5/13/38	SB	2 mi NNE of Cima		4100	1 ad male		Joshua tree - fledged young 5/14	MVz - # 74336
5/15/38	SB	2 mi NNE of Cima		4100	1 pair w/4 juv		Scattered Joshua trees - nest in Opuntia	Johnson et al 1948
5/27/72	SB	Near Cima				SWC	Several pairs feeding young	BLM
5/29/76	SB	2 1/2 mi. SE of Cima	T13N R14E NE1/4 SEC 15	4360	1 pair w/1 juv	Cardiff	Joshua tree woodland	BLM
5/29/76	SB	5 1/2 mi. SSE of Cima	T13N R14E NW1/4 SEC 35	4440	1 pair w/4 juv	Cardiff	Joshua tree woodland-nest in Joshua tree	BLM/Nest-Record Card
5/30/76	SB	6 mi. NW of Cima	T15N R13E NE1/4 SEC 20	5320	1 pair w/1 juv	Cardiff	Joshua tree woodland	BLM
5/30/76	SB	7 1/2 mi. SE of Cima	T13N R15E NE1/4 SEC 29	5220	1 pair w/1 juv	Cardiff	Joshua tree-juniper woodland	BLM
6/12/76	SB	12 mi. SE of Ivanpah		4220	4 juv in nest	SWC	Joshua tree woodland - nest in cholla	Nest-Record Card
6/12/76	SB	13 1/2 mi. N of Goffs	T12N R17E SW1/4 SEC 13	3700	2 pairs +1 im	Cardiff	Joshua tree with catclaw wash	BLM
6/12/76	SB	13 1/4 mi. ESE of Cima	T13N R16E NE1/4 SEC 29	4880	1 pair w/2 im	Cardiff	Joshua tree/juniper/cholla	BLM
6/12/76	SB	13 1/4 mi. ESE of Cima	T13N R16E NE1/4 SEC 29	4880	1 im	Cardiff	Joshua tree/cholla	BLM
6/13/76	SB	10 mi. S of Mountain Pass	T14N R13E SW1/4 SEC 1	5020	1 pair w/1 juv	Cardiff	Joshua tree woodland	BLM
5/12/78	SB	SW edge of Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 pair w/4 juv	SWC	Mojave yucca/cholla - BBC	BLM - AB 33:94 1979
5/14/78	SB	SW edge of Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 pair w/4 juv	SWC	Mojave yucca/cholla - BBC	BLM - AB 33:94 1979
6/11/78	SB	Lanfair Valley	T13N R17E NW1/4 SEC 9	4180	1 pair w/4 juv	BAC, SJN	Joshua tree woodland II - BBC	BLM- AB 33:93 1979
5/26/80	SB	Cima Rd 2 1/4 mi. N I-15			1 pair w/4 juv	BMcl, AS	Nest in Mojave yucca	Field notes
SOUTHERN MOJAVE DESERT								
6/01/74	RIV	Ryan Mtn. - JTNM			1 pair w/4 juv	RR		AB 28:950 1974
4/11/20	SB	Victoville					First CA nesting record egg set	SBCM#5987; Pierce 1921
4/11/20	SB	Victoville			1 female & eggs		Nest in cholla	Pierce 1921
CENTRAL MOJAVE DESERT								
5/12/82	SB	Superior Valley N of Barstow			1+3 juv in nest	ASE	W of species' known breeding range	AB 36:1017 1982 photo
WESTERN MOJAVE DESERT								
5/87	KE	Kelso Valley			Nest	RSa		Personal Communication
COLORADO DESERT								
4/01/20	SB	Turtle Mtns.			Egg set			SBCM#1632
5/05/85	RIV	Com Springs			1 ad w/3 juv	RMcK	Present 4/19-5/21 - feeding young	Field notes

Table 2 - Desert records for Bendire's Thrasher in the non-breeding season (August through mid-March). All observations are of single birds unless noted otherwise. The boundary between the Mojave and Colorado deserts is illustrated in Figures 1 and 2. Days is the number of consecutive days between the first and last observations at a location. Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer. References to observations in American Birds (AB) or Audubon Field Notes (AFN) include volume, page number, and year, and do not appear in the literature cited.

DATE	DAYS	CO.	LOCALITY	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
<b>MOJAVE DESERT</b>						
Winter 1977-1978	1	INY	Salt Lake - Bird Population Study	RMS	Mesquite forest	AB 33:94 1979
1/01/66	1	KE	7 mi. E of Red Mountain			LACM #66090
11/13/73	1	LA	Near Lancaster		Migrants moving in wrong direction	AB 28:109 1974
12/17/83-3/05/84	80	LA	Near Lancaster	JD	Most unusual place to winter	AB 38:358 1984
10/12/85	1	LA	Near Lancaster	FH	Unexpected area	AB 40:160 1986
11/17/68-12/01/68	15	SB	Morongo Valley	JS, RM		AFN 23:110 & 522 1969
8/13/78	1	SB	Round Valley	SWC	<u>Juniperus osteosperma/Artemisia</u> -2 birds	BLM
10/08/78	1	SB	Lanfair Valley	SWC	Exceptionally late; previous date 8/22	AB 33:216 1979
<b>COLORADO DESERT</b>						
11/01/64-1/27/65	88	IMP	South end of Salton Sea			Garrett and Dunn 1981
11/12/67	1	IMP	Near Niland	EAC	New locality	AFN 22:90 1968
3/02/68	1	IMP	Near Niland	GSS, DAG	Spring migrant	AFN 22:479 1968
2/01/74	1	IMP	Bard	RS	Rare anywhere in CA in winter	AB 28:693 1974
2/14/87-2/15/87	2	SB	Chemehuevi Wash	RMcK	Probably early migrants - 2 birds	AB 41:331 1987

TABLE 3 - Historical breeding season observations and specimen records (mid-March through July) of Bendire's Thrasher in the eastern Mojave Desert of San Bernardino County. Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer, therefore, elevations and distances are expressed in English units. References to observations in American Birds (AB) and Audubon Field Notes (AFN) include volume, page number and year, and do not appear in the literature cited.

DATE	LOCALITY	LEGAL DESCRIPTION	ELEV	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
5/13/38	2 mi. NNE of Cima		4100	5 - 2 singing		Open Joshua forest	Johnson et al. 1948
5/14/38	2 mi. NNE of Cima		4100	2		Scattered Joshua trees	Johnson et al. 1948
6/05/38	2 mi. ESE Rock Spring		4700			Joshua tree	M V Z # 7 4 3 4 1
6/18/40	1 mi. N Cima						Johnson et al. 1948
Early June	Near Clark Mountain			1	GMcC		AFN 16:48 1962
6/26/66	Near Cima			Common	GSS	Reasonably common	AFN 20:600 1966
Spring 1967	Cima area			Common	GMcC		AFN 21:541 1967
5/13/67	Near Cima/Mid Hills			1			SBCM #3957
5/27/67	6 1/2 mi. S, 6 mi. E Cima			1			LACM #66370
Sum. 1967	Cima			Common	GMcC	Common breeding bird	AFN 21:605 1967
Spring 1968	Near Cima			Present		Hard to imagine more common anywhere	AFN 22:577 1968
Spring 1969	Cima			Common			AFN 23:627 1969
5/03/69	Cedar Canyon			1			SBCM #4245
5/60/69	Cima			1			SBCM #4262
5/21/70	Cima Breeding Bird Survey			9	JT		USFWS
Early April	Cima			common	GMcC		AB 25:801 1971
Spring 1971	Cima Breeding Bird Survey			4	JT		USFWS
5/08/72	Cima Breeding Bird Survey			8	JT		USFWS
4/01/73	Around Cima			Common			AB 27:821 1973
5/13/73	Around Cima Dome			Present		Common in area. after late March	AB 27:821 1973
5/19/73	Cima Breeding Bird Survey			7	JT		USFWS
5/23/74	Cima Breeding Bird Survey			6	JT		USFWS
3/27/75	Near Cima				SWC	Singing on territory	BLM
Spring 1975	Cima Breeding Bird Survey			3	JT		USFWS
3/24/76	Granite Mountains (East Mojave)			1	JVR	Spring migrant returning to breed	AB 30:892 1976
3/24/76	Granite Pass	T09N R13E SE1/4 SEC 20	3528	1	JVR	<u>Larrea/Acacia/Yucca schidigera</u>	BLM
3/25/76	Kelso	T11N R12B NE1/4 SEC 25	2140	1	JVR	Town lawn	BLM
3/26/76	Cedar Canyon	T13N R14E SE1/4 SEC 35	4560	2	JVR	Joshua tree/ <u>Opuntia</u>	BLM
3/26/76	Kelso	T11N R12B NE1/4 SEC 25	2140	1	JVR	Town lawn	BLM
4/08/76	Lanfair Valley	T12N R14E SW1/4 SEC 6	4760	1	JVR	<u>Opuntia acanthocarpa/ Yucca baccata</u>	BLM
4/14/76	Cedar Wash	T13N R14E SW1/4 SEC 36	4600	1	JVR	Wash - <u>Yucca brevifolia/ Acacia</u>	BLM
4/14/76	Hole-in-the-Wall	T11N R151 SE1/4 SEC 8	4280	1	JVR	Corral - <u>Yucca brevifolia</u> and <u>schidigera</u>	BLM
4/14/76	White Rock Spring	T14N R13E SW1/4 SEC 25	4960	2	JVR	<u>Yucca brevifolia/ Opuntia</u>	BLM
4/15/76	Hole-in-the-Wall	T11N R151 SE1/4 SEC 8	4280	1	JVR	Corral - <u>Yucca brevifolia</u> and <u>schidigera</u>	BLM
4/20/76	Cedar Wash	T13N R14E SW1/4 SEC 36	4600	1	JVR	Wash - <u>Yucca brevifolia/ Acacia</u>	BLM
4/24/76	10 1/4 mi. SE of Cima (Gov't Holes)	T12N R15E NW1/4 SEC 3	5020	1 pair	Cardiff	Juniper/Great Basin sage	BLM
4/24/76	5 1/2 mi. SSE of Cima	T13N R14E NW1/4 SEC 35	4440	1 pair	Cardiff	Joshua tree woodland	BLM/ Nest-Record Card
4/27/76	Cima Dome	T13N R13E SW1/4 SEC 1	4600	1	JVR	<u>Yucca brevifolia/ Opuntia</u>	BLM
4/27/76	Round Valley	T13N R15E SE1/4 SEC 32	5160	1	JVR	Juniper-sage	BLM
4/29/76	Caruthers	T13N R16E SE1/4 SEC 1	5400	1	AS	Joshua	BLM
4/30/76	Caruthers	T13N R16E SE1/4 SEC 7	5400	1	AS	Joshua	BLM
4/30/76	Pinto Valley	T13N R15E SEC 24	5100	2	AS	Open Joshua/Juniper	BLM
4/30/76	Round Valley	T13N R15E SW1/4 SEC 33	5100	1 male	AS	Artemisia/ Juniper	BLM
5/13/76	12 1/2 mi. ENE of Kelso	T11N R14E NE1/4 SEC 12	4560	1 ad male	Cardiff	Juniper	BLM
5/13/76	13 mi. ENE of Kelso	T11N R15E SW1/4 SEC 18	4520	1 ad male	Cardiff	Mojave yucca/cholla	BLM
5/13/76	13 mi. ENE of Kelso	T11N R15E SW1/4 SEC 18	4230	1 ad male	Cardiff	Mojave yucca/cholla	BLM
5/16/76	Cima Dome	T13N R13E NW1/4 SEC 1	4720	1	JVR	<u>Yucca brevifolia/ brush</u>	BLM
5/16/76	Little Cut Spring	T14N R13E SE1/4 SEC 23	5120	1	JVR	<u>Yucca brevifolia/ Opuntia</u>	BLM
5/16/76	Shadow Valley	T15N R13E NW1/4 SEC 17	4120	1	JVR	<u>Y. brevifolia &amp; schidigera/Larrea/ Cholla</u>	BLM
5/17/76	White Rock Spring	T14N R13E SW1/4 SEC 15	4960	1	JVR	<u>Yucca brevifolia/Opuntia</u>	BLM
5/18/76	Fenner Wash	T11N R17E NE1/4 SEC 8	1560	1	JVR	Wash - <u>Y. schidigera/Opuntia/Acacia/Larrea</u>	BLM
5/20/76	Pinto Valley	T13N R16E SW1/4 SEC 14	5280	1	JVR	Open heavily grazed <u>Artemisia/Lycium</u>	BLM

(Continued)

TABLE 3 (Continued)

DATE	LOCALITY	LEGAL DESCRIPTION	ELEV	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
5/29/76	1 1/4 mi. SE of Cima	T13N R14E NE1/R SEC 10	4320	3 adults	Cardiff	Joshua tree woodland	BLM
5/29/76	3 1/2 mi. NW of Cima	T14N R14E SW1/4 SEC 19	4880	1 ad	Cardiff	Joshua tree woodland	BLM
5/29/76	3 mi. SE of Cima	T13N R14E SE1/4 SEC 15	4280	1 ad male	Cardiff	Joshua tree woodland	BLM
5/29/76	4 mi. SE of Cima	T13N R14E SW1/4 SEC 23	4440	1 ad	Cardiff	Joshua tree woodland	BLM
5/29/76	5 1/2 mi. SSE of Cima	T13N R14E SW1/4 SEC 35	4440	1 ad	Cardiff	Joshua tree woodland	BLM
5/29/76	5 1/2 mi. SSE of Cima	T13N R14E SW1/4 SEC 35	4380	1 pair	Cardiff	Joshua tree woodland	BLM
5/29/76	5 mi. S of Cima	T13N R14E SE1/4 SEC 33	4080	1 ad male	Cardiff	Joshua tree woodland	BLM
5/29/76	5 mi. S of Cima	T13N R14E NE1/4 SEC 33	4040	1 pair	Cardiff	Joshua tree woodland	BLM
5/29/76	5 mi. S of Cima	T1N R14E NE1/4 SEC 33	4080	1 pair	Cardiff	Joshua tree woodland	BLM
5/30/76	10 1/2 mi. ENE of Cima	T15N R12E SW1/4 SEC 35	4400	1 ad	Cardiff	Joshua tree woodland	BLM
5/30/76	10 mi. NW of Cima	T15N R13E NE1/4 SEC 28	4460	1 ad male	Cardiff	Joshua tree woodland	BLM
5/30/76	10 mi. NW of Cima	T15N R13E NE1/4 SEC 28	4440	1 pair	Cardiff	Joshua tree woodland	BLM
5/30/76	6 1/2 mi. NW of Cima	T15N R13E SW1/4 SEC 17	5120	1 ad male	Cardiff	Joshua tree woodland	BLM
5/30/76	6 mi. NW of Cima	T15N R13E NW1/4 SEC 16	5320	1 ad male	Cardiff	Joshua tree woodland	BLM
5/30/76	6 mi. NW of Cima	T15N R13E SW1/4 SEC 16	5400	1 ad male	Cardiff	Joshua tree woodland	BLM
5/30/76	7 1/2 mi. SE of Cima	T13N R15E SE1/4 SEC 30	5220	1 ad male	Cardiff	Juniper woodland	BLM
5/30/76	8 1/2 mi. E of Cima	T13N R12E SE1/4 SEC 11	4600	1 ad	Cardiff	Joshua tree woodland	BLM
5/30/76	9 mi. E of Cima	T13N R12E NW1/4 SEC 2	4440	1 ad male	Cardiff	Joshua tree woodland	BLM
5/30/76	9 mi. E of Cima	T13N R12E NW1/4 SEC 2	4440	1 pair	Cardiff	Joshua tree woodland	BLM
5/30/76	Cima Breeding Bird Survey			5	JT		USFWS
6/11/76	10 1/4 mi. SE of Cima (Gov't Holes)	T12N R15E NW1/4 SEC 3	5020	1 pair	Cardiff	Juniper/Great Basin sage	BLM
6/11/76	11 mi. SE of Cima (Rock Spring)	T12N R15E NE1/4 SEC 2	4920	1 pair	Cardiff	Juniper/Great Basin sage	BLM
6/11/76	11 mi. SE of Cima (Rock Spring)	T12N R15E NE1/4 SEC 2	4900	1 pair	Cardiff	Juniper/Great Basin sagebolla	BLM
6/11/76	13 mi. ENE of Kelso	T11N R15E NW1/4 SEC 18	4300	1 ad	Cardiff	Mojave yucca/cholla	BLM
6/11/76	5 1/2 mi. SSE of Cima	T13N R14E SW1/4 SEC 35	4380	1 pair	Cardiff	Joshua tree woodland	BLM
6/11/76	5 mi. SSE of Cima	T13N R14E NW1/4 SEC 34	4120	1 ad	Cardiff	Joshua tree woodland	BLM
6/11/76	9 1/4 mi. SSE of Cima	T12N R14E SW1/4 SEC 24	5420	1 pair	Cardiff	Juniper/Great Basin sage	BLM
6/12/76	11 mi. NW of Goffs	T11N R17E SE1/4 SEC 5	3640	1 pair	Cardiff	Yucca/cholla	BLM
6/12/76	12 1/2 mi. NW of Goffs	T12N R17E NE1/4 SEC 32	3740	1 pair w/food	Cardiff	Yucca/cholla	BLM
6/13/76	13 1/2 mi. N of Goffs	T12N R18E NE1/4 SEC 19	3610	1 ad	Cardiff	Mojave yucca/Joshua tree	BLM
6/12/76	13 1/2 mi. N of Goffs	T12N R18E NE1/4 SEC 20	3500	1 ad	Cardiff	Mojave yucca/catclaw and catalpa wash	BLM
6/12/76	13 1/2 mi. N of Goffs	T12N R18E NW1/4 SEC 19	3660	1 ad	Cardiff	Mojave yucca/Joshua tree	BLM
6/12/76	13 1/2 mi. N of Goffs	T12N R18E NW1/4 SEC 20	3540	1 ad	Cardiff	Mohave yucca/Joshua tree	BLM
6/12/76	13 1/2 mi. N of Goffs	T12N R18E NE1/4 SEC 20	3500	1 ad male	Cardiff	Mojave yucca/catclaw and catalpa wash	BLM
6/12/76	13 1/2 mi. N of Goffs	T12N R18E NE1/4 SEC 20	3500	1 pair	Cardiff	Mojave yucca/catclaw and catalpa wash	BLM
6/12/76	13 1/4 mi. ESE of Cima	T13N R16E NE1/4 SEC 29	4880	1 pair	Cardiff	Joshua tree/cholla	BLM
6/12/76	13 1/4 mi. ESE of Cima	T13N R16E NE1/4 SEC 29	4880	1 pair w/2 imm	Cardiff	Joshua tree/Juniper/cholla	BLM
6/12/76	13 mi. NW of Goffs	T12N R17E SE1/4 SEC 27	3780	1 ad	Cardiff	Yucca/cholla	BLM
6/12/76	14 1/4 mi. NW of Goffs	T12N R16E SW1/4 SEC 25	3980	1 ad	Cardiff	Mojave yucca/Joshua tree/cholla	BLM
6/12/76	14 1/4 mi. NW of Goffs	T12N R16E SW1/4 SEC 25	4000	1 pair	Cardiff	Mojave yucca/Joshua tree/cholla	BLM
6/12/76	14 3/4 mi. SE of Cima	T12N R16E SE1/4 SEC 8	4540	1 ad	Cardiff	Joshua tree/cholla	BLM
6/12/76	14 mi. NW of Goffs	T12N R16E SW1/4 SEC 25	3950	1 ad	Cardiff	Mojave yucca/Joshua tree/cholla	BLM
6/12/76	16 mi. NW of Goffs	T12N R16E NW1/4 SEC 23	4180	1 ad	Cardiff	Mojave yucca/Joshua tree/cholla	BLM
6/12/76	9 mi. NW of Goffs	T11N R17E SE1/4 SEC 16	3420	1 ad	Cardiff	Yucca/cholla	BLM
6/13/76	1 1/4 mi. N of Cima	T14N R14E SE1/4 SEC 32	4240	1 ad	Cardiff	Joshua tree woodland	BLM
6/13/76	10 mi. S of Mountain Pass	T14N R13E NE1/4 SEC 2	4940	1 ad male	Cardiff	Joshua tree woodland	BLM
6/13/76	3 1/2 mi. E of Cima	T13N R14E NE1/4 SEC 1	4540	1 pair w/food	Cardiff	Joshua tree woodland	BLM
6/13/76	3 1/2 mi. NW of Cima	T14N R13E SW1/4 SEC 25	4950	1 ad	Cardiff	Joshua tree woodland	BLM
6/13/76	3 3/4 mi. SE of Mountain Pass	T15N R14E NW1/4 SEC 5	4960	1 ad male	Cardiff	Joshua tree woodland	BLM
6/13/76	3 mi. SE of Cima	T13N R14E SE1/4 SEC 11	4560	1 ad	Cardiff	Joshua tree woodland	BLM
6/13/76	4 1/4 mi. N of Cima	T14N R14E SW1/4 SEC 16	4190	1 ad	Cardiff	Joshua tree woodland	BLM
6/13/76	4 1/4 mi. N of Cima	T14N R14E SW1/4 SEC 16	4200	2 adults	Cardiff	Joshua tree woodland	BLM
6/13/76	4 1/4 mi. N of Cima	T14N R14E SE1/4 SEC 16	4080	1 pair	Cardiff	Joshua tree woodland	BLM
6/13/76	4 1/4 mi. S of Mountain Pass	T15N R14E SW1/4 SEC 6	4800	1 pair	Cardiff	Joshua tree woodland	BLM
6/13/76	5 mi. E of Cima	T13N R15E NE1/4 SEC 6	4680	1 ad	Cardiff	Joshua tree woodland	BLM
6/13/76	5 mi. S of Mountain Pass	T15N R13E NE1/4 SEC 11	4620	1 pair	Cardiff	Joshua tree woodland	BLM
6/13/76	6 mi. SSE of Mountain Pass	T15N R14E NE1/4 SEC 18	5300	1 ad male	Cardiff	Joshua tree woodland	BLM

(Continued)

TABLE 3 (Continued)

DATE	LOCALITY	LEGAL DESCRIPTION	ELEV	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
6/13/76	8 3/4 mi. S of Mountain Pass	T15N R13E NW1/4 SEC 36	4970	1 ad male	Cardiff		
6/13/76	9 mi. S. of Mountain Pass	T15N R13E NW1/4 SEC 36	4990	1 pair	Cardiff		
6/14/76	14 mi. S of Kelso (Granite Pass)	T08N R13E NE1/4 SEC 4	3880	1 ad w/food	Cardiff	Johusa tree woodland	BLM
6/14/76	15 1/4 mi. S of Kelso (Granite Pass)	T08N R13E NW1/4 SEC 10	3860	1 a d	Cardiff	Joshua tree woodland	BLM
7/18/16	Cedar Wash	T13N R14E SWU4 SEC 35	4480	1	JVR	Mojave yucca/ cholla/juniper	BLM
7/20/76	Lanfair Valley	T14N R17E NW1/4 SEC 9	4640	5	JVR	Cholla	BLM
7/21/76	Caruthers Canyon	T13N R16E SW1/4 SEC 1	5400	1	JVR	<u>Yucca brevifolia</u>	BLM
7/21/76	Caruthers Canyon	T13N R15E NE1/4 SEC 13	5328	2	JVR	<u>Yucca brevifolia/ Opuntia acanthocarpa</u>	BLM
7/21/76	Cedar Cyn Rd and Watson Wash	T13N R15E SW1/4 SEC 36	4800	1	EW	Juniper/ <u>Yucca brevifolia</u>	BLM
7/21/76	Lanfair Valley	T12N R17E SE1/4 SEC 30	3440	1	JVR	Juniper/ <u>Yucca brevifolia</u>	BLM
7/21/76	Pinto Valley	T13N R15E NW1/4 SEC 13	5328	1	JVR	<u>Juniperus osteosperma/ Haplopappus</u>	BLM
7/21/76	Pinto Valley	T13N R15E SW1/4 SEC 13	5300	1	EW	<u>Yucca schidigera/ Opuntia acanthocarpa</u>	BLM
7/21/76	Pinto Valley	T13N R15E NW1/4 SEC 13	5200	2	JVR	Open area - <u>Artemisia tridentata</u>	BLM
7/21/76	Piute Valley	T13N R19E SW1/4 SEC 32	2320	2	JVR	<u>Juniperus osteosperma/ Yucca baccata</u>	BLM
7/22/76	Lanfair Valley	T12N R18E SWU4 SEC 22	3440	2	JVR	<u>Artemisia/ Juniperus osteosperma</u>	BLM
7/29/76	Pinto Valley	T13N R15E NW1/4 SEC 23	5120	1	JVR	<u>Yucca schidigera/ Larrea tridentata</u>	BLM
7/29/76	Pinto Valley	T13N R15E NW1/4 SEC 26	5080	1	JVR	Wash with <u>Acacia greggii</u>	BLM
4/10/77	NW of Cedar Canyon Wash	T13N R14E SE1/4 SEC 27	4320	1 ad male	SWC	Open <u>Juniperus osteosperma/ Opuntia</u>	BLM
4/10/77	SE side Cima Dome	T14N R13E SE1/4 SEC 23	5080	1 ad male	SWC	Open <u>Juniperus osteosperma/ Opuntia</u>	BLM
4/11/77	Cottonwood Wash - Granite Mtns.	T09N R13E NE1/4 SEC 32	3800	1 a d	SWC	Joshua tree mixed	BLM
4/11/77	Wash on S side Granite Pass	T08N R13E SW1/4 SEC 10	3825	1 ad male	SWC	Joshua tree mixed	BLM
4/15/77	Small wash along Kelbaker Rd.	T12N R12E SW1/4 SEC 6	3640	1 pair	SWC	Mojave yucca	BLM
4/16/77	4 3/4 mi. SSE of Cima	T13N R14E NE1/4 SEC 33	4100	1 ad male	SWC	Catclaw wash	BLM
4/16/77	Cima Dome - Deer Spring	T14N R13E NE1/4 SEC 20	5400	2 males	SWC	Small wash along road	BLM
4/16/77	Rock Spring	T12N R15E NE1/4 SEC 2	4900	1 ad	SWC	Joshua tree mixed	BLM
4/16/77	Upper Cedar Canyon	T13N R15E SE1/4 SEC 29	5200	1 pair	SWC	Joshua tree mixed	BLM
Spring 1977	2 mi. N and 0.7 mi. W of Cima	T14N R14E SW1/4 SEC 29		Present	SWC	Sagebrush/Juniper	AB 32:101 1978
4/22/77	Cottonwood Wash mouth	T09N R13E SW1/4 SEC 32	3920	1 a d	SWC	Pinyon Joshua tree	BLM
4/23/77	Fenner Wash narrows	T11N R17E SE1/4 SEC 5	3600	1 a d	SWC	Joshua tree woodland - BBC	BLM
4/24/77	Cedar Canyon	T13N R15E SW1/4 SEC 30	4800	1 a d	SWC	Mojave yucca/creosote	BLM
4/24/77	Cedar Canyon mouth	T13N R14E SE1/4 SEC 35	4600	1 a d	SWC	Mojave yucca/cholla	
5/02/77	3 mi. N of Rock Spring	T13N R15E NE1/4 SEC 24	5160	1 ad	SWC	Wash - cholla on hills	BLM
5/02/77	4 mi. NW of Rock Spring	T13N R15E NE1/4 SEC 13	5300	1 pair + 1 male	SWC	Joshua tree mixed	BLM
5/03/77	1.5 mi. NW Kessler Spring	T14N R13E NE1/4 SEC 11	5040	1 a d	SWC	Joshua tree/juniper	BLM
5/03/77	1/2 mi. N of Fenner Wash narrow	T11N R17E NE1/4 SEC 5	3684	1 ad male	SWC	Brushy wash - Joshua tree/Juniper	BLM
5/03/77	3.5 mi. NW of Bobcat Hills	T13N R17E NW1/4 SEC 24	4120	1 ad	SWC	Joshua tree/blackbrush	BLM
5/03/77	Kessler Spring	T14N R14E SW1/4 SEC 18	4840	1 a d	SWC	Mojave yucca/cholla	BLM
5/03/77	Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 male-singing	SWC	Joshua tree - mixed	BLM - AB 32:102 1978
5/03/77	Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 male-singing	SWC	Joshua tree - mixed	BLM - AB 32:102 1978
5/04/77	22 q i. N of Cima	T14N R14E SW1/4 SEC 29	4400	1 ad male	SWC	Mojave yucca/cholla - BBC	BLM
5/04/77	4 mi. NW of Kessler Spring	T15N R13E SE1/4 SEC 35	4840	1 a d	SWC	Mojave yucca/cholla - BBC	BLM
5/04/77	Cima	T14N R14E SW1/4 SEC 29	4450	1 male-singing	SWC	Joshua tree/mixed	BLM
5/11/77	2 1/4 mi. WSW of Bobcat Hills	T12N R15E NE1/4 SEC 36			SWC	Joshua tree/mixed	BLM
5/11/77	3 mi. NW of Cima	T14N R13E NW1/4 SEC 1	4720	1 ad male	SWC	Joshua tree woodland	
5/11/77	Cedar Canyon	T13N R15E SW1/4 SEC 30	4800	2 adult	SWC	<u>Yucca baccata/ Y. schidigera/ blackbntsh</u>	BLM
5/14/77	Lanfair Vally	T11N R17E NE1/4 SEC 5	3650	1 pair	SWC	Joshua tree - mixed	BLM - AB 32102 1978
Spring 1977	Cima Breeding Bird Survey			3	JT	Wash - cholla on hills	USFWS
5/17/77	2 mi. NW of Government Holes	T13N R15E NW1/4 SEC 33	5100	1 ad	SWC	Mojave yucca/cholla - BBC	BLM
5/18/77	2 mi. NW of Rock Spring	T13N R15E NE1/4 SEC 25	5040	1 a d	SWC	Joshua tree - mixed	BLM
5/18/77	4 mi W of Rock Spring	T13N R16E NE1/4 SEC 4	4600	1 a d	SWC	Joshua tree - mixed	BLM
5/25/77	Caruthers Canyon	T13N R16E SW1/4 SEC 7	5440	1 a d	SWC	Joshua tree - mixed	
5/25/77	Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	2 pairs	SWC	Mojave yucca/cholla - BBC	BLM - AB 32:102 1978
6/01/77	Watson Wash	T11N R16E NE1/4 SEC 21	3690	2 males	SWC	Mojave yucca/ cholla	BLM
6/08/77	Fenner Wash narrows	T11N R17E SE1/4 SEC 5	3640	4 adult	SWC	<u>Y. schidigera/ cholla/ Acacia</u>	BLM
6/08/77	Lanfair Valley	T11N R17E NE1/4 SEC 5	3450	2 males-singing	SWC	Mojave yucca/ cholla	BLM - AB 32:102 1978
6/15/77	Watson Wash	T11N R16E NE1/4 SEC 21	3690	2 males	SWC	Mojave yucca/ cholla	BLM
7/09/77	Canthers canyon	T13N R15E NE1/4 SEC 6	5600	5	EAC	<u>Prunus</u>	BLM

(Continued)

TABLE 3 (Continued)

DATE	LOCALITY	LEGAL DESCRIPTION	ELEV	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
7/09/77	Grotto Hills	T13N R17E SW1/4 SEC 31	4200	1 ad	SWC	Joshua tree - mixed	BLM
7/09/77	OX Ranch	T13N R17E SW1/4 SEC 18	4360	1 ad	SWC	Joshua tree - mixed	BLM
7/09/77	OX Ranch	T13N R17E SW1/4 SEC 18	4350	1 ad	SWC, EAC	Joshua tree - mixed	BLM
7/10/77	Lanfair Valley	T12N R17E NW1/4 SEC 25	3880	1 ad	SWC	Mojave yucca/ Joshua tree	BLM
7/11/77	Halloran Summit	T15N R11E SW1/4 SEC 10	4040	1 ad	SWC	Joshua tree/ blackbrush	BLM
7/11/77	Woods Wash	T11N R15E NE1/4 SEC 13	3800	1 pair	SWC	Mojave yucca/ cholla	BLM
4/22/78	SW edge of Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 ad	SWC	Mojave yucca/ cholla - BBC	BLM - AB 33:94 1979
5/10/78	SW edge of Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 ad	SWC	Mojave yucca/ cholla - BBC	BLM - AB 33:94 1979
Spring 1978	Cima Breeding Bird Survey			11	JT		USFWS
5/28/78	SW edge of Lanfair Valley	T11N R17E NE1/4 SEC 5	3650	1 ad	SWC	Mojave yucca/ cholla - BBC	BLM - AB 33:94 1979
5/29/78	Powerline Rd. N of Clark Mtn.	T17N R3E SEC 6		1 pair	PM		Field notes
6/07/78	2 mi. W of Government Holes	T13N R15E NW1/4 SEC 33	5200	2	ASE		BLM
6/07/78	3/4 mi. N Cedar Canyon Rd - Pinto Vly	T13N R15E NW1/4 SEC 36	4950	2	ASE	Juniper	BLM
6/10/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	1	BAC, SJN	Joshua tree woodland	BLM
6/15/78	Lanfair Valley	T13N R17E NW1/4 SEC 9	4180	1	BAC, SJN	Joshua tree woodland II - BBC	BLM - AB 33:93 1979
6/18/78	Lanfair Valley	T13N R18E NW1/4 SEC 19	3860	1 male-singing	SWC, LL	Grazed creosote/ yucca II - BBC	BLM - AB 33:91 1979
6/19/78	Lanfair Valley	T13N R18E NW1/4 SEC 29	3760	1 pair	SWC, LL	Grazed creosote/ yucca I - BBC	BLM - AB 33:91 1979
6/21/78	Lanfair Valley	T13N R18E NW1/4 SEC 29	3760	1 ad	SWC, LL	Grazed creosote/ yucca I - BBC	BLM - AB 33:91 1979
6/21/78	Lanfair Valley	T13N R17E NE1/4 SEC 31	3700	2 adults	DJ, MF	Yucca/ creosote II - BBC	BLM - AB 33:96 1979
6/23/78	Lanfair Valley	T13N R17E NE1/4 SEC 31	3700	2 adults	DJ, MF	Yucca/ creosote II - BBC	BLM - AB 33:96 1979
6/23/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	7	BAC, SJN	Joshua tree woodland III - BBC	BLM - AB 33:93 1979
6/24/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	1	BAC, SJN	Joshua tree woodland III - BBC	BLM - AB 33:93 1979
6/25/78	Lanfair Valley	T13N R17E NE1/4 SEC 31	3700	2 adults	DJ, MF	Yucca/ creosote II - BBC	BLM - AB 33:93 1979
6/26/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	3	BAC, SJN	Joshua tree woodland III - BBC	BLM - AB 33:93 1979
6/27/78	Lanfair Valley	T13N R17E NW1/4 SEC 9	4180	1	BAC, SJN	Joshua tree woodland II - BBC	BLM - AB 33:93 1979
6/28/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	5	BAC, SJN	Joshua tree woodland III - BBC	BLM - AB 33:93 1979
6/29/78	Lanfair Valley	T13N R17E NW1/4 SEC 9	4180	1	BAC, SJN	Joshua tree woodland II - BBC	BLM - AB 33:93 1979
6/30/78	Lanfair Valley	T13N R17E NW1/4 SEC 9	4180	1	BAC, SJN	Joshua tree woodland II - BBC	BLM - AB 33:93 1979
6/30/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	10	BAC, SJN	Joshua tree woodland III - BBC	BLM - AB 33:93 1979
7/20/78	Lanfair Valley	T13N R17E NW1/4 SEC 10	4100	1	BAC, SJN	Joshua tree woodland	BLM
Spring 1979	Cima Breeding Bird Survey			3	JT		USFWS
Spring 1980	Cima Breeding Bird Survey			5	JT		USFWS



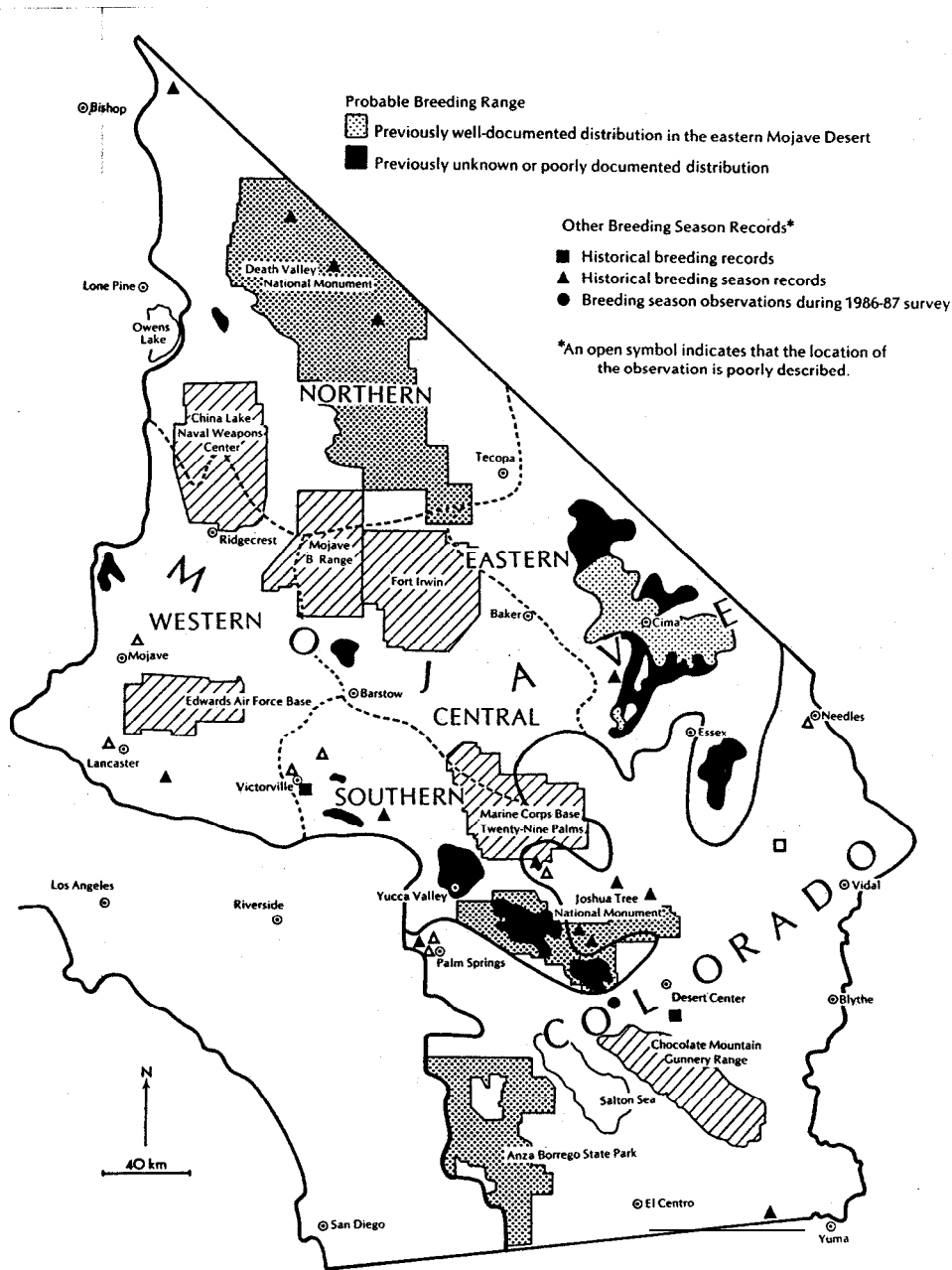


FIGURE 2 - Breeding range of Bendire's Thrasher in the Mojave Desert based on historical records and the results of our study. Historical records for the Colorado Desert are also illustrated.

TABLE 4 - Bendire's Thrasher detections on transects in the eastern Mojave Desert of San Bernardino County during the 1986-87 surveys. The subdivisions and boundaries of the Mojave Desert are illustrated in Figures 1 and 2. The locations of transects are illustrated in Figure 1.

TRANSECT NAME	ABBREVIATION	DATE	POINTS		DETECTIONS		
			TOTAL	w/BENDIRE'S	hrd	obs	tot
Cima Dome	CD	04/27/86	3	2	2	0	2
		04/28/86	12	5	4	7	8
		05/21/87	12	2	2	2	2
		TOTAL <sup>1</sup>	12	8	-	-	-
California Valley	CV	06/06/86	11	0	0	0	0
Clark Mountain	CM	04/28/86	12	7	9	3	9
		05/20/87 <sup>2</sup>	12	0	0	0	0
		TOTAL	12	7			
Halioran Summit	HS	04/28/86	10	5	3	5	5
		05/21/77	10	5	4	5	6
		TOTAL	10	7			
Kingston Mountains	KM	06/05/86	11	0	0	0	0
Lanfair Valley	LV	04/28/86	1	0	0	0	0
		04/29/86	27	9	6	6	11
		05/19/87	29	11	6	13	15
		TOTAL	29	13			
Old Woman Mountains	OW	04/30/86	16	9	9	9	12
		05/17/87	17	5	6	7	9
		TOTAL	19	10			
Providence Mountains	PM	04/29/86	22	8	6	6	9
		05/18/87	11	4	4	3	5
		TOTAL	22	8	-	-	-
Shadow Valley	SV	04/28/86	12	4	7	1	7
		05/20/72	12	0	0	0	0
		TOTAL	12	4			
Ward Valley	WV	04/30/86	16	3	3	2	3

<sup>1</sup>TOTAL is the cumulative number of locations sampled between years.

<sup>2</sup>Extremely strong winds during surveys in Shadow Valley and Clark Mountain during 1987.

hrd = heard; obs = observed; tot = total

In 1986, Bendire's Thrasher was also relatively common on the Clark Mountain transect over Keany Pass on the north side of Clark Mountain and on the Shadow Valley transect west of Clark Mountain along Excelsior Mine Road (Table 4). They were not found on these transects in 1987, but the winds were extremely heavy the day we surveyed both transects, and few birds of any species were detected.

Based on these results, we conclude that the breeding distribution of Bendire's Thrasher in the eastern Mojave Desert is considerably larger than previously documented (Figure 2). This population extends north into Shadow Valley and onto the northern and western slopes of Clark Mountain, east extends into Ivanpah Valley and south into upper Fenner Valley and along the flanks of the Providence Mountains.

We also discovered an unreported population of Bendire's Thrashers in the Old Woman Mountains southeast of Essex. The bird was common along this transect in 1986 and 1987 (Table 4) this elevational range nearly all sample points above an elevation of 850 m. We also found three birds in this elevational range on the south side of the Little Piute Mountains while surveying along the Ward Valley transect (Table 4). The habitat in the Old Woman and Little Piute Mountains lacked Joshua trees but had relatively dense stands of Mojave yucca and other succulents. The thrasher population appeared to extend, from the south side of the Little Piute Mountains south to at least the center of the Old Woman Mountains (Figure 2).

We did not locate Bendire's Thrashers along either the California Valley or the Kingston Mountains transects in 1986 (Table 4). Although the plant species composition appeared to be suitable for this thrasher, the soil in California Valley was rocky desert pavement and the topography along the Kingston Mountains transect was extremely steep with rocky soils. Neither area appeared suitable for Bendire's Thrasher, and we did not return in 1987.

### Southern Mojave Desert

Historical breeding season records for this portion of the Mojave Desert are centered around three general locations: Lucerne Valley/Victorville; Yucca Valley/Pioneertown; and Joshua Tree National Monument (JTNM).

We located six breeding season records for the Lucerne Valley/Victorville area (Tables 1 and 5). The first verified California nesting records for Bendire's Thrasher were a nest, bird, and two sets of eggs collected near Victorville in April 1920 (Pierce 1921). Other records for this area include a specimen collected near Victorville in 1916 (Pierce 1919) and a bird seen carrying food near Victorville on May 1969 (Table 5). We located only two breeding season records for this portion of the Mojave Desert during the 1970's and 1980's (Table 5).

In 1986 and 1987, we conducted surveys on four transects in the Lucerne Valley/Victorville area (Figure 1 and Table 6). The record for 22 May 1969 was along the Stoddard Mountain transect located north of Victorville (Figure 1 and Table 5). We failed to find Bendire's Thrashers on this transect or on the nearby Goat Mountain transect (Table 6). Both transects were through areas with either Joshua trees Mojave yucca, but the Stoddard Mountain area was heavily used by off-road vehicles, and the soil was very rocky at Goat Mountain. At both sites, the habitat had widely spaced Joshua trees, Mojave yucca, and creosote (Larrea tridentata) with few other shrubs and only sparse annual growth.

We found Bendire's Thrashers both years on transects over Sidewinder Mountain and in southeastern Apple Valley (Table 6). The Joshua tree habitat in southeastern Apple Valley had a relatively rich mixture of Joshua trees and columnar cholla cactus. The area is being developed, and houses were scattered along the transect. The Sidewinder Mountain transect crossed an undeveloped area with

TABLE 5 - Historical breeding season observations and specimen records (mid-March through July) of Bendire's Thrasher in the southern, central, western, and northern Mojave Desert. The subdivisions of the Mojave Desert are illustrated in Figures 1 and 2 Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer. References to observations in American Birds (AB) and Audubon Field Notes (AFN) include volume, page number, and year, and do not appear in the literature cited.

DATE	CO.	LOCALITY	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
<b>SOUTHERN MOJAVE DESERT</b>						
5/1986	RIV	Warren's Well (Yucca Valley)	Fairly common		More numerous than Le Conte's Thrasher	Heller 1901
5/13/73	RIV	Near Cottonwood Spg. - JTNM	1		Scarce in area	AB 27:821 1973
4/13/74	R N	Salton View - JTNM	1 male-singing	JM		AB 28:950 1974
May 1975	R N	Joshua Tree Breeding Bird Svy.	2			USFWS
3/25/78	R N	JTNM	1	DZ	Spring arrival date this year	AB 32:1056 1977
5/10/81	R N	Near Cottonwood Spg. - JTNM	2	RMcK		Field Notes
5/07/16	SB	Near Victorville	1 ad male		Date suggests nesting	MVZ-#54556; Pierce 1919
5/22/69	SB	Near Victorville	1	GSS	Carrying food - Barstow BBS 1969	AFN 23:627 1969
Spring 1978	SB	Barstow Breeding Bird Svy.	1			USFWS
April 1974	SB	Around Yucca Valley	2 pairs	ASm, GGS		AB 28:950 1974
6/75-7/75	SB	Near Yucca Valley	6	FH	Few records exist in area	AB 29:1034 1975
6/06/81	SB	Near Pioneertown	1	EAC	In an area where is considered rare	AB 35:979 1981
May 1984	SB	Near Pioneertown	1	TMe		Field Notes
7/08/86	SB	Near Lucerne Valley	3	RMcK	Thought to be nesting locally	AB 40:1256 1986
<b>CENTRAL MOJAVE DESERT</b>						
Spring 1981	SB	Superior Valley N of Barstow	4 male-singing	ASE	Present all spring - probable breeding	Field Notes
<b>WESTERN MOJAVE DESERT</b>						
4/04/81	KE	California City	1	GWP	Appreciably NW of normal range	AB 35:864 1981
6/18/82	KE	Kelso Valley	1 male	BE	W of known breeding range - singing	AB 36:1017 1982
4/07/79	LA	Near Lancaster	1	JD	Joshua tree woodland; singing	AB 33:806 1979
<b>NORTHERN MOJAVE DESERT</b>						
6/01/74	INY	Stovepipe Wells - DVNM	1	JVR	North of range; may be first in DVNM	AB 28:853 1974
5/23/77	INY	Mesquite Springs - DVNM	1	GMcC	North of normal range	AB 31:1048 1977
5/28/77	INY	Furnace Creek Ranch - DVNM	1	KG	North of normal range	AB 31:1048 1977
5/23/70	MON	Oasis Ranch - Fish Lake Vly.	1	GMcC	Northernmost record for California	AB 24:645 1970

few obvious signs of human use. The Joshua tree habitat was a diverse mixture of shrubs with numerous Joshua trees, Mojave yucca, and columnar cholla cactus.

Breeding by Bendire's Thrashers has not been confirmed in the Yucca Valley/Pioneertown area (Table 1), but is suggested by irregular but repeated observations of birds (Table 5) in apparently suitable habitat with dense Joshua trees. We conducted surveys on three transects in 1986 and on two in 1987 (Table 6). The Yucca Valley transect was located on the south side of town between Black Rock Canyon Campground and Yucca Alta Drive. This transect is through a heavily developed area with scattered Joshua trees on remaining undeveloped lots and as landscape plant around homes. Bendire's Thrashers were not observed on this transect in 1986, and it was not sampled in 1987.

Bendire's Thrashers were not found on either the Landers or the Pipes Canyon transects in 1986, but were found on both in 1987 (Table 6). The number of points on each transect was increased in 1987 to include areas not sampled the first year, and in both cases the 1987 observations were at new points. The Pipes Canyon transect started at Highway 247 and followed Pipes Canyon Road and Pioneertown Road to near Pioneertown. Both birds observed on the Pipes Canyon transect were found at the intersection of Highway 247 and Pipes Wash. The Landers transect winds through numerous paved and dirt roads between Landers and Highway 62. All three birds observed on this transect in 1987 were on the uplands due east of Pipes Wash. Thus, both transects appeared to intersect a small population of these thrashers when more points were added the second year. All five locations with Bendire's Thrashers were in habitats with Joshua trees and columnar cholla cactus. The points in Pipes Wash also had large catclaw trees, but both birds were observed at the edge of the wash on nearby hillsides. Mojave yucca was common along the Landers transect. Houses also were scattered along the route.

Our record confirms breeding by Bendire's Thrashers in JTNM (Table 1) where the species is considered to be scarce (McCaskie 1973) or occasional in the Monument (Miller and Stebbins 1964). Our literature review yielded seven historical records for JTNM (Tables 1 and 5). We used the playback technique to sample thrashers at 41 points along a transect through JTNM in 1986 (Table 6). We found Bendire's Thrashers at 17 of 41 points, and a number of the points where we did not find them were in the Colorado Desert at low elevations in the Pinto Basin and south of the entrance to JTNM (Figure 2). Thus, Bendire's Thrasher was much more common than expected. The desert scrub habitat at most sites occupied by the thrasher had relatively dense stands of Mojave yucca and few or no Joshua trees.

### Central Mojave Desert

Bendire's Thrashers were first reported from this region of the Mojave Desert at Superior Valley in 1981 (Table 5). Breeding was suspected at this location in 1981 but was not confirmed until 1982 (Table 1). This site is located north of Barstow, south of Superior Dry Lake, and west of Lane Mountain. We conducted Bendire's Thrashers surveys in Superior Valley and near Goldstone in 1986 (Table 6) and found three birds in Superior Valley. Both sites are relatively small isolated stands of Joshua tree woodland habitat. The Superior Valley site is on firm soil with little sand, gravel, or rock. The Goldstone site is on relatively loose sand.

### Western Mojave Desert

Our literature review documented three breeding season records of Bendire's Thrasher in the western region of the Mojave Desert (Table 5). Two were early April observations of probable migrants. The other one was a mid-June sighting of a singing male in apparently suitable Joshua tree

woodland habitat in Kelso Valley on the eastern slope of the Sierra Nevada west of Red Rock Canyon State Park.

Much of the western Mojave Desert has stands of Joshua trees that outwardly appear suitable for Bendire's Thrashers, but observations are curiously lacking. Therefore, we concentrated our efforts in the region and sampled 152 points on 16 transects in 1986 and 99 points on ten transects in 1987 (Table 7). Despite the intense effort, we located only one Bendire's Thrasher in the western Mojave Desert (Table 7). This individual was seen in 1987 in upper Butterbread Canyon, one ridge east of Kelso Valley. The bird did not make any sounds. The Butterbread transect included sample points in Kelso Valley, but we did not observe thrashers there. Rick Saval (Pers. Comm.) independently located a Bendire's Thrasher nest in Kelso Valley in 1987 (Table 1). This confirmed breeding record combined with the other observations in the area suggests that a small population of Bendire's Thrashers may breed in these and possibly other canyons on the southeastern slope of the Sierra Nevada (Figure 2).

### Northern Mojave Desert

Prior to our study, the only records of Bendire's Thrashers from this portion of the Mojave Desert were four observations of presumably non-breeding birds between 23 May and 1 June (Table 5 and Figure 2). These observations were recorded on or around Memorial Day weekend in Death Valley National Monument and at Oasis Ranch in Fish Lake Valley. All are at sites regularly visited by field ornithologists and bird-watchers searching for eastern vagrants at desert oases at this time of year.

We conducted Bendire's Thrasher surveys in Joshua tree woodland habitats at two locations in the northern Mojave Desert in 1986 and at four locations in 1987 (Table 6). These thrashers were fairly common both years on the Lee Flat transect. This site is located south of Saline Valley and east of Cerro Gordo Peak in the Inyo Mountains. Although breeding has not been confirmed at this site, it is strongly suggested by relatively high abundance, apparently suitable habitat, presence in two consecutive years, and unsolicited vocalizations of singing males. Bendire's Thrashers were not found in similar vegetation at nearby sites. However, the soil at Centennial Plats was relatively loose and sandy, at Santa Rosa Flats was desert pavement, and at Santa Rosa Mines Road was rocky.

### Colorado Desert

Most records of Bendire's Thrasher in the Colorado Desert are of early spring migrants (Table 8), and this species is generally regarded as a transient here (Garrett and Dunn 1981). In general, these observations are all from the northern Colorado Desert near the boundary with the Mojave Desert (Figure 2). The only exception is one bird observed on 4 April 1972 in the southern Imperial Valley (Figure 2 and Table 8).

Our records search located two breeding records for the Colorado Desert (Figure 2 and Table 1). Specimen #1632 at the San Bernardino County Museum is an egg set collected in the Turtle Mountains, San Bernardino County, on 1 April 1920. The second record was of breeding birds at Corn Spring in the Chuckwalla Mountains, Riverside County. These birds were present from 4 April through 5 May 1985, and were observed feeding fledged juveniles on 2 May. Garrett and Dunn (1981) reported that there are "unsubstantiated reports of nesting on the creosote desert to the west of the Colorado R. between Needles and Blythe." In a figure illustrating the Arizona distribution of Bendire's Thrasher, Phillips et al. (1964) also indicated that summer records exist in California for the area between Needles and Blythe, but these observations are not mentioned in the accompanying account. We were unable to locate any breeding season records for this area.

TABLE 7 - Bendire's Thrasher detections on transects in the western Mojave Desert during the 1986-87 surveys. The subdivisions and boundaries of the Mojave Desert are illustrated in Figures 1 and 2. The locations of transects are illustrated in Figure 1.

TRANSECT		DATE	POINTS		DETECTIONS		
NAME	ABBREVIATION		TOTAL	w/BENDIRE'S	hrd	obs	tot
Alpine Butte	AB	06/03/86	19	0	0	0	0
		05/12/87	15	0	0	0	0
		TOTAL <sup>1</sup>	19	0			
Baldy Mesa	BM	06/04/86	7	0	0	0	0
Beekley Road	BR	06/04/86	9	0	0	0	0
		05/13/87	9	0	0	0	0
		TOTAL	9	0			
Butterbread Spring	BS	06/02/86	28	0	0	0	0
		05/11/87	17	1	0	1	1
		TOTAL	28	1			
County Line	CL	06/03/86	8	0	0	0	0
		05/13/87	8	0	0	0	0
		TOTAL	8	0			
Freeman Canyon	FC	06/02/86	8	0	0	0	0
Graham Canyon	GC	06/03/86	10	0	0	0	0
		05/13/87	10	0	0	0	0
		TOTAL	10	0			
Mojave	MO	06/01/86	7	0	0	0	0
Mojave River	MR	06/04/86	5	0	0	0	0
		05/14/86	5	0	0	0	0
		TOTAL	5	0			
Oak Spring Ranch	OS	06/04/86	7	0	0	0	0
		05/16/87	7	0	0	0	0
		TOTAL	7	0			
Pinyon Hills	PH	06/04/86	5	0	0	0	0
		05/13/87	5	0	0	0	0
		TOTAL	5	0	0	0	0
Rosamond Hills	RH	06/01/86	8	0	0	0	0
Saddleback Butte	SB	06/03/86	18	0	0	0	0
		05/12/87	18	0	0	0	0
		TOTAL	18	0			
Shadow Mountains	SH	06/04/86	5	0	0	0	0
		05/14/87	5	0	0	0	0
		TOTAL	5	0			
Soledad Mountain	SO	06/01/86	6	0	0	0	0
Tehachapi	TE	05/04/86		0	0	0	0

<sup>1</sup>TOTAL is the cumulative number of locations sampled between years.  
hrd = heard; obs = observed; tot = total

TABLE 8 - Historical breeding season observations and specimen records (mid-March through July) of Bendire's Thrasher in the Colorado Desert. The boundary between the Colorado and the Mojave deserts is illustrated in Figures 1 and 2. Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer. References to observations in American Birds (AB) and Audubon Field Notes (AFN) include volume, page number, and year, and do not appear in the literature cited.

DATE	CO.	LOCALITY	OBSERVATION	OBSERVER	HABITAT DESCRIPTION & COMMENTS	REFERENCE
COLORADO DESERT						
4/30/72	IMP	Rock Exptl. Ranch - Holtville	1		Singing; outside normal range	AB 26:812 1972
4/08/1885	RIV	Palm Springs	1			Stephens 1919
5/22/1897	RIV	Whitewater	1	EH	Specimen - Stanford	Ginnell 1915
May 1979	RIV	Blythe Breeding Bird Svy.	1			USFWS
4/16/80	RIV	Mouth of Whitewater Canyon	1	RMcK	Unusual locality	AB 34:816 1980
5/6/80	RIV	Cholla Garden - JTNM	2	RMcK		Field Notes
5/23-6/8/85	RIV	Pinto Basin - JTNM	2	RMcK		Field Notes
6/19/63	SB	Near Needles	5	RS, AW		AFN 18:536 1964
4/25/74	SB	Near Twentynine Palms	2 pairs	GLB		AB 28:950 1974
5/7/84	SB	West of Dale Dry Lake	1	RMcK		Field Notes
5/7/84	SB	Clarks Pass east of 29 Palms	2	RMcK		Field Notes
5/12/84	SB	Twentynine Palms	1	RMcK	At Roadrunner Dunes Golf Course	Field Notes



In 1986, we conducted surveys for Bendire's Thrashers on four transects in areas and habitats where birds had been reported, but we failed to locate any birds on these transects. However, we did locate one Bendire's Thrasher in the Colorado Desert at the beginning of the JTNM transect (Figures 1 and 2). This bird was observed due north of Chiriaco Summit just inside the JTNM boundary. The habitat there was dense and diverse stand of desert scrub visually dominated by paloo verde (*Cercidium floridum*), ocotillo (*Fouquieria splendens*), and columnar cholla cactus. This vegetation is similar to that found in the wash near Corn Spring.

## Movement Patterns and Distribution during the Non-breeding Season

Records of Bendire's Thrasher between 1 August and 15 March are extremely rare in the deserts of California. Our literature review located only eight for the Mojave Desert and five for the Colorado Desert (Table 2). Essentially all were outside confirmed breeding areas and were between mid-October and the first week of March. The only exception was one bird found on 13 August 1978 in Round Valley in the eastern Mojave Desert (Table 2), a well-known breeding location. Ten of these records were of birds present for only one or two days. The other three were birds observed for 15-88 days. We located 52 records of Bendire's Thrasher outside the Mojave and Colorado deserts (Table 9). Nearly all were in the non-breeding season (August through mid-March) and were at sites relatively close to the coast (Table 9). Approximately half the records are for birds found for more than one day, and over a quarter were present for more than one month. Most remarkable were records of presumably the same bird that returned to Courtland, Sacramento County, for 5-8 months each year for four consecutive years (Table 9).

The geographical and temporal distribution of all Bendire's Thrasher observations from California illustrate the following seasonal movement pattern. Birds observed during late May and early June in habitat not suitable for breeding are either late spring migrants or unsuccessful breeders wandering away from breeding habitats (e.g., four records in the northern Mojave Desert, Table 5). Most breeding birds probably begin to leave desert habitats in late June and are gone by the end of July (Tables 1, 3, and 5). A small number of birds linger on the breeding grounds into August (Table 2). This number may be higher than currently documented because: (1) the birds are not vocal at this time of year; (2) they are fairly secretive and may be easily missed, and (3) few field ornithologists and bird-watchers visit the desert during the hot months of August, September, and October.

Most birds migrate south to wintering grounds in southern Arizona and northeastern Mexico (A.O.U. 1983). However, some individuals move west, and fall migrants first appear in coastal California in mid-July (Figure 3 and Table 9). Coastal and desert records indicate that fall movements appear to continue until October or early November, but this pattern becomes confused with a small number of birds that spend all or part of the winter in California (Figure 3 and Tables 2 and 9). The Courtland bird arrived in August during the second, third, and fourth winters it was reported, and remained until March or mid-April (Table 9). Regularly observed wintering birds usually depart in early to mid-March (Tables 2 and 9), but a few linger to mid-April (e.g., the Courtland Bird, Table 9). Spring migration appears to be well under way in February, when the number of records from outside the deserts begins to decline (Figure 3) and when birds occasionally appear in the southern Colorado Desert (Table 2). However, a few early migrants may reappear after mid-January (Table 9). This latter date is consistent with the arrival date for spring migrants in southern Arizona (Monson and Phillips 1981). The end of spring migration probably overlaps with movements by early post-breeding dispersers and unsuccessful breeders.

TABLE 9 - California records for Bendire's Thrasher outside the Mojave and Colorado deserts. All observations are of single birds. Days is the number of consecutive days between the first and last observations at a location. Abbreviations are defined in Table 10. Observations and habitat descriptions use the units of measurement, terminology, and taxonomy of the original observer. References to observations in American Birds (AB) or Audubon Field Notes (AFN) include volume, page number, and year, and do not appear in the literature cited.

DATE	DAYS	CO.	LOCALITY	OBSERVER	COMMENTS	REFERENCE
10/10/12	1	LA	Los Angeles			MVZ - #23259; Miller 1913
9/18/68	1	LA	Palos Verdes Peninsula	RS, GSS		AFN 23:110 1969
7/30/76-8/02/76	4	LA	San Pedro	IPL, JD		AB 31:224 1977
9/01/76	1	LA	Malibu	TC		AB 31:224 1977
12/24/79-12/27/79	4	LA	San Pedro	HF	Another coastal record	AB 34:308 1980
10/07/80-12/02/80	57	LA	Malibu	BE		AB 35:227 1981
1/14/86-2/14/86	32	LA	Palos Verdes Peninsula	BL	Casual along coast in winter	AB 40:335 1986
7/21/85	1	ORN	I r v i n e	DRW	A few stray to coast each year	AB 39:963 1985
12/09/84-1/26/85	49	RIV	Lake Paris	AMC	Casual winter visitor to S. CA coast	AB 39:211 1985
1/26/85-3/22/85	56	RIV	Near Lakeview	AMC	Casual winter visitor to S. CA coast	AB 39:211 1985
10/16/75-3/31/76	168	SAC	Courtland	AP, RS	Region's first mainland record	AB 30:122 & 763 1976
8/08/76-4/11/77	247	SAC	Courtland	AP	2nd regional record-present last year	AB 31:219, 371 & 1045 1977
8/01/77-4/08/78	251	SAC	Courtland	RS	Fixture at site	AB 32:254, 396 & 1052 1978
8/25/78-2/28/79	188	SAC	Courtland	AP		AB 33:211 & 311 1979
11/16/62	1	SD	Imperial Beach	GMcC	Only 2nd occurrence	McCaskie & Banks 1964
8/27/64	1	SD	Solana Beach	GMcC, JS	Post-breeding wandering to coast	McCaskie et al. 1967
10/01/64-10/02/64	2	SD	Imperial Beach	GMcC, GSS	Post-breeding wandering to coast	McCaskie et al. 1967
12/21/68	1	SD	Imperial Beach	JS		CSULB #3742; AFN 23:522 1969
12/20/69	1	SD	Imperial Beach			AFN 24:455 1969
4/04/70	1	SD	Imperial Beach	GMcC	May have wintered in vicinity	AB 24:645 1970
10/04/70	1	SD	Imperial Beach	GMcC	Casual on coast	AB 25:110 1971
9/14/73	1	SD	Imperial Beach	HK	Migrants moving in wrong direction	AB 28:109 1974
10/04/73-10/11/73	8	SD	San Diego	JWDeW	Migrants moving in wrong direction	AB 28:109 1974
10/21/73	1	SD	Imperial Beach	GSS	Migrants moving in wrong direction	AB 28:109 1974
11/08/73-1/31/74	85	SD	Imperial Beach	JD	Rare anywhere in CA in winter	AB 28:109 & 693 1974
11/27/74	1	SD	Near San Diego	SWi		AB 29:123 1975
10/16/75	1	SD	Imperial Beach	JD	Rare at coastal localities	AB 30:128 1976
11/27/78	1	SD	Imperial Beach	EC		AB 33:216 1979
12/17/78-3/10/79	84	SD	Imperial Beach	EC	Few winter records for California	AB 33:315 1979
9/15/79-9/16/79	2	SD	San Clemente Island	PJ	Wander regularly to coast every fall	AB 34:202 1980
8/17/80-10/12/80	57	SD	Pt. Loma	DP		AB 35:227 1981
3/19/83	1	SD	Palm Spring, Anza Borrego SP	EAC	Considered migrant	A13 37:913 1983; photo on file
1/28/85-3/03/85	35	SD	Coronado	JC	Casual winter visitor to S. CA coast	AB 39:211 1985
2/16/85-3/16/85	29	SD	Otay Mesa	MO	Casual winter visitor to S. CA coast	AB 39:211 1985
9/02/73-9/05/73	4	SF	Farallon Islands		1st regional record	DeSante and Ainley 1980
7/14/75	1	SF	Farallon Islands		Considered a fall not spring record	DeSante and Ainley 1980
4/17/80-4/18/80	2	SF	Farallon Islands	BrB	4th regional record; three from F.I.	AB 34:812 1980
5/19/84	1	SF	Farallon Islands	TMcE	5th record for region; 2nd spring record	AB 38:955 1984; photo on file

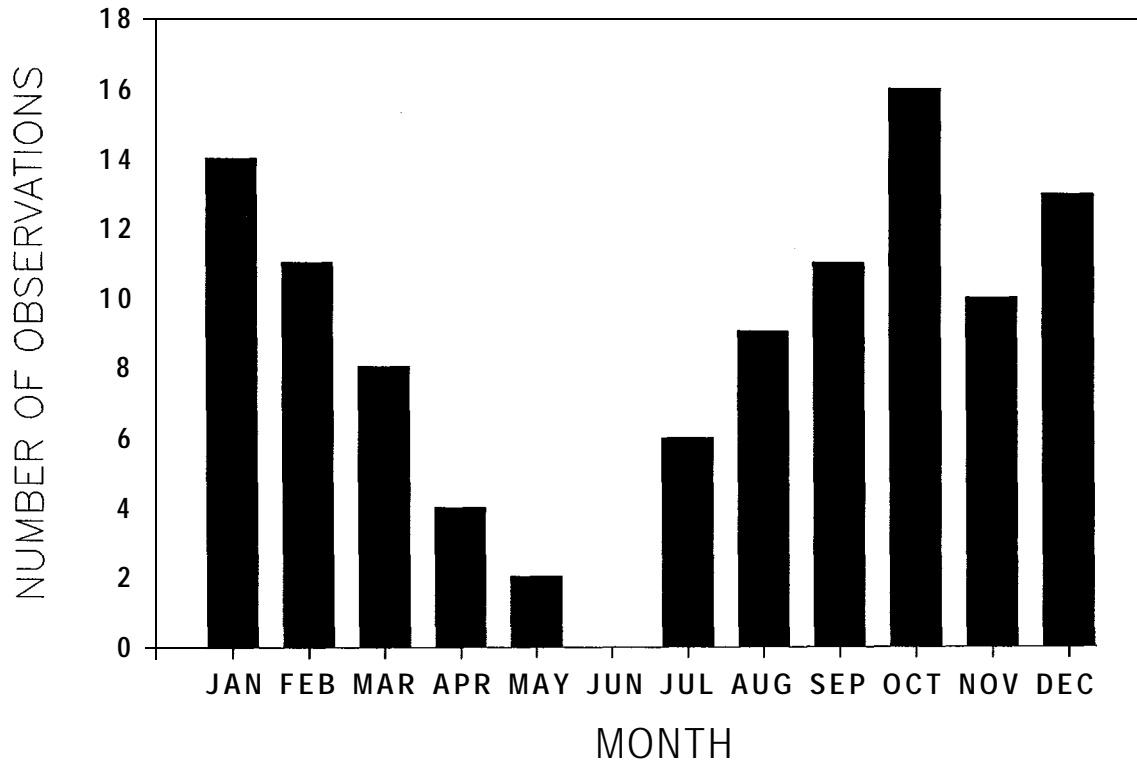
(Continued)

TABLE 9 (Continued)

DATE	DAYS	CO.	LOCALITY	OBSERVER	COMMENTS	REFERENCE
12/21/85-2/15/86	57	SJ	Lodi	TM, ML	6th record for region	AB 40:327 1986; photo on file
1/14/59	1	SLO	Near Shandon			Garrett and Dunn 1981
5/01/82	1	SLO	San Luis Obispo	FRT	Second ever along coast in spring	AB 36:894 1982
Early October	1	StB	El Capitan State Park	R&MW	Few coastal records and northernmost	AFN 21:78 1967
9/29/73	1	StB	San Nicholas Island	LJ, KG	Migrants moving-in wrong direction	AB 28:109 1974
10/17/75	1	StB	Santa Barbara Island	W, KG	Rare at coastal localities	AB 30:128 1976
8/25/79-8/29/79	5	StB	Goleta	PL	Wander regularly to coast every fall	AB 34:202 1980
8/30/83	1	StB	Santa Barbara Island	CD	Rare to casual straggler S Calif. coast	AB 38:247 1984; photo on file
1/11/84-2/19/84	40	StB	Goleta	AB	Considered casual	AB 38:358 1984
12/21/84-1/23/85	34	StB	Goleta	RAH	Casual tinter visitor to S. CA coast	AB 39:211 1985
8/14/18	1	VEN	McGrath State Park	RW		AB 33:216 1979
11/09/78-11/12/78	4	VEN	Pt. Magu State Park	TC		AB 33:216 1979
9/15/79-10/01/79	17	VEN	Pt. Magu	BB	Few wander regularly to coast every fall	AB 34:202 1980
8/21/83	1	VEN	VEN Santa Clara River Estuary	S&DR	Rare to casual straggler S Calif. coast	AB 38:247 1984

**TABLE 10 - Abbreviations used in Table 1, 2, 3, 5, 8, and 9.**

OBSERVERS		
BrB = Bryant Bainbridge	FH = Fred Heath	AP = Arvill Parker
AB = Allyn Bissel	EH = E. Heller	DP = Dennis Parker
GLB = Gordon L. Bolander	DJ = D. Johnston	GWP = Gary W. Potter
BB = Bruce Broadbrooks	LJ = Lee Jones	JVR = James Van Remsen
EAC = Eugene A. Cardiff	PJ = Paul Jorgensen	S&DR = Steve and Diane Ross
SWC = Steven W. Cardiff	HK = Harry Krueger	RR = Richard Rowlett
BAC = Barbara A. Carlson	BL = Barbara Lachina	AS = Andy Sanders
TC = Terry Clark	PL = Paul Lehman	RSa = Rick Saval
JC = Jim Coatsworth	LL = Larry LePrè	JS = Jay Sheppard
EC = Elizabeth Coppers	ML = Mike Lippsmeyer	ASm = Arnold Small
AMC = Alan M. Craig	IPL = Isabel P. Ludlum	RS = Rich Stallcup
JWDeW = John W. Dewitt	BMcI = Bev McIntosh	RMS = Robert M. Stewart
CD = Charles Drost	PM = Paul Mack	GSS = G. Shumway Suffel
JD = Jon Dunn	RM = Ralph Manke	FRT = Fern R. Tainter
BE = Barbara Elliott	TM = Tim Manolis	JT = Jan Tarbel
ASE = A. Sidney England	TMe = Tony Metcalf	AW = Art Wang
BE = Brett Engstrom	GMcC = Guy McCaskie	RW = Richard Webster
HF = Hal Ferris	TMcE = T. McElroy	EW = Ed Wessman
MF = M. Foster	RMcK = Robert McKeman	DRW = Douglas R. Willick
DAG = David A. Gaines	JM = Joe Morlan	R&MW = Russ & Marion Wilson
KG = Kimball Garrett	SIN = Sheldon J. Newberger	SWi = Susan Wise
RAH = Robb A. Hamilton	MO = Marty Orell	DZ = David Zumata
COUNTIES		
IMP = Imperial	ORN = Orange	SF = San Francisco
INY = Inyo	RIV = Riverside	SJ = San Joaquin
KE = Kern	SAC = Sacramento	SLO = San Luis Obispo
LA = Los Angeles	SB = San Bernardino	StB = Santa Barbara
MON = Mono	SD = San Diego	VEN = Ventura
OTHER ABBREVIATIONS		
AB = American Birds	JTNM = Joshua Tree National Monument	
ad = adult	juv = juvenile	
AFN = <u>Audubon Field Notes</u>	LACM = Los Angeles County Museum	
BBC = Breeding Bird Count	MVZ = Museum of Vertebrate Zoology	
BLM = Bureau of Land Management	SBCM = San Bernardino County Museum	
DVNM = Death Valley National Monument	SDMNH = San Diego Museum of Natural History	
imm = immature	USFWS = U. S. Fish and Wildlife Service	



**FIGURE 3** - Monthly distribution of California observations of Bendire's Thrashers outside the Mojave and Colorado deserts. Data are presented in Table 9. Birds present at a location in more than one month are counted as one observation for each month detected.

## Habitat Relationships

The habitat requirements of Bendire's Thrasher have not been studied in any detail and are especially poorly understood in California. Descriptions of breeding habitat in California usually are limited to statements about the presence of birds in habitats with Joshua trees, yucca, and cholla.

floor where scatteringly grown to clumps of cholla cactus, of one species or another, and bushes of various kinds. (Grinnell and Miller 1944)

...they were on nearly level terrain among scattered Joshua Trees. (Johnson et al. 1948)

...desert with usual vegetation of cholla cactus, Creosote Bush, yuccas, and other shrubs. (Small 1974)

The breeding habitat of the Bendire's Thrasher consists of Joshua Tree woodland with scattered shrubs (creosote, etc.) and patches of grassland on the e. Mohave Desert it also breeds away from Joshua Trees in areas where Opuntia cactus is plentiful (up to over 1500m). (Garrett and Dunn 1981)

The results of our study: (1) delineate and expand the elevational range of this thrasher in the Mojave Desert; (2) quantify vegetation differences between sites occupied and not occupied by this species; (3) confirm the presence of breeding Bendire's Thrashers in habitats with characteristics identified in our literature review; (4) increase the number of records in other habitats; and 5) quantify soil differences between; sites occupied and not occupied by this thrasher.

The elevational range of breeding Bendire's Thrashers in California has been defined by historical records for birds in the eastern Mojave Desert. All records for this region fall between 1050 m (3440 ft.) and 1650 m (5400 ft.) (Tables 1 and 3). We found birds from 575 m (1880 ft.) at Chiriaco Summit in the Colorado Desert to 1775 m (5780 ft.) on Lee Flat in the northern Mojave Desert (Figure 4). The typical lower elevational limit of probable breeding birds was approximately 950 m (3100 ft.) (Figure 4), and the distribution of points with the thrasher were significantly higher than those where the thrasher was absent ( $X^2=32.57$ ,  $p<.005$ ). A few possible breeding birds were found between 800 m (2650 ft.) and 925 m (3040 ft.) (Figure 4). All these observations were near the transition between the Mojave and Colorado deserts along the JTNM, Ward Valley, and Old Woman Mountains transects. Both observations of birds below 750 m (2500 ft.) also were along these two transects. The upper elevational limit of probable breeding birds occurred on Lee Flat, and all observations above 1525 m (5000 ft.) were on either Lee Flat or near Keys View in JTNM.

Our measurements of succulents and arborescent plant species indicated that these were significant components of Bendire's Thrasher habitat and were useful for predicting presence of this bird. The points where we found birds had significantly denser total succulent and arborescent species, denser columnar cholla cactus, and denser Mojave yucca and Spanish bayonet than points where we did not find the thrasher (Table 11). However, we did not find a difference in the densities of Joshua trees between points with and without the bird (Table 11). The height of succulent and arborescent species did not differ between points with and without the thrasher (Table 11).

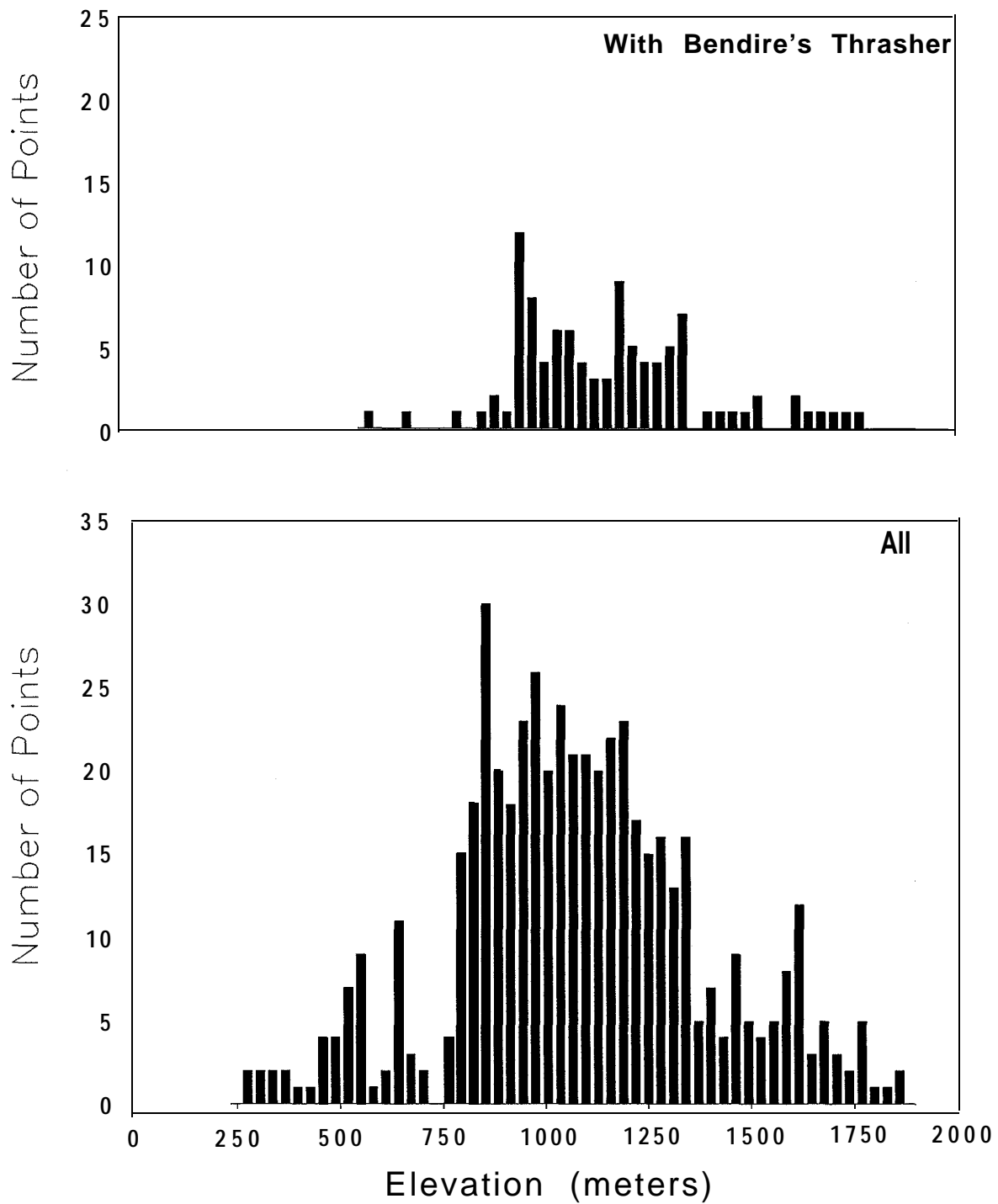


FIGURE 4 - Elevational distribution of Bendire's Thrasher survey points. Lower graph illustrates distribution of points sampled in either 1986, 1987, or both. Upper graph illustrates distribution of points where Bendire's Thrashers were observed in either 1986, 1987, or both.

TABLE 11 - Comparison of habitat characteristics at points where Bendire's Thrashers were present and absent. Variable definitions are presented in the text. Tests are for differences in means using a t-test with n=105.

Variable (units)	Points with <u>Bendire's present</u> Mean±SE	Points with <u>Bendire's absent</u> Mean±SE
<b>PERENNIAL VEGETATION</b>		
AVGHGT (meters)	0.44±0.02	0.47±0.03
ABSDENS (plants/ha)	12178.73 ± 1370.01	7542.20±1085.66 ***
PCTCOV (percent)	37.5±2.81	23.50±1.56 ****
<b>SUCCULENTS AND ARBORESCENT SPECIES</b>		
TOTPLNTS (plants/ha)	1265.19±96.21	513.48±86.36 ****
AVGHGTSA (meters)	1.83±0.09	1.91±0.22
OPSPNUM (plants/ha)	435.03±62.10	199.14±56.39 ***
OPSPHGT (meters)	0.66±0.03	0.62±0.042
YUBRNUM (plants/ha)	284.76±39.00	201.03±47.39
YUBRHGT (meters)	3.67±0.19	3.14±0.29
YUSPNUM (plants/ha)	434.77±63.87	86.59±28.33 ****
YUSPHGT (meters)	1.52±0.09	1.45±0.14
<b>SOIL SURFACE /TEXTURE</b>		
SAND (percent)	8.89±2.46	31.27±5.84 ****
DIRT (percent)	75.46±3.76	50.17±5.67 ****
GRAVEL (percent)	13.47±3.04	8.96±2.35
ROCK <sup>1</sup> (percent)	2.19±1.31	9.60±3.92 *
MEANPEN <sup>2</sup> (penetrometer units)	5.04±0.30	2.70±0.19 ****

<sup>1</sup>Includes rock and pavement

<sup>2</sup>Excludes points with ≥ 50% rock and pavement (n=97)

\*=p<.05 \*\*=p<.025 \*\*\*=p<.01 \*\*\*\*=p<.001



Bendire's Thrashers were found at sites lacking either Mojave yucca and Spanish bayonet (30.0% of 60 sites), Joshua trees (33.0% of 60 sites), or columnar cholla cactus (7.0% of 60 sites). However, probable breeding birds were never found at sites lacking all three, and either Joshua trees or Mojave yucca and Spanish bayonet were always present. The density of Mojave yucca and Spanish bayonet was inversely related to the density of Joshua trees ( $r=-0.32$ ,  $p>.025$ ). These results confirm that yuccas, Joshua trees, and columnar cholla cactus are important components of Bendire's Thrasher breeding habitat, and for California, they strongly suggest an interrelationship between the biology of the thrasher and members of the genera Yucca and Opuntia.

The composition and structure of perennial shrubs found in Bendire's Thrasher habitat generally have not been described. We found that sites with the thrasher had significantly denser populations of perennial shrubs and higher shrub cover than at points without Bendire's Thrasher (Table 11). Vegetation height, however, did not differ significantly with presence or absence of the thrasher (Table 11). Plant species composition was highly variable. The dominant species at most sites were creosote bush, cheese bush (Hymenoclea salsola), squaw-tea (Ephedra nevadensis), burro bush (Ambrosia dumosa), and big galleta grass (Hilaria rigida). At these sites, shrub composition was relatively diverse and other common species included California buckwheat (Eriogonum fasciculatum), spiny hopsage (Grayia spinosa), Cooper desertthorn (Lycium cooperi), Anderson desertthorn (L. andersonii), ratany (Krameria sp.), bladdersage (Salazaria mexicana), and goldenbush (Happlopappus sp.).

Bendire's Thrashers also were present at sites where the primary perennial shrub was black-brush (Coleogyne ramosissima) with scattered Joshua trees, junipers (Juniperus osteosperma, J. occidentalis, or J. californica), and columnar cholla cactus. Locations with this type of perennial vegetation included Halloran Summit, the road to Keys View in JTNM, and Clark Mountain near Keany Pass. Although, the vegetation on Lee Flat had a sparse overstory of Joshua trees, the understory differed from that at other sites. Shrub cover was composed primarily of shadscale (Atriplex confertifolia), spiny hopsage, winterfat (Eurotia lanata), and spiny menodora (Menodora spinescens). On three occasions Bendire's Thrashers were observed in washes dominated by catclaw, and at least two of these observations were of birds that apparently flew into the wash from adjacent habitat in response to the song playback.

Our results also indicated that soil surface texture and hardness can be used to predict presence of Bendire's Thrasher. Soil surface texture at sites with Bendire's Thrashers had significantly less sand, rock, and desert pavement, and more firm packed dirt than sites without the thrasher (Table 11). Excluding sites with  $\geq 50.0\%$  rock and pavement, sites with Bendire's Thrashers had harder soils as measured with the penetrometer than sites without the bird (Table 11). Thus, Bendire's Thrashers occurred less frequently on soft, sandy soils and on hard, rocky soils. Presumably this pattern was related to the fact that this species forages on the ground and the bill is used to peck, probe and hammer in the soil, but not for digging (Engels 1940).

The habitat relationships that we have identified for Bendire's Thrasher may help explain the absence of this thrasher from most of the Antelope Valley in the western Mojave Desert. Nearly the entire western Mojave Desert is below 950 m (3100 ft.) in elevation. Compared to sites with Bendire's Thrashers, soils at our sample sites in the western Mojave had a more sandy surface texture ( $t=-6.82$ ,  $p<.001$ ), less firm dirt ( $t=5.71$ ,  $p<.001$ ), and lower soil hardness as measured with the penetrometer ( $t=4.17$ ,  $p<.001$ ). The species composition of succulents and arborescent plants was significantly different from points with Bendire's Thrashers. Mojave yucca and Spanish bayonet do not occur in the western Mojave Desert, and ecologically equivalent species are not present. Also, columnar cholla cactus are rare compared to other areas in the Mojave Desert. Perennial vegetation in the western Mojave Desert has a lower absolute density ( $t=4.01$ ,  $p<.001$ ) and lower percent cover ( $t=3.72$ ,  $p<.001$ ) than areas with Bendire's Thrashers. Thus, although Joshua trees are found in much of the Antelope Valley and adjacent bajadas, other important habitat components appear to be lacking. Therefore, this part of the western Mojave Desert may be unsuitable for breeding populations of Bendire's Thrasher.

## STATUS OF BENDIRE'S THRASHER IN CALIFORNIA

The primary population center of Bendire's Thrasher in California has been identified within the eastern Mojave Desert. Our results verified that the species continues to occupy this historical breeding range, and our observations have considerably expanded the range in the eastern Mojave Desert (Figure 2). The smaller population known from JTNM in the southern Mojave Desert is still present, and our results indicate this population is larger and more widely distributed than expected from historical records (Figure 2). We documented that small populations of Bendire's Thrasher are scattered from JTNM west through the southern Mojave Desert to near Victorville (Figure 2), where the species was recorded breeding in 1920 (Table 1). The central Mojave Desert population first found in 1981 (Table 5) was still present in 1986 (Figure 2). In the northern Mojave Desert, a previously unknown population was discovered on Lee Flat (Figure 2). In the western Mojave Desert, breeding has been confirmed from Kelso Valley (Table 1), and when combined with other observations, suggests the presence of a small population (Figure 2).

In summary, our results and historical records lead us to the following conclusions on the status of Bendire's Thrasher in the deserts of California:

1. Bendire's Thrasher continues to occupy all parts of the historical breeding range in the eastern and southern Mojave Desert, and this range is larger than previously reported.
2. Small isolated populations exist at scattered locations in the southern, central, northern, and western Mojave Desert.
3. Existing information is inadequate to determine whether Bendire's Thrasher populations are increasing, decreasing, or stable.
4. Bendire's Thrashers have been reported from parts of the Colorado Desert including documented breeding records. However, the status of this thrasher in the Colorado Desert is unknown.

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## LITERATURE CITED

- American Ornithologists' Union. 1983. Check-list of North American birds. 6th edition. American Ornithologists' Union, Washington, D.C. 877pp.
- Barbour, M. G., J. H. Burk, and W. D. Pitts. 1980. Terrestrial plant ecology. Benjamin/Cummings Publishing Co., Menlo Park, CA 604pp.
- Bent, A. C. 1948. Life histories of North American nuthatches, wrens, thrashers, and their allies. U.S. National Museum Bulletin No. 195.
- Cottam, G. and J. T. Curtis. 1956. The use of distance measures in phytosociological sampling. *Ecology* 37:451-460.
- DeSante, D. F. and D. G. Ainley. 1980. The avifauna of the south Farallon Islands, California. *Studies in Avian Biology* No. 4.
- England, A. S. and W. F. Laudenslayer, Jr. 1987. Bendire's Thrasher survey results -- Spring 1986 and 1987. Department of Wildlife and Fisheries Biology, University of California, Davis.
- Engels, W. L. 1940. Structural adaptations in thrashers (Mimidae: Genus *Toxostoma*) with comments on interspecific relationships. *University of California Publications in Zoology* 42:341-400.
- Garrett, K. and J. Dunn. 1981. *Birds of southern California*. Los Angeles Audubon Society, Los Angeles, CA
- Grinnell, J. 1915. A distributional list of the birds of California. *Pacific Coast Avifauna* No. 11.
- Grinnell, J. and A. H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna* No. 27.
- Heller, E. 1901. Notes on some little-known birds of southern California. *Condor* 3:100.
- Johnson, D. H., M. D. Bryant, and A. H. Miller. 1948. Vertebrate animals of the Providence Mountains area of California. *University of California Publications in Zoology* 48:221-376.
- Laudenslayer, W. F., Jr. 1988. Joshua tree habitat. Pp. 92-92 in K. E. Mayer and W. F. Laudenslayer, Jr. (eds.). *A guide to wildlife habitats of California*. Calif. Dept. of Forestry and Fire Protection, Sacramento, CA
- McCaskie, G. 1973. The spring migration: South Pacific Coast Region. *American Birds* 27:821.
- McCaskie, R. G. and R. C. Banks. 1964. Occurrence and migration of certain birds in southwestern California. *Auk* 81:353-361.
- McCaskie, G., R. Stallcup, and P. De Benedictis. 1967. The distribution of certain Mimidae in California. *Condor* 69:310-311.
- McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of Northern California*. Golden Gate Audubon Society, Berkeley, CA 84pp.
- Miller, L. 1913. A specimen of Bendire Thrasher in the San Diegan Region. *Condor* 15:41.
- Miller, A. H. and R. C. Stebbins. 1964. *The lives of desert animals in Joshua Tree National Monu-*

- ment. University of Californian Press, Berkeley, CA 452pp.
- Monson, G. and A. R. Phillips. 1981. Annotated checklist of the birds of Arizona. 2nd edition. University of Arizona Press, Tucson, AZ.
- Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley & Sons, New York, NY. 547pp.
- Phillips, A, J. Marshall, and G. Monson. 1964. The birds of Arizona. University of Arizona Press, Tucson, AZ 220pp.
- Pierce, W. M. 1919. Another California record of the Bendire Thrasher. *Condor* 21:123.
- Pierce, W. M. 1921. The Bendire Thrasher nesting in California. *Condor* 23:34.
- Remsen, J. V., Jr. 1978. Bird species of special concern in California: an annotated list of declining or vulnerable bird species. California Department of Fish and Game, Nongame Wildlife Investigations, Wildlife Management Branch Administrative Report No. 78-1.
- Sheppard, J. M. 1970. A study of the LeConte's Thrasher. *California Birds* 1:85-94.
- Small, A 1974. The birds of California. Winchester Press, New York, NY.
- Stephens, F. 1919. Unusual occurrences of Bendire Thrasher, Fork-tailed Petrel and Western Goshawk *Condor* 21:87.