BEFORE THE CALIFORNIA FISH AND GAME COMMISSION

Petition to List
Bendire's Thrasher (*Toxostoma bendirei*)

and
LeConte's Thrasher (*Toxostoma lecontei*)

as Threatened or Endangered under the California Endangered Species Act

Center for Biological Diversity

September 16, 2025

Notice of Petition

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and Division 3, Chapter 1.5, Article 2 of the California Fish and Game Code (Sections 2070 *et seq*.) relating to listing and delisting endangered and threatened species of plants and animals.

SPECIES BEING PETITIONED: Bendire's Thrasher (*Toxostoma bendirei*)
LeConte's Thrasher (*Toxostoma lecontei*)

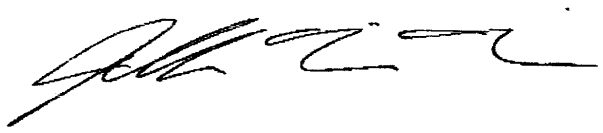
RECOMMENDED ACTION: Listing as Endangered or Threatened

The Center for Biological Diversity submits this petition to list both Bendire's thrasher (*Toxostoma bendirei*) and LeConte's thrasher (*Toxostoma lecontei*) as threatened or endangered pursuant to the California Endangered Species Act (CA Fish and Game Code §§ 2050 et seq., "CESA"). This petition demonstrates that these species are eligible for and warrant listing under CESA based on the factors specified in the statute and implementing regulations. As detailed in this petition, these desert thrashers are two of North America's fastest declining bird species, with Bendire's having lost nearly 90% and LeConte's having lost almost 70% of their U.S. populations over the past 50 years, and both species face multiple severe threats. Listing as endangered or threatened species clearly "may be warranted." We respectfully request the Department of Fish and Wildlife and the Fish and Game Commission to make such recommendations and findings pursuant to their respective authorities. Cal. Fish & Game Code §§ 2073.5 & 2074.2.

AUTHORS OF PETITION:

I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Jeff Miller, Senior Conservation Advocate
Center for Biological Diversity



Date: September 16, 2025

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Executive Summary

Bendire's thrasher and LeConte's thrasher are both desert songbirds, native to arid lands of the southwestern U.S. and northwest Mexico. An estimated 4,400 Bendire's thrashers (about 5% of the global population) live in the Sonoran and Mojave Deserts in southeastern California. An estimated 37,000 LeConte's thrashers (about 82% of the global population) inhabit California, in the Sonoran and Mojave Deserts and the southern San Joaquin Valley.

These secretive thrashers spend much of their time on the ground foraging for insects, often running with their long tails cocked over their backs Both species are most conspicuous during the breeding season when males perch on high branches of bushes and cacti to sing. Bendire's thrashers nest in cholla cactus, mesquite trees, yuccas, and Joshua trees. LeConte's thrashers nest primarily in cholla cactus and saltbush. Both thrasher species require large patches of flat land with desert scrub habitats and adequate prey resources to survive in their water-scarce environment.

They are two of North America's fastest declining bird species, with LeConte's thrasher having lost almost 70% and Bendire's thrasher having lost almost 90% of their U.S. populations over the past 50 years. Threats to both species are ubiquitous and increasing and include habitat loss due to sprawl development, agricultural expansion, large-scale solar energy development, mining, and infrastructure such as roads and energy corridors. Other significant threats to desert thrashers are off-road vehicles, livestock grazing, invasive species, altered wildfire regimes, and rapid climate change.

Due to their high vulnerability to extirpation from California, both Bendire's thrasher and LeConte's thrasher urgently need the protections afforded by the California Endangered Species Act.

1. INTRODUCTION

Nearly half of bird species worldwide are now declining, with only 6% having increasing populations (BirdLife International 2022). More than one-fifth of the world's bird species are categorized by the IUCN as either Threatened or Near Threatened, a category that includes those species which are approaching the threshold for qualifying as globally threatened. The number of bird species that have gone extinct since the year 1500 is at least 187 (Ibid). In the U.S. and Canada, bird populations have declined by 29% since 1970, a net loss of almost 3 billion birds (Rosenberg et al. 2019). According to the 2025 U.S. State of the Birds report, a status assessment of the health of the nation's bird populations (NABCI 2025), birds across the U.S. show downward trends in almost every habitat, with arid land birds declining by 36% (Rosenberg et al. 2019) to 41% since 1970 (NABCI 2025).

Bendire's thrasher and LeConte's thrasher are both desert songbirds native to the southwestern United States and northwest Mexico. Bendire's thrasher inhabits the Mojave Desert and Sonoran Desert ecoregions in southeastern California. The LeConte's thrasher range in California includes the Mojave and Sonoran Deserts and the Southern San Joaquin Valley.

Bendire's thrasher is secretive in nature and spends much of its time foraging on the ground, moving in and out of bushes varying speed from run to slow walk. These thrashers are most conspicuous when singing a rich, variable, warble during the breeding season. Over the past 50 years, Bendire's thrasher has lost 90% of its U.S. population.

LeConte's thrasher inhabits some of the hottest, driest, and most barren desert habitats within the region. LeConte's thrashers often stay on the ground in bushy cover, and when in the open, their sand-colored plumage allows them to blend in well with their desert habitat. Over the past 50 years, LeConte's thrasher has lost almost 70% of its U.S. population.

Threats to both thrashers are ubiquitous and increasing. Habitat is lost to sprawl development and agriculture, large-scale solar energy projects, and mining, and is fragmented and degraded by roads, livestock grazing, off-highway vehicles, military activities. Other threats include invasive species, altered wildfire regimes, and climate change.

To avoid extirpation in California, both Bendire's thrasher and LeConte's thrasher urgently need the protections afforded by the California Endangered Species Act.

2. NATURAL HISTORY

2.1 Description

Bendire's

A detailed description of Bendire's thrasher is provided in the Cornell Lab of Ornithology online guide All About Birds, and most of the information below is from this account.

Bendire's thrasher is medium-sized bird, similar to an American robin, measuring 9.1-9.8 in (23-25 cm) and weighing on average 2.1 oz (60 g) (Cornell Lab of Ornithology 2025c, p. 4-5). It has a long tail and strong legs (Cornell Lab of Ornithology 2025c, p. 4) and often runs on the ground with its tail cocked over its back (Cornell Lab of Ornithology 2025b, p. 3). Its bill is grayish brown with a pale patch at the base of the mandible that remains present in all life stages (Borgman et al. 2024, p. 15, 16). The bill is fairly long and slightly curved (Cornell Lab of Ornithology 2025c, p. 4), but shorter than the similar-appearing curve-billed thrasher, which has a more curved, all dark bill (Cornell Lab of Ornithology 2025d, p. 1).

The color of Bendire's thrasher's plumage is mousy brown, with paler underparts and indistinct spotting on the breast. The undertail coverts are buffy, and the tips of the tail feathers are grayish. Later in the year, once the plumage has worn, individuals appear more uniformly gray-brown or buffy brown below. Compared to the curve-billed thrasher, the spots on the breast of Bendire's thrasher are more triangular and less rounded (Cornell Lab of Ornithology 2025d, p. 1).

LeConte's

LeConte's thrasher is a medium-sized bird, with an average length of 9.4-11.0 in (24-28 cm) and weight of 1.9-2.7 oz (55-76 g) (Borgman et al. 2024, p. 16; Cornell Lab of Ornithology 2025a, p. 1-2). It is a highly inconspicuous bird, as its sand-colored plumage allows it to blend in well into its desert habitats (Cornell Lab of Ornithology 2025b, p. 2). These thrashers have an unmarked breast, a strongly curved bill, a thin dark malar stripe bordering the throat, and a contrasting long, dark tail with a rusty or peachy wash underneath (Borgman et al. 2024, p. 16; Cornell Lab of Ornithology 2025a, p. 3). The eyes, legs, and bills are all dark in color (Cornell Lab of Ornithology 2025a, p. 3).

LeConte's thrashers are mainly terrestrial and often stay on the ground in bushy cover (Ibid). Their preference for running rather than flying is evident when individuals are

startled, as they often flee on foot with their tail cocked high (Borgman et al. 2024, p. 16; Cornell Lab of Ornithology 2025b, p. 2). LeConte's thrashers are more conspicuous during the breeding season, when males perch on high shrubs and trees to sing (Cornell Lab of Ornithology 2025b, p. 2; Cornell Lab of Ornithology 2025c, p. 3-4).

2.2 Taxonomy

Bendire's

Bendire's thrasher, *Toxostoma bendirei*, was described by Charles E. Bendire in 1872 and is the last thrasher to be described for mainland North America (England and Laudenslayer 1993, p. 1; NDOW 2025, p. 4). It is accepted as a valid species by the American Ornithological Society and numerous other entities, including the Integrated Taxonomic Information System (ITIS 2025, p. 1), BirdLife International (BirdLife International 2020, p. 2), Arizona Game and Fish Department (AZGFD 2022, p. 310), Nevada Department of Wildlife (NDOW 2025, p. 4) and the Cornell Lab of Ornithology (Cornell Lab of Ornithology 2025b, p. 3).

The Desert Thrasher Working Group states that three subspecies of Bendire's thrasher are "currently recognized" by the American Ornithologist's Union (AOU) [now American Ornithological Society (AOS)], citing the AOU's 1957 5th edition Checklist of North American Birds (Borgman et al. 2024, p. 15). The subspecies are identified as *T. b. bendirei*, found in southeastern California, southern Nevada, southern Utah, and southern Colorado down to the northernmost part of Sonora, Mexico; *T. b. candidum*, found in west-central Sonora; and *T. b. rubricatum*, confined to interior southern Sonora (Ibid).

According to the Cornell Lab Birds of the World Account for *T. bendirei* (England and Laudenslayer 2020), *T. b. bendirei*, *T. b. candidum*, and *T. b. rubricatum* were distinguished by van Rossem on coloration (England and Laudenslayer 2020, p. 1). Debate on the coloration of the subspecies is further noted (p. 1):

> *T. b. candidum* (central w. Sonora) paler, more ashy brown dorsally, and much whiter ventrally than *T. b. bendirei* (sw. United States to n. Sonora), with pale grayish buff flanks and under tail coverts. *T. b. rubricatum* (interior central and s. Sonora) generally darker and redder, with more prominent spotting than *T. b. bendirei*. Phillips [(1962;1986)] states that apparent differences between subspecies are due to season, wear, and fading. Most northern and western birds withdraw from the breeding range in mid-Aug, just before molting. Most

> museum specimens with fresh plumages are from wintering grounds in Sonora and Sinaloa, and most northern specimens are heavily worn, paler, and with a less cinnamon hue. Phillips [(1962)] concludes that geographic color variation in the species has not been proven.

Despite the comments made by Phillips, *T. bendirei* subspecies are currently recognized by Avibase (Avibase 2025, p. 2) and the Cornell Lab of Ornithology Clements database (Clements et al. 2024) and were also previously recognized by Miller et al. (1957) and Mayr and Greenway (1960), according to England and Laudenslayer 2020 (p. 1). Thus, there is on balance enough evidence to suggest the three subspecies of *T. bendirei* may be valid. Regardless of the validity of any subspecies, as detailed below, listing of the California population is supported by the best available science.

LeConte's

LeConte's thrasher (*Toxostoma lecontei*) was described by Dr. John LeConte in 1851, who collected the described specimen near Fort Yuma, Arizona (Borgman et al. 2024, p. 16). Similar to Bendire's thrasher, LeConte's thrasher is elusive and one of the last North American bird species to be described (Ibid, p. 16). The American Ornithological Society and numerous other entities accept *T. lecontei* as a valid species, including the Integrated Taxonomic Information System (ITIS 2025, p. 1), BirdLife International (BirdLife International 2018, p. 1), Avibase (Avibase 2025, p. 1), and the Cornell Lab of Ornithology Birds of the World (Sheppard 2020a, p. 1) and associated Clements Checklist (Clements et al. 2024).

Currently, two subspecies of LeConte's thrasher are recognized by ornithologists: *T. lecontei lecontei*, dispersed across the Mojave and Sonoran deserts in Arizona, Nevada, California, as well as northeastern Baja California and northwestern Sonora, Mexico; and *T. lecontei arenicola*, isolated in the Vizcaíno Desert on the west coast of Baja California, Mexico. (Sheppard 2020a, p. 2; Borgman et al. 2024, p. 16, 20; Cornell Lab of Ornithology 2025a, p. 6). Both subspecies differ slightly in morphology and coloration, with birds originating from Baja California on average having the shortest tails, wings, and tarsi, and longer bill length, while birds from southwestern Arizona and northwestern Sonora are often the palest in coloration (Sheppard 2020a, p. 1).

A presumed subspecies *T. lecontei macmillanorum* is found in the southern San Joaquin Valley, California. Evidence for *T. lecontei macmillanorum* as a valid subspecies, however, is weak according to multiple sources and it is no longer recognized as a subspecies. Tests on mitochondrial DNA between Central Valley, CA and Mojave populations failed to find a

genetic difference (Sheppard 2020a, p. 1-2; Borgman et al. 2024, p. 16 and references cited therein). Regardless of taxonomic treatment, LeConte's thrashers in the San Joaquin Valley are isolated geographically from other populations (CDFG 2008b).

Currently, all three subspecies are recognized by the Cornell Lab of Ornithology Clements database (Clements et al. 2024), and Avibase (Avibase 2025, p. 1). Regardless of the validity of any subspecies, as discussed below, listing of the California population is supported by the best available science.

2.3 Biology

Most of the life history information for these thrashers is obtained from the Cornell Lab of Ornithology (2025a-d) and Borgman et al. (2024).

Diet

Bendire's

The diet of Bendire's thrasher mostly consists of insects, including ants, termites, caterpillars, beetles, spiders, and other various larvae and pupae (Borgman et al. 2024, p. 8; Cornell Lab of Ornithology 2025f, p. 2). Less frequently, Bendire's thrashers consume fruit and seeds from small trees and shrubs such as *Lycium* spp. and desert mistletoe (*Phoradendron californicum*) (Borgman et al. 2024, p. 8). Closer to rural edges, they have also been observed feeding at seed feeders and on livestock feed (Ibid).

Like most thrashers, Bendire's thrasher forages mostly on the ground, using its bill to uncover and dislodge prey. When prey is lodged in the ground, Bendire's thrasher will peck, probe, and hammer with their bill. These birds also flip over vegetation and stones in search of prey. Unlike some thrashers, Bendire's rarely use their feet for uncovering prey, and bills are used less for digging than in longer-billed species. Occasionally, Bendire's thrashers will climb into shrubs or small trees to glean insects or take fruit (Cornell Lab of Ornithology 2025f, p. 2).

LeConte's

LeConte's thrashers are primarily insectivorous, eating insects and other arthropods such as grasshoppers, beetles, caterpillars, ants, spiders, and scorpions (Borgman et al. 2024, p. 12; Cornell Lab of Ornithology 2025c, p. 2). They will also eat small vertebrates such as

lizards and eggs of other birds, as well as seeds of mesquite (*Prosopis* and *Neltuma* spp.), stork's bill (*Erodium* spp.), and other desert plants (Ibid). LeConte's thrashers rarely drink surface water when it is available and instead meet their water needs via their prey consumption (Borgman et al. 2024, p. 12; Cornell Lab of Ornithology 2025b, p. 3). They forage for food by using their long bill to clear leaf litter and dig pits in the ground up to 5 inches deep. They will also flip over rocks and debris, chase prey on foot, and glean invertebrate prey off low vegetation (Cornell Lab of Ornithology 2025c, p. 2).

Breeding

Bendire's

Breeding timing for Bendire's thrasher varies widely and is dependent on precipitation, elevation, and latitude. Populations at lower elevations and more southern regions, such as central and southern Arizona and California, initiate breeding in late January to mid-February, with nesting periods peaking in April. In more northern, higher elevation populations, nest initiation starts early April into July (Borgman et al. 2024, p. 10, 11).

During the breeding season, males sing somewhat conspicuously from perches on shrubs or small trees but they are not known to exhibit a courtship display. Male Bendire's thrashers sing a rich, variable warble made up of repeated elements, with each part repeated 2–4 times. The song has fewer harsh phrases, trills, or whistles than songs of larger thrashers, and there usually are no pauses between phrases. Females are not known to sing. Calls made by this species include a low, guttural *chek*, recalling the common call of the northern mockingbird, and an inquisitive sounding *quee* (Cornell Lab of Ornithology 2025e, p. 1-2). Singing often only occurs during the breeding season (Borgman et al. 2024, p. 8).

Both parents construct a compact, bowl-shaped nest and feed the young, with family groups sometimes foraging together for several weeks after the young fledge. Most nests are set approximately 1.5 m (5 ft) above the ground in shrubs, short trees, or cacti; especially in cholla cactus (*Cylindropuntia* spp.), mesquite (*Prosopis* and *Neltuma* spp.), yucca (*Yucca* spp.), and Joshua trees (*Yucca brevifolia*; *Y. jaegeriana*) (Borgman et al. 2024, p. 24; Cornell Lab of Ornithology 2025f, p. 2-3). In rural or low-development areas, Bendire's thrashers will nest near human dwellings or agricultural structures as long as suitable habitat is nearby (Borgman et al. 2024, pg. 9, 27, 36). Females are the primary incubators (Ibid).

LeConte's

Breeding season for LeConte's thrashers begins around December and January, during the coolest parts of the year in their desert habitats (Borgman et al. 2024, p. 13; Cornell Lab of Ornithology 2025c, p. 3-4). The first breeding season is in the second calendar year, around the age of 9 to 11.5 months, and will breed annually thereafter (Sheppard 2020b, p. 1). Males mark the breeding season by perching on shrubs and trees to sing, in this manner establishing territories (Cornell Lab of Ornithology 2025c, p. 3-4). Males will display when they encounter another male in their territory. Males sing a highly variable series of calls, described as being higher in pitch and squeakier sounding than other thrashers, and lacking repeated phrasing (Cornell Lab of Ornithology 2025d, p. 1). Females also occasionally sing, with their songs being similar to the males. The most common call for LeConte's thrasher is a short and rising whistled "*suuuweeeep*" while the distress calls are similar to those of the curve-billed thrasher (*Toxostoma curvirostre*), described as a "double-note whistle" (Ibid, p. 1-2). LeConte's thrashers are mostly monogamous, mating for life and remaining together year-round for multiple years in a row (Ibid).

Nesting typically occurs between February and mid-June, although in more southern portions of the range, nesting may begin in December (as seen in Sonora and Baja California) or January (southern Arizona) (Borgman et al. 2024, p. 13; Sheppard 2018, cited therein). The nest structure for LeConte's thrashers is distinct among thrashers and all desert birds of similar size, as they build four-layered stick nests with a unique well-padded inner layer (Borgman et al. 2024, p. 13). They require dense shrubs to adequately support and protect their nests, and some researchers have hypothesized that nest site selection is likely driven by vegetation structure rather than species (Ibid, and references cited therein). Previous reports and surveys for LeConte's thrashers have noted the significance of cholla cactus (*Cylindropuntia* spp.) in providing nesting structure for the species (Hargrove et al. 2019, p. 4, A36; Ammon et al. 2020, p. 28, 29). This is most notable in California (Hargrove et al. 2019, p. 4; Borgman et al. 2024, p. 13), although a range-wide survey also noted the majority of LeConte's thrasher nests were built in cholla (Ammon et al. 2020, p. 28). Another study which sampled approximately 700 LeConte's thrasher nests determined that 82% were built in cholla or saltbush (*Atriplex* spp.), although other plant species with dense branches were used (Borgman et al. 2024, p. 13). On average, nests are built 0.8 m above the ground (Ibid).

Generally, mated pairs will lay 2-5 blueish-green eggs per clutch during the breeding season (Cornell Lab of Ornithology 2025c, p. 3-4), however, a study of clutch sizes reported birds in San Joaquin Valley, CA to have significantly larger clutches than birds in the rest of

the thrashers' range (Sheppard 2020b, p. 1). LeConte's thrashers will typically have two to three clutches during the breeding season and incubate the eggs for an average of 15.8 days (14-to 19-day range) (Borgman et al. 2024, p. 13). Both the male and female incubate the eggs and raise the chicks (Cornell Lab of Ornithology 2025c, p. 3-4).

Growth and Longevity

Bendire's

Although incubation and nestling periods are not well defined overall, fledglings leave the nest approximately 12 days after hatching according to the North American Nest Record Card Program (Borgman et al. 2024, p. 9). In southern New Mexico, incubation was found to average 13 days, and nestling period 15 days (Borgman et al. 2024, p. 9; and Salas 2021 cited therein). Nest survival is strongly influenced by time of year, with nests initiated later in the year having decreased chances of survival (Ibid). On average, post-fledgling survival was reported to be under 40% (Ibid). Adult lifespans have not yet been estimated for birds in both breeding and nonbreeding locations (Ibid, p. 11), however, there are some general suggestions for the longevity of individuals. According to the Bird Banding Laboratory, Bendire's thrasher has a longevity record of almost 10 years (Borgman et al. 2024, p. 11; Cornell Lab of Ornithology 2025b, p. 4), while the Nevada Department of Wildlife suggests an individual's life span may range from two to six years (NDOW 2025, p. 1).

LeConte's

While more research is needed, it is suspected juvenile survival may be a limiting factor in LeConte's thrasher population growth, as their survival rates are low compared to other species (Borgman et al. 2024, p. 14). A study on LeConte's thrasher juvenile survival estimated approximately 46% survived during the first 58 days after fledging and determined that juvenile survivorship decreased with greater time spent outside of the nest, although the study had a small sample size (n = 7) (Ibid; Blackman and Diamond 2015, cited therein). Another study with a larger sample size (n = 242) reported a lower estimate of juvenile survival, with only 20% of young thrashers surviving to the following year post-fledging (Ibid; Sheppard 2018, cited therein). Annual survival rate for adults has been estimated at around 60% (Ibid). The calculated longevity for LeConte's thrasher is 7-8 years (Borgman et al. 2024, p. 15). The Cornell Lab Birds of the World account notes that the maximum recorded longevity for the species from banding records is 5 years and 8 months (Sheppard 2020b, p. 2), but very few LeConte's thrashers have been banded.

Migration and Dispersal

Bendire's

England and Laudenslayer (1993) report Bendire's thrashers to withdraw from breeding areas in the Mojave and Great Basin deserts, the Colorado Plateau, and on the Arizona/New Mexico Plateau, and move southward of this breeding range, although they note winter distributions are poorly known (England and Laudenslayer 1993, p. 2, 4). Migration and dispersal patterns of this thrasher, especially in regard to nonbreeding locations and habitat, remain generally understudied (Borgman et al. 2024, p. 10). A recent study (Borgman and Kondrat, in prep), however, suggests that individuals within southern Arizona and Sonora, Mexico likely stay within their breeding territories year-round, while those residing in northwestern Arizona and southwestern and central New Mexico are likely migratory (Ibid). Migratory birds are reported to primarily overwinter in Sonora, Mexico, and occasionally southern Arizona (Ibid). The study also determined that migration was initiated at different times, as migratory individuals were recorded to leave breeding habitats from late July to late September. Birds residing in northwestern Arizona departed earlier than birds in central New Mexico, and the latter departed earlier than birds in southwestern New Mexico (Ibid). Typically, migratory Bendire's thrashers return to their breeding territories around February (SJV 2019, p. 4).

LeConte's

LeConte's thrashers are non-migratory and stay within their suitable habitats year-round (Sheppard 2020c, p. 1; Borgman et al. 2024, p. 12). The species is reported to have greatly restricted dispersal into isolated patches of suitable habitats, with suggestions of individuals only moving 5-8 kilometers in a lifetime (Borgman et al. 2024, p. 36). However, studies of young thrashers in Maricopa, CA reported their maximum dispersal was slightly further than suggested by Borgman et al. (2024, p. 36), ranging from 8-10 kilometers (Sheppard 2020c, p. 1). A radio-telemetry study in the Barry M. Goldwater Range in Arizona reported LeConte's thrasher juveniles moved an average of 678.9 m from their nests within 50 days after fledging (Borgman et al. 2024, p. 14 and Blackman and Diamond 2025 referenced therein). A study conducted in Maricopa, CA examined adult LeConte's thrashers and reported that after losing a mate, females were more likely to move into new territories than males, finding that females moved an average of only about 720 m to a new territory (Sheppard 2020b, p. 4). Blackman and Diamond (2015) conducted a radio-telemetry study of juvenile thrashers at the Barry M. Goldwater Range on 7 individuals and reported juveniles dispersed approximately 365 ha (~902 acres) on average.

Territory

Bendire's

Bendire's thrashers' breeding territories are large and well-spaced. Territories are often separated from each other anywhere from 400 m (0.25 mi) in densely populated habitats and up to a kilometer (0.6 mi) or more in less suitable locations (Borgman et al. 2024, p. 12). A study of territory size in southwestern New Mexico reported thrasher territories ranging from 1.3 ha to 2.3 ha (3.2 to 5.7 acres), with size fluctuating yearly based on precipitation (Bear Sutton 2020, p. 33, 51). When selecting territory locations, Bendire's thrasher often avoids areas of contiguous cover, preferring instead to choose areas with high levels of heterogeneity and bare ground (Borgman et al. 2024, p. 12).

LeConte's

Sheppard (2018) determined that the breeding territory of adult LeConte's thrashers in Maricopa, CA ranged in size from 4-12 ha (9.9-29.7 acres), with an average of 7.34 ha (18.1 acres). Sheppard (2018) also reported mating pairs utilizing 10-40 ha (24.7-98.8 acres) of habitat over multiple years and considered this to be minimum territory size (Ibid), however, it was also noted that acceptable habitat patches less than 160 ha (395 acres) in size were not used (Ibid, p. 36). Borgman et al. (2024) discussed the drastically different estimates of territory size between the Blackman and Diamond (2015) and Sheppard (2018) studies, attributing the majority of discrepancies to differences in study area, design, goals, and examined measures (e.g. home range versus breeding territory) (Ibid, p. 14). The Cornell Lab Birds of the World account notes that the home range of LeConte's thrashers during the nonbreeding season is ill-defined (Sheppard 2020b, p. 4). Borgman et al. (2024) stress that more research is needed to understand the extent of LeConte's thrashers' home range and territory size (Borgman et al. 2024, p. 14). Ultimately, it is agreed that the species has a large minimum patch size requirement (Ibid, p. 36), and may need at least 1,000 ha (2,471 acres) of suitable habitat to support a viable population of approximately 250 individuals (NatureServe Explorer 2025, p. 5).

2.4 Habitat

Bendire's

Understanding of Bendire's thrasher habitat needs is evolving. Information on breeding habitats was initially summarized by England and Laudenslayer (1993), noting that Bendire's thrashers prefer desert habitats of open ground, grasslands, shrublands, or woodlands with scattered shrubs and trees, ranging in elevation from sea level to about 2,000 m (England and Laudenslayer 1993, p. 4). More recently, field vegetation assessments were conducted in the United States to improve understanding of Bendire's thrashers' breeding habitat use (Ammon et al. 2020, p. 3). The results of the two-year surveys suggest that the birds are more likely to occur in areas with high cholla densities, near washes, in areas with low slopes, in areas with low densities of trees, and at elevations averaging 1,000 meters (Ibid, p. 31, 42). A conservation strategy plan released by the Desert Thrasher Working Group in 2024 additionally noted that preferred grasslands include a significant shrub component, and that vegetated desert washes are important habitat features across all thrasher habitat types (Borgman et al. 2024, p. 24). Individuals are known to avoid areas of continuous cover like open grasslands or stands of woody shrubs and trees but require some patches of dense vegetation for ideal nest building and concealment (Borgman et al. 2024, p. 9, 12).

At higher elevations and latitudes, Bendire's thrasher habitat consists of sagebrush (*Artemisia* sp.) with scattered junipers (*Juniperus* sp.). At lower elevations, Bendire's thrasher commonly inhabits desert grassland and shrubland with spinescent shrubs or cacti such as cholla, Joshua trees, palo verde (*Parkinsonia* spp.), mesquite, and various yucca (England and Laudenslayer 1993, p. 4; Ammon et al. 2020, p. 29, 64; Borgman et al. 2024, p. 9). Recent studies note the importance of cholla stands being used for breeding habitat (Ammon et al. 2020, p. 28, 31, 33, 42; Borgman et al. 2024, p. 24, 55). Bendire's thrashers may avoid cholla stands occupied by curve-billed thrashers (England and Laudenslayer 1993, p. 4, 5). Little information is available regarding non-breeding habitats, but these are likely to be similar to those used during breeding (Borgman et al. 2024, p. 24).

Recent habitat surveys by Ammon et al. (2020) and the Desert Thrasher Working Group also brought to light ecoregional and vegetative differences in habitat use across Bendire's thrasher's range (Ammon et al. 2020, p. 43-50; Borgman et al. 2024, p. 25-29). The majority of Bendire's thrasher populations have been confirmed in five EPA level three ecoregions (noted to be highly comparable to Bird Conservation Regions), and one ecoregion in Mexico (Borgman et al. 2024, p. 18-19, 22-23). In California, Bendire's thrasher occurs primarily in

the Mojave Basin and Range and Sonoran Desert ecoregions (Ammon et al. 2020). See Figure 1.

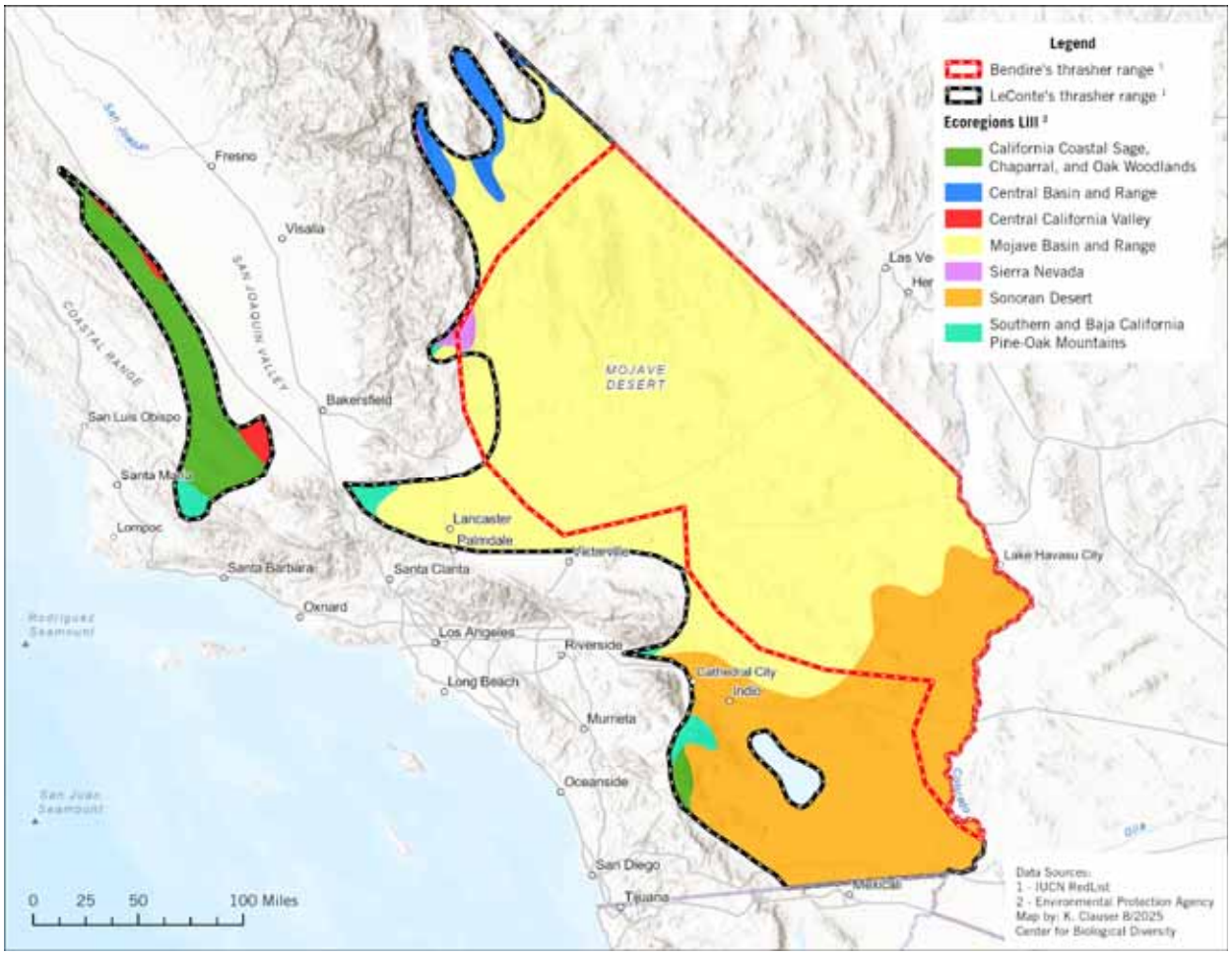

Figure 1. **EPA Level III ecoregions within the California range of Bendire's thrasher and LeConte's thrasher.** Data sources: IUCN Red List (BirdLife International 2020); USEPA (2025a).

The most up-to-date synthesis of Bendire's thrasher habitat characteristics in the two California ecoregions it inhabits, Mojave Basin and Range and Sonoran Basin and Range, is found in Borgman et al. (2024) and largely informed the following summary:

Bendire's thrashers in the Mojave Basin and Range are found in Arizona, California, Nevada, and Utah and are primarily migratory (Borgman et al. 2024, p. 26). Most often, thrashers are found in habitats with a moderate density of Joshua tree and big galleta (*Hilaria rigida*) or other bunchgrasses (Ammon et al. 2020, p. 43). See Figure 2, right. Smaller shrubs characteristic of preferred Bendire's thrasher habitat in this ecoregion include Mojave buckwheat (*Eriogonum fasciculatum*), blackbrush (*Coleogyne*

ramosissima), white bursage (*Ambrosia dumosa*), ephedra (*Ephedra* spp.), and winterfat (*Krascheninnikovia lanata*). Large to medium sized chollas, Mojave yucca (*Yucca schidigera*), and banana yucca (*Yucca baccata*) are also often present. In the absence of Joshua trees, Bendire's thrashers will utilize habitats with large Mojave yuccas (Borgman et al. 2024, p. 26).

Figure 2. Examples of Bendire's thrasher habitat in the Sonoran Basin and Range ecoregion (left) and the Mojave Basin and Range ecoregion (right). Photos from Borgman et al. (2024) and Ammon et al. (2020).

Bendire's thrashers in the Sonoran Basin and Range in Arizona, California, Baja California, and Sonora are primarily found residing year-round, although both breeding and non-breeding populations can be found throughout the region (Borgman et al. 2024, p. 27). Preferred habitats mostly consist of creosote (*Larrea tridentata*), *Lycium* spp., graythorn (*Ziziphus obtusifolia*), large yuccas and chollas, as well as desert trees such as mesquite, palo verde, and ironwood (*Olneya tesota*). See Figure 2, left. Bendire's thrashers have also been observed utilizing shrubs and mesquite trees at the edges of agricultural fields, livestock operations and ranches, and rural communities (Ibid).

LeConte's

LeConte's thrasher inhabits some of the hottest, driest, and most barren regions of the North American southwestern deserts year-round, ranging in elevation from the floor of Death Valley, CA up to 1,600 m in the northern parts of its range (Hargrove et al. 2019, p. 2; Borgman et al. 2024, p. 12, 30). These thrashers generally occupy desert scrub habitat and Mojave yucca (*Yucca schidigera*) and Joshua tree (*Yucca brevifolia*; *Y. jaegeriana*) dominated woodlands but have been reported to prefer habitats with scattered cholla (*Cylindroptunia* spp.) and saltbush (*Atriplex* spp.) (Borgman et al. 2024, p. 30). Shrubs

(including cholla) in thrasher habitat rarely exceed 2 meters in height. LeConte's thrasher habitat is often distributed within alluvial fans, desert flats, or the margins of river drainages or dried lakes. They are also often associated with dunes but are rarely found in areas where the bedrock is close to the surface (Ibid). Grinnell and Miller (1944) and Sheppard (1970, 1973) also note that LeConte's thrashers occur often in areas with alkaline soils (Ibid).

LeConte's thrasher can often be found in heterogeneous shrub cover, including near desert washes and arroyos that generally provide more variety in vegetation type and structure, as these locations also typically provide larger, denser shrubs that can support nests (Ibid). While thrashers have been found in areas of minimal topographic relief (e.g. flat valleys and low rolling hills), the species is typically found in flat areas of less than 5% slope (Borgman et al. 2024, p. 30; Fletcher 2009, cited therein). While it has been suggested that the species occurs over a wide range of temperatures, aridity is a limiting factor (Hargrove et al. 2019, p. 2), as precipitation in LeConte's thrasher habitats is less than 20 cm (7.9 in) per year (Borgman et al. 2024, p. 12). Snowfall in suitable habitats is also minimal, as it has been reported that the species rarely occur in areas where snowfall exceeds 15 cm (5.9 in) annually (Ibid). Surface water in their habitats is also rarely present (Ibid, p. 30). As mentioned previously, LeConte's thrashers meet their water needs via prey consumption and thus require habitats with ample soil, sand, and/or leaf litter, as these features provide necessary shelter for their prey (Ibid).

LeConte's thrashers are found in California primarily in two ecoregions, the Mojave Basin and Range and Sonoran Desert. LeConte's thrashers in the southern San Joaquin Valley occur in the California Coastal Sage, Chaparral, and Oak Woodlands ecoregion. See Figure 1. The most up-to-date synthesis of LeConte's thrasher habitat characteristics in the Mojave Basin and Range and Sonoran Desert ecoregions is found in Borgman et al. (2024).

LeConte's thrashers in the Mojave Basin and Range ecoregion (Figure 3, right) are found in Arizona, California, and Nevada, most often in areas of little topographic relief (Borgman et al. 2024, p. 31). While creosote (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) make up most of the vegetative cover types in the Mojave Desert, thrashers are only associated with these plants when they occur with larger plants that provide enough structure for nesting, most notably cattle saltbush (*Atriplex polycarpa*) (Ibid). Typical habitats in this ecoregion often contain Mojave yucca, silver cholla (*Cylindropuntia echinocarpa*), or buckhorn cholla (*C. acanthocarpa*), although desert willow (*Chilopsis linearis*), desert almond (*Prunus fasciculata*), and catclaw acacia (*Senegalia greggii*) are

also important plant species. The latter three species are also noted to be largely associated with desert washes or arroyos (Ibid).

The Sonoran Desert is described as a dry, subtropical ecoregion, spanning from Arizona and California, across the U.S.-Mexico border, into Baja California and Sonora (Borgman et al. 2024, p. 31). LeConte's thrashers occur in areas of sparse vegetation in this ecoregion, with typical habitat consisting of flat to gentle-rolling hills and shallow washes (Figure 3, left). Other important landscape features for this thrasher include sand dunes, large open dry washes, and arroyos. Where LeConte's thrashers are typically found, common vegetation includes saltbush, bursage (*Ambrosia* spp.), and *Lycium* spp. (Ibid, p. 32). Trees and larger desert shrubs are very sparse in the region; however, small-leaved trees such as palo verde (*Parkinsonia* spp.), mesquite (*Prosopis* and *Neltuma* spp.), and ironwood (*Olneya tesota*), and other vegetation such as creosote, brittlebush (*Encelia farinosa*), and cholla are common (Ibid, p. 31-32).

Figure 3: Examples of LeConte's thrasher habitat. Left: Sonoran Desert habitat. Right: Mojave Basin and Range habitat. Photos from Borgman et al. (2024).

A disjunct LeConte's thrasher population exists at the northwestern edge of the species' range in the San Joaquin Valley, residing only in the southern San Joaquin Valley and adjacent Cuyama Valley and Carrizo Plain (Grinnell and Miller 1944; Sheppard 1996; CDFG 2008b). Le Conte's thrasher distribution in the San Joaquin Valley is likely determined by the presence, structure, and vigor of saltbush, the size of habitat fragments, and the proximity to other saltbush areas (CDFG 2008b). Thrashers seek gentle to rolling, well-drained slopes bisected with dry washes, conditions found most often on bajadas or alluvial fans (CDFG 2008b). Occupied habitats are generally moderately to sparsely vegetated by common saltbush (*Atriplex polycarpa*), spiny saltbush (*Atriplex spinifera*), or

rarely—in a small area in the Carrizo Plain and Cuyama Valley—desert tea (*Ephedra californica*) (CDFG 2008b). The ground is bare or has patches of sparse, low-growing grass. Nesting areas must have at least a few larger, dense shrubs for nest placement. Flat, poorly drained soils of the valley floors provide suitable shrub species and structure (adequate height and spacing for nesting) but apparently are unsuitable foraging habitat (flooded in wet winters and highly alkaline and deeply powdery during the summer drought), as LeConte's thrasher avoids these areas (CDFG 2008b).

3. RANGE AND STATUS

3.1 Range

Bendire's

Bendire's thrashers are patchily distributed over a relatively small global range (Ammon et al. 2020, p. 3; Borgman et al. 2024, p. 33; Audubon 2025, p. 4). See Figure 4. A detailed description of their distribution is given in Borgman et al. 2024 (p. 18).

The global range of Bendire's thrasher extends East to West from the Rio Grande in New Mexico through the Mojave Desert in Southern California and Nevada, and northward from southern Sonora to northern New Mexico, northern Arizona, and southern Utah, with some historical detections in southwestern Colorado (Borgman et al. 2024, p. 18). They have been found in elevation ranging from sea level (near Guaymas, Sonora, Mexico, occupied mostly in winter) to about 1,800 m (near Escalante, Utah), with some thrashers reported to occur at elevations over 2,000 m in New Mexico (Ibid). Bendire's thrashers' core range encompasses southwestern New Mexico, through Arizona, into southern California, Nevada, and Sonora (Ibid). Bendire's thrashers are rarely seen outside of their normal range, but have been occasionally spotted in southwestern Colorado, east-central Utah, greater Los Angeles, the Farallon islands, and in mountains outside of Bakersfield, CA (Ibid).

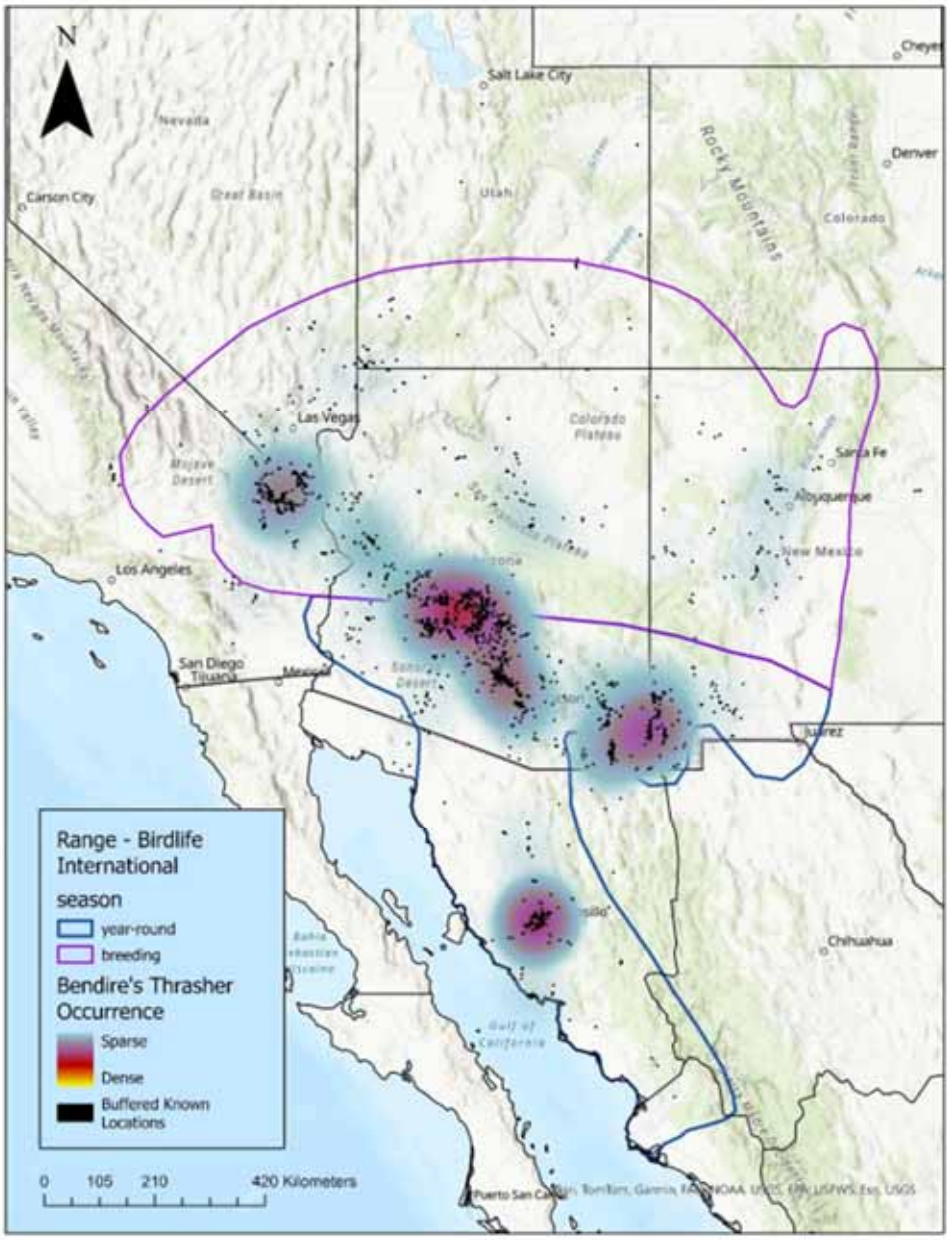

Figure 4. Global range and population density map of Bendire's thrasher from Borgman et al. (2024, p. 19).[1] Presence is depicted as a heat density map, with black dots as buffered confirmed detection points. Points included are not comprehensive, and densities are likely skewed towards more populated areas (e.g., cities) where there is higher observation effort. The BirdLife International range map is included as the blue (year-round) and purple (breeding) polygons.

According to Borgman et al. (2024), some changes in the global distribution of Bendire's thrasher have occurred. In New Mexico, Bendire's thrasher have not been observed at

[1] Data used by Borgman et al. (2024) is a combination of public eBird surveys, Desert Thrasher Working Group surveys, and other data from non-referenced monitoring efforts.

numerous historic locations in the eastern part of the state (Borgman et al. 2024, p. 18 and Baumann 2015 cited therein), and detections are rare east of the Rio Grande. In California, the species has undergone some range contractions due to habitat loss and shifting (Borgman et al. 2024, p 18). In Nevada, there is some indication of northward range expansion, with confirmed breeding near Wendover, based on eBird and Great Basin Bird Observatory unpublished data (Ibid). While the cause of this potential range expansion is unknown, habitat shifting and alteration due to climate change (discussed in more detail in Section 4.13) is identified by the authors as the highest-ranking threat to Bendire's thrasher (Ibid, p. 34, 48).

The range of Bendire's thrasher in California was mostly delineated by England and Laudenslayer (1989a, b), who conducted extensive focused surveys in 1986 and 1987. Prior to their surveys, England and Laudenslayer (1989a, b) summarized all documented breeding season records from the state within the following areas: (1) Eastern Mojave Region, the southern area of Clark Mountain, Cima Dome, Mid Hills, Lanfair, Gold, Pinto, and Round valleys, and Granite Pass between the Granite and Providence mountains, San Bernardino County; (2) Southern Mojave Region, in the vicinity of Lucerne Valley/Victorville, Yucca Valley/Pioneertown, and in Joshua Tree National Park, San Bernardino County; and (3) Colorado Desert Region, the Turtle Mountains and elsewhere between Needles and Blythe, San Bernardino and Riverside counties.

England and Laudenslayer (1989a, b) greatly expanded knowledge of the range and abundance of Bendire's thrasher in California by surveying throughout the Mojave and northern Colorado deserts in 1986 and 1987. They surveyed 44 transects, but only 23 of these in both years. Areas where they found previously unreported or poorly documented populations were around Kelso Valley and Butterbredt Spring, Kern County; the Old Woman Mountains area, the north side of Clark Mountain, Shadow Valley, upper Fenner Valley, north of Cima Dome, Ward Valley, Apple Valley, and within and near the Superior Valley north of Barstow, San Bernardino County; and Lee Flat, Inyo County.

See Figure 5 for a map of the breeding range of Bendire's thrasher in California.

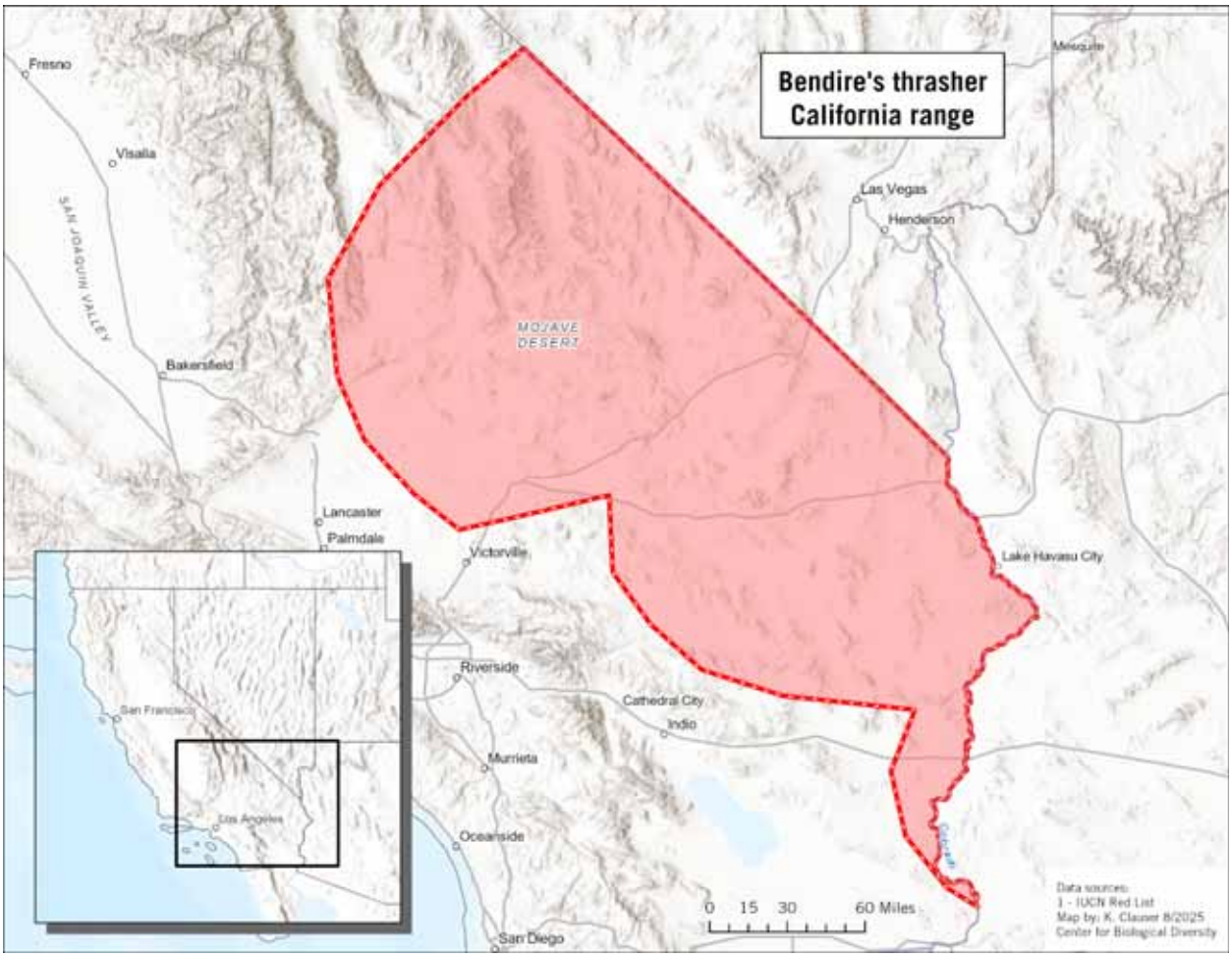

Figure 5. Breeding range of Bendire's thrasher in California. Data sources: IUCN Red List (BirdLife International 2020); Borgman et al. (2024).

LeConte's

LeConte's thrasher is patchily distributed in the driest regions of the southwestern United States and northern Mexico. The global range extends from the San Joaquin Valley and Mojave and Sonoran deserts of southeastern California, eastward into southern Nevada and the southwestern-most corner of Utah, and southward through western Arizona into northeastern Sonora and Baja California, Mexico (Sheppard 2020d, p. 1; Borgman et al. 2024, p. 12). See Figure 6. LeConte's thrashers reside mainly in flat deserts, in elevations ranging from -81 m (Death Valley, CA) up to 1,600 m (Ibid). Few individuals have been found outside of their breeding range, such as a specimen recorded 61 km northeast of Beatty, Nye County, Nevada (Sheppard 202d, p. 1).

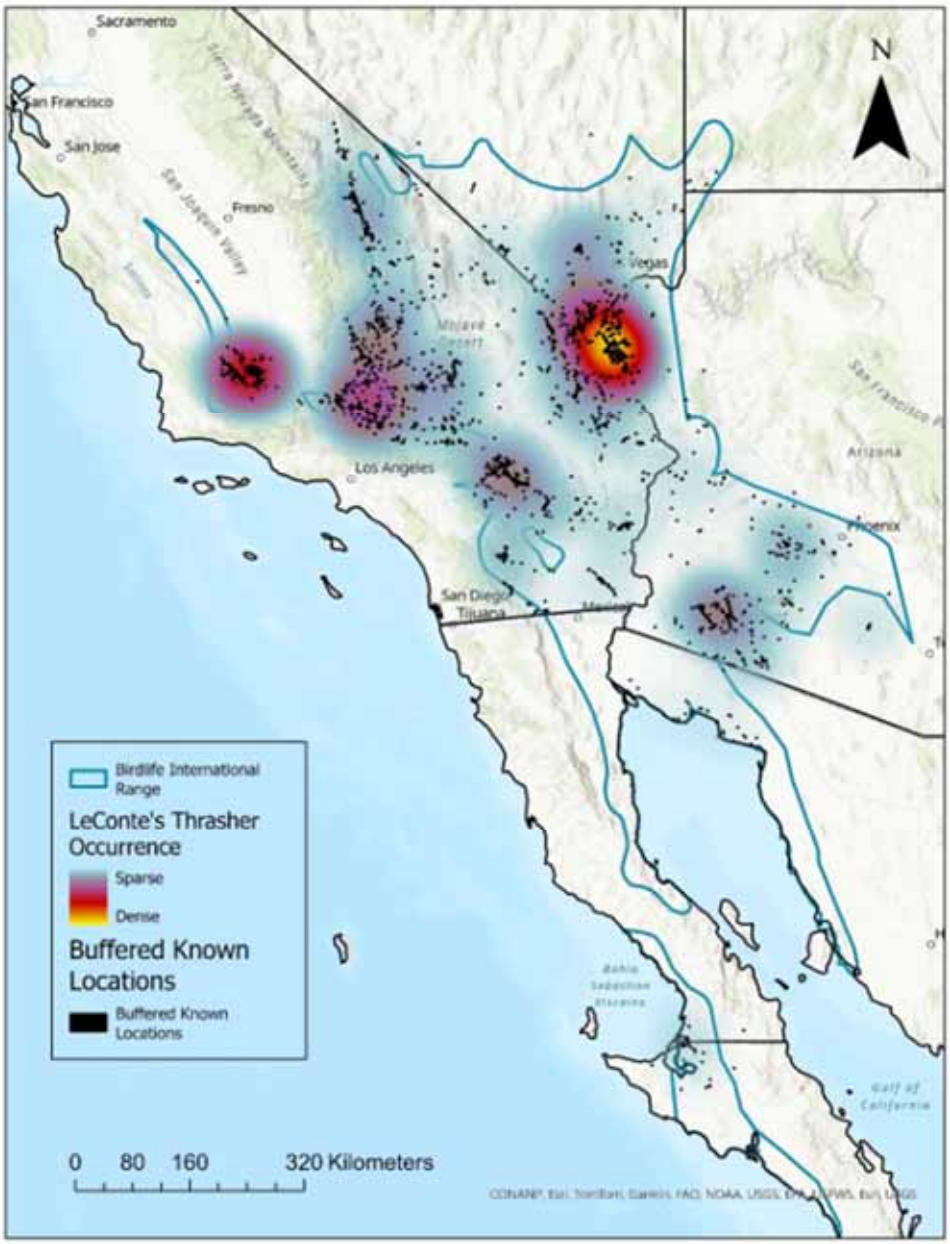

Figure 6. Global range and population density map of LeConte's thrasher (from Borgman et al. 2024, p. 21). Presence is depicted as a heat density map, with black dots as buffered confirmed detection points.[2] The BirdLife International range map is outlined by blue polygons.

The Cornell Lab Birds of the World account states that the extent of the known distribution of LeConte's thrasher has not significantly changed since the 1890s, except for their discovery on the coast of central Sonora, Mexico (Sheppard 2020d, p. 2). However, a recent

[2] Points included are not comprehensive and densities are likely skewed towards more populated areas (e.g., cities) where there is higher observation effort. Data used by Borgman et al. (2024) is a combination of public eBird surveys, Desert Thrasher Working Group surveys, and other data from non-referenced monitoring efforts.

conservation strategy released by the Desert Thrasher Working Group (the most up-to-date synthesis of the species) notes many local reductions in the species' distribution have occurred in multiple parts of their range (Borgman et al. 2024, p. 20).

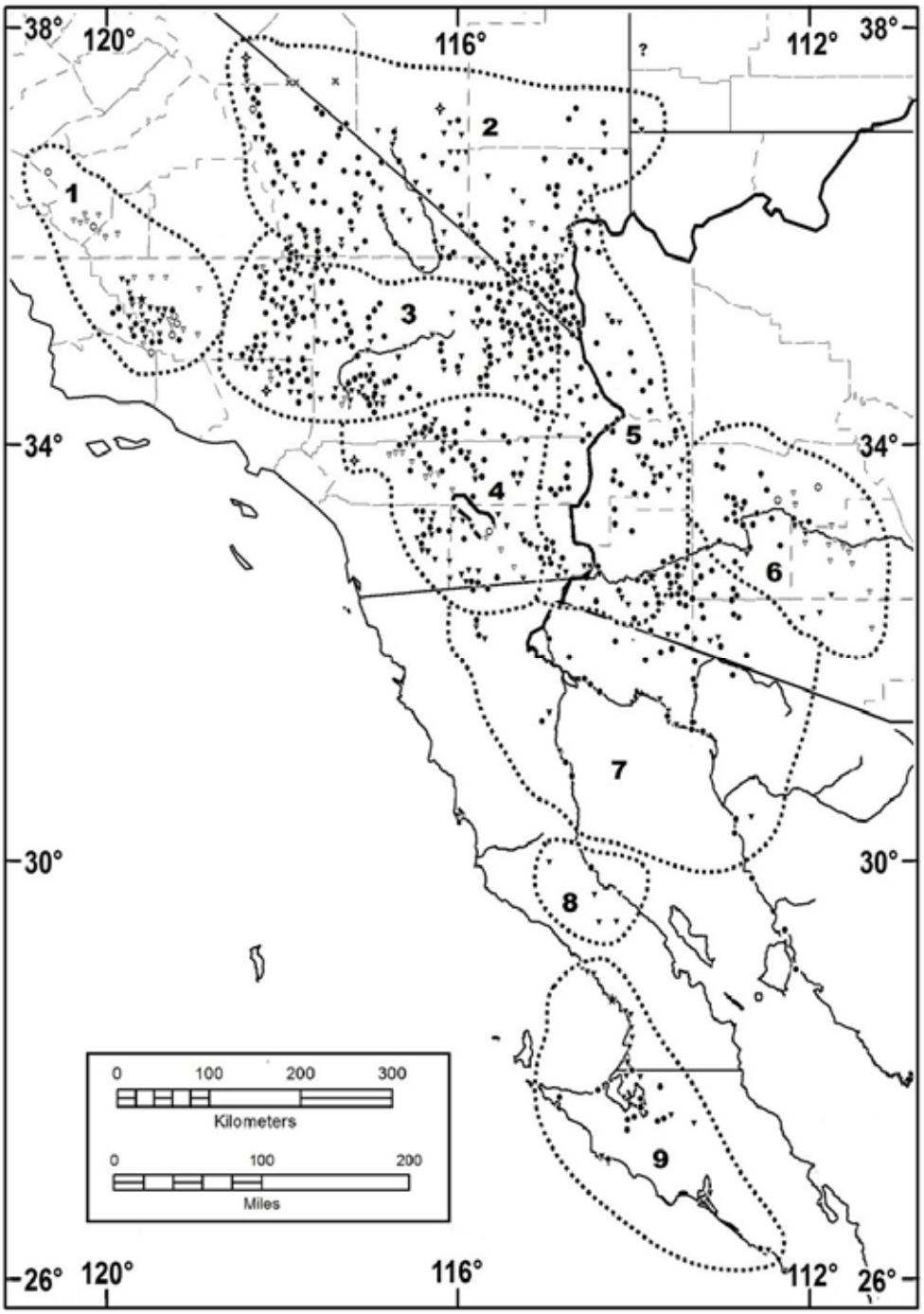

Figure 7. Historic range map for LeConte's thrasher from Sheppard (2018). Circles are observation supported locations; triangles are specimen or photograph supported; open symbols are historic sites (extirpated); and solid were still thought to be present in late 2017. Each symbol represents an area of ~3.5 km radius.

Sheppard (2018) compiled a detailed historic range map for LeConte's thrasher, documenting observations as of 2017 and denoting extirpated sites. See Figure 7.

See Figure 8 for a map of the historic range of LeConte's thrasher in California.

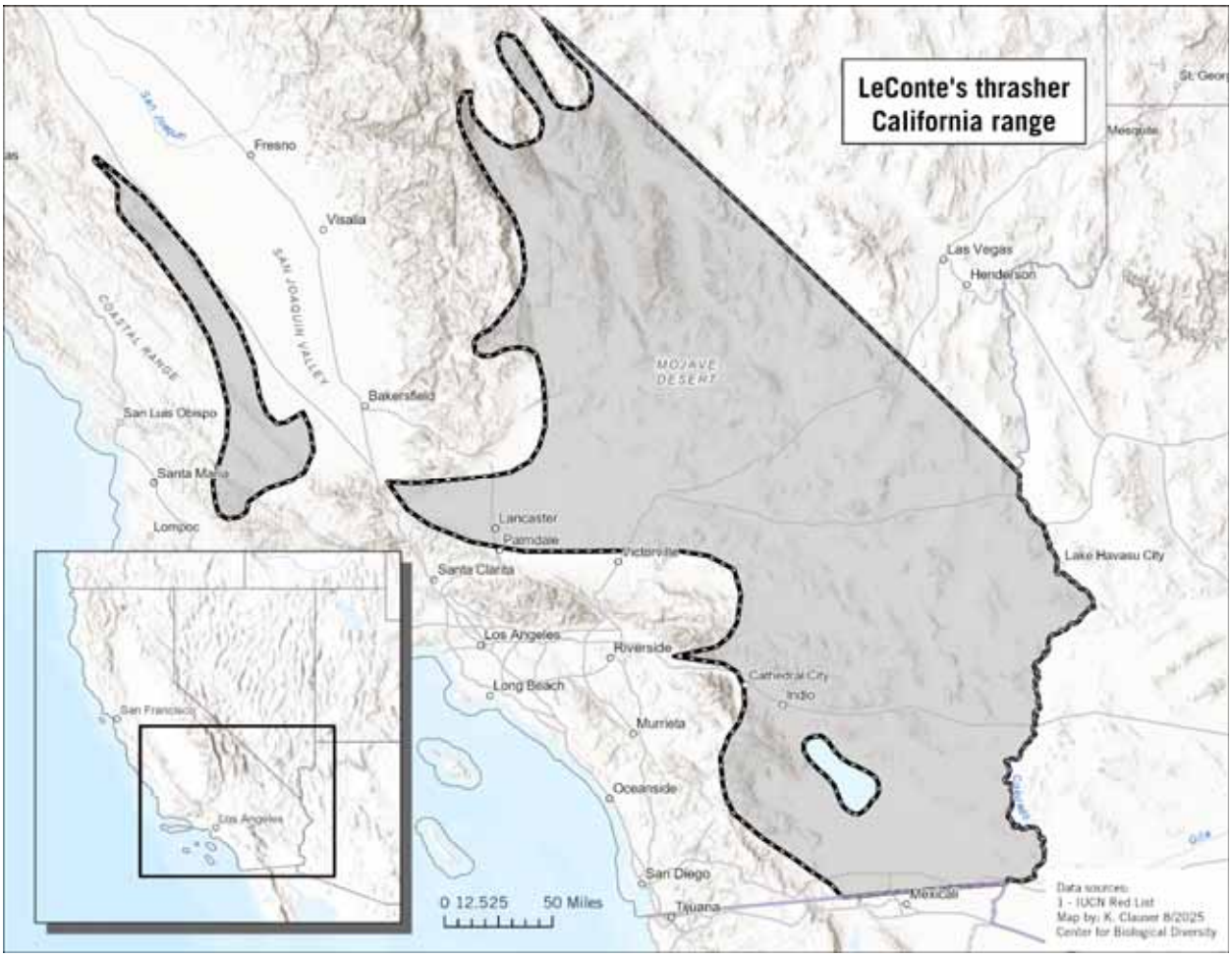

Figure 8. Historic range of LeConte's thrasher in California. Data sources: IUCN Red List (BirdLife International 2020); Borgman et al. (2024).

The historic known range of LeConte's thrasher in the San Joaquin Valley, shaped like a reverse "J," included the western edge from the vicinity of Huron and Coalinga, Fresno County, south to the base of the Tehachapi Mountains then north on the east side to near Poso Creek 13 km north of Bakersfield, Kern County (Grinnell 1933; Grinnell and Miller 1944). Historic locations of confirmed breeding include near McKittrick and Lost Hills, Kern County (Grinnell 1933, MVZ egg set data). Building on prior knowledge, Sheppard (1970, 1973) noted populations in the Carrizo Plain and Cuyama Valley, much of the San Joaquin Valley, and the Panoche Hills. This probably reflected a more accurate depiction of the

species' range at the time of Grinnell and Miller (1944) rather than a subsequent range expansion.

The LeConte's thrasher range as of 2008 in the McKittrick-Maricopa area, Kern County, extended 75 km north to south and 25 km west to east, from the Belridge oil field just north of McKittrick south to Devil's Gulch south of Maricopa, east to the California Aqueduct between Lokern Pumping Station and Pentland, and west to the lower third of the Temblor Mountains (CDFG 2008b). It was fragmented by large blocks of unsuitable habitat created by several barren oil fields, large wildfires, and urban development in the towns of Taft, Maricopa, McKittrick, and Valley Acres (CDFG 2008b). The highest concentrations of Le Conte's thrashers were found near Maricopa, followed by McKittrick (Sheppard 1996). The Belridge oil field had just over 100 ha of good habitat where several pairs of thrashers persisted through the drought of the late 1980s (CDFG 2008b). In early 1997 a wildfire burned 16,000 ha in the Lokern area, leaving only charred skeletons of saltbush, and there was no evidence of thrashers in 1998 and 2003 in areas where they were detected prior to the fire (CDFG 2008b), however, outside of the breeding season this species was detected in one of the burned areas where saltbush, especially spiny saltbush, was starting to recover (Germano 2003).

The LeConte's thrasher range as of 2008 in the Carrizo-Elkhorn Plains, San Luis Obispo County was composed of two subunits, one in the Elkhorn Plain (approximately 32 km x 2 km), extending from Wallace Creek in the Panorama Hills on the north to Beam Flat on the south, and from the alluvial fans on the east side of Carrizo Plain east to the foot of the steep west slope of the Temblor Mountains (CDFG 2008b). Here LeConte's thrashers occupied saltbush stringers as well as areas of the rolling hills dominated by desert tea (CDFG 2008b). The saltbush had recovered greatly since the cessation of the late 1980s drought and become newly and naturally reestablished along many drainages, where they were documented in 2004 (CDFG 2008b). The other subunit is a small area (approximately 8 km x 2 km) of gently rolling hills largely dominated by desert tea, above the southern end of the Carrizo Plain and below the steep east slopes of the Caliente Mountains, where LeConte's thrasher was more abundant in saltbush than in the desert tea habitat (CDFG 2008b).

See Figure 9 for a detailed map of the known range of LeConte's thrasher in the San Joaquin Valley as of 2008, showing a significant range contraction.

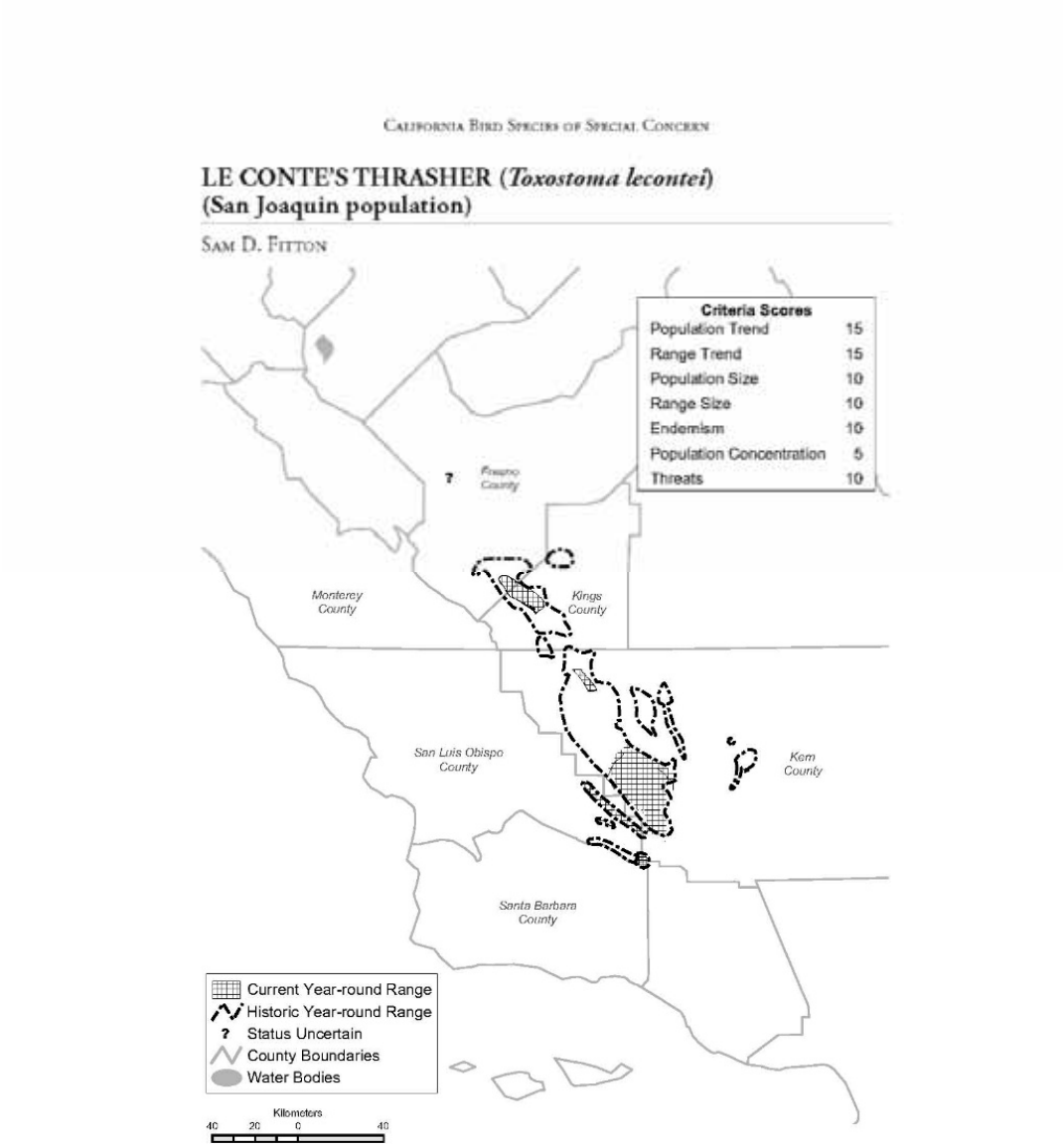

Figure 9. Known breeding range of LeConte's thrasher in the San Joaquin Valley as of 2008, from CDFG (2008b). Note range contraction.

3.2 Population Abundance and Trends

Population Size

Bendire's

According to the Partners in Flight (PIF) Population Estimates Database, which combines Breeding Bird Survey (BBS) and eBird data for Bendire's thrasher, there are an estimated 83,000 breeding Bendire's thrashers globally. Of those, 67% (56,000) breed in the United

States (Partners in Flight Databases 2025a; Partners in Flight Databases 2025b).[3] Based on eBird data alone, the proportion of the global population breeding in the U.S. is estimated to be even higher, at nearly 80% (NABCI 2025, p. 7). The breeding population of Bendire's thrasher in California is estimated at 4,400 adults, which is 8% of the U.S. population and 5% of the global population.

Through the Avian Conservation Assessment Database, PIF additionally reports season-specific population estimates and trends across Bird Conservation Regions (BCRs), which are ecologically distinct regions in North America with similar communities, habitats, and resource management issues (Panjabi et al. 2024, p. 7; Cornell Lab of Ornithology 2025g, p. 1). Six BCRs exist within the global range of Bendire's thrasher (Partners in Flight Databases 2025c), and 79% of all breeding and 92% of all wintering Bendire's thrashers are found in the Sonoran and Mojave Desert BCR, which covers a large portion of southern California and Arizona (Partners in Flight Databases 2025c).

LeConte's

According to the Partners in Flight (PIF) Population Estimates Database, which combines Breeding Bird Survey (BBS) and eBird data for LeConte's thrasher, there are approximately 71,000 breeding thrashers globally (PIF 2025a). In the United States, the population is estimated at 46,000 (PIF 2025a), about 65% of the global population.[4] An estimated 37,000 adult LeConte's thrashers breed in California (53% of the global population), and the state accounts for 82% of the U.S. population (PIF 2025b).

Through the Avian Conservation Assessment Database, PIF additionally reports population estimates and trends across Bird Conservation Regions (BCRs), ecologically distinct regions in North America with similar communities, habitats, and resource management issues (Panjabi et al. 2024, p. 7; Cornell Lab of Ornithology 2025f, p. 1). The global LeConte's thrasher range overlaps with three BCRs (PIF 2025c), with 97% of the global population residing in the Sonoran and Mojave Desert BCR in southern California and Arizona (PIF 2025c). Around 2% of the global population resides in the Coastal California BCR in the Southern San Joaquin Valley (PIF 2025c).

[3] Global and state populations are breeding populations per the PIF Population Estimates Database Handbook (Will et al. 2020, p. 28, 29). For information about underlying BBS data and global population estimates, see Will et al. 2020, pages 4-7 and 13-16. For a description of state-specific estimates, see Will et al. 2020 pages 6 and 9. Partners in Flight Databases 2025a reports a U.S. population size of 56,000 individuals, whereas summing the populations in each state, as reported in Partners in Flight Databases 2025b, gives a U.S. population size of 56,810.

[4] PIF (2025a) reports a U.S. population size of 46,000 individuals, whereas summing the populations in each state, as reported in PIF (2025b), gives a U.S. population size of 45,229.

Population Trends

Bendire's

Global

As reported in Borgman et al. (2024), Bendire's thrasher is one of the fastest declining avian taxa in North America (Rosenberg et al. 2016, 2019; Sauer et al. 2020). Based on BBS data, Bendire's thrasher populations in the U.S. have declined by 3.12%/year from 1968-2019, resulting in an 86% decline over that same time period (Rosenberg et al. 2019; Sauer et al. 2020; Borgman et al. 2024). See Figure 10. While population trends in Mexico are currently unknown (Borgman et al. 2024, p. 3), this decline is alarming given roughly 70-80% of the global breeding population is in the U.S. Due to this long-term decline and high scores for other vulnerability factors such as threats to the breeding population, Bendire's thrasher is also categorized in the PIF Avian Conservation Assessment Database as a Red Watch List species — a bird species which is highly vulnerable and in urgent need of special attention (Partners in Flight Databases 2025d). All PIF Red Watch List species are also Red Alert Tipping Point species, as identified by the Road to Recovery Initiative (Panjabi et al. 2024, p. 66; Road to Recovery 2024, p. 2). Tipping Point species exhibit high vulnerability to extinction and worrisome population declines, with the associated Red Alert designation signifying the highest degree of urgency in addressing these declines (Road to Recovery 2024, p. 1). In the recently released U.S. State of the Birds report, Bendire's thrasher is still identified as a Red Alert Tipping Point species (NABCI 2025, p. 14).

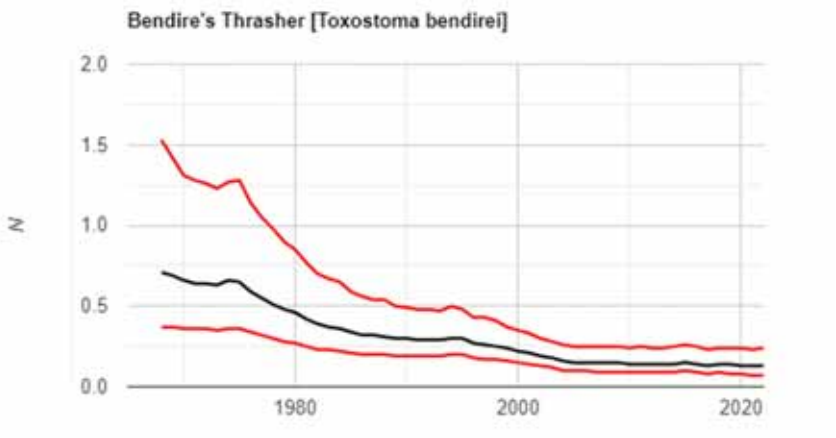

Figure 10. U.S. Breeding Bird Survey population trends for Bendire's thrasher, 1966-2022. As presented on the USGS BBS trends website (USGS 2025a, p. 1)[5].

[5] BBS trendlines above based on surveywide scale (U.S. and Canada combined) and core data (same as most recent Partners in Flight analyses for Bendire's thrasher) (Panjabi et al. 2024, p, 37; Partners in Flight Databases 2025c, Partners in Flight Databases 2025d).

Limitations of using BBS data for thrashers have been discussed by thrasher-specific working groups, as the survey protocols for BBS are not specifically designed for species like thrashers which have a low likelihood to be recorded with conventional point counts and survey periods can be mismatched with thrasher breeding phenology (Ammon et al. 2020, p. 6, 7; Borgman et al. 2024, p. 4). However, Bendire's thrasher is "sampled well enough overall to provide reasonable downward trend estimates" (Borgman et al. 2024, p. 4). Furthermore, recent surveys developed specifically for desert thrashers have shown greater population declines than those suggested by BBS for LeConte's thrasher, which has similar range and threats as Bendire's (CalPIF 2009, p. 12, 62, 64; Borgman et al. 2024, p. 1, 4).

Further declines in Bendire's thrasher populations are expected as habitat losses are projected to increase throughout the species' range due to multiple, severe threats (see Section 4). Given the species' perilously low population size, even small losses could be catastrophic. The precarious status of Bendire's thrasher is also evident from the numerous federal and state-level designations it possesses (Borgman et al. 2024, p. 1, 7).

Regional

Regional population trends for Bendire's thrasher are widely negative across states and ecoregions, with the greatest declines seen in populations in the Southern Rockies, Arizona, and New Mexico, as reported by the BBS (Borgman et al. 2024, p. 3, 5). BBS data from 1968-2022 reported declining population trends in all states that encompass the thrasher's range including California (Borgman et al. 2024, p. 5).

These negative trends are also reflected in all BCR regions, especially for populations in the Southern Rockies/Colorado Plateau, the Chihuahua Desert, and the Sonoran and Mojave Deserts which are experiencing significantly large decreases as reported by PIF (Panjabi et al. 2024, p. 21; Partners in Flight Databases 2025c). PIF has additionally placed Bendire's thrasher on their Species of Regional Importance Watch List in four BCRs: the Southern Rockies/Colorado Plateau, the Sonoran and Mojave Deserts, and the Chihuahuan Desert (Partners in Flight Databases 2025c). These BCRs are provided with "action codes", which provide overviews of population trends and general guidance on necessary actions for improving or maintaining current populations within the BCR (Panjabi et al. 2024, p. 28).

For Bendire's thrasher, moderate to large population declines in the Sierra Madre Occidental BCR warranted an action code of "Management Attention" (MA), while the other Watch List BCRs are listed with an action code of "Immediate Management" (IM) (Panjabi

et al. 2024, p. 5, 26, 29; Partners in Flight Databases 2025c). Species in BCRs with IM action codes are expected to be subject to high regional threats combined with a large population decline, where lack of action may put the species at risk of extirpation (Panjabi et al. 2024, p. 29).

In a follow-up to the England and Laudenslayer (1989a, b) 1986–1987 surveys, in 2001 observers used the same transects and points but only in the western and southern Mojave Desert, on the periphery of the species' range. This subset of 28 transects was surveyed two to three times versus once in 1986 and/or 1987; only 3 Bendire's thrashers were detected in 2001 versus 31 and 23 in 1986 and 1987, respectively (Jones & Stokes 2001). During 2001, southern California was undergoing a severe drought, and it is likely that these survey results indicate a population decline in response to these dry conditions. The sharp decline in numbers in the western Mojave between the late 1980s and 2001 was thought to be indicative of annual variation in the thrasher's response to fluctuating climatic conditions or other forces influencing population dynamics at the edge of the species' range (CDFG 2008a). Anecdotal reports from 2005, which had substantial winter and spring precipitation, indicated increased breeding of Bendire's thrashers throughout the Mojave, including in the far western Mojave in Kelso Valley, Kern County, and in Lee Flat, Inyo County, at the northern outpost of the species' range (CDFG 2008a).

LeConte's

Global

LeConte's thrasher is considered one of the fastest declining avian taxa in North America (Rosenberg et al. 2016; Sauer et al. 2020, as cited in Borgman et al. 2024, p. 1). Based on BBS data, U.S. LeConte's thrasher populations have declined by 2.77% per year over the last 50 years, resulting in a 67% decline from 1968-2019 (Borgman et al. 2024, p. 1-2; Sauer et al. 2020, cited therein).[6] See Figure 11. BBS population trends in Mexico are unknown as the BBS only reflects trends in the U.S. (Borgman et al. 2024, p. 3). However, based on community science data, from 2012 to 2022, the thrasher population in Mexico declined by 10.4% and the US population by 15.3% (Fink et al. 2023 as cited in Borgman et al. 2024, p. 3-4), much greater declines than those estimated by BBS data (Borgman et al 2024, p. 4). Borgman et al. 2024 also report that other studies have shown downward trends in local LeConte's thrasher populations which are better fit by non-linear trends (Sheppard 2018, as cited in Borgman et al. 2024, p. 4).

[6] For the exact BBS data used by Borgman et al. (2024) to calculate their 67% decline see p. 1 of their report.

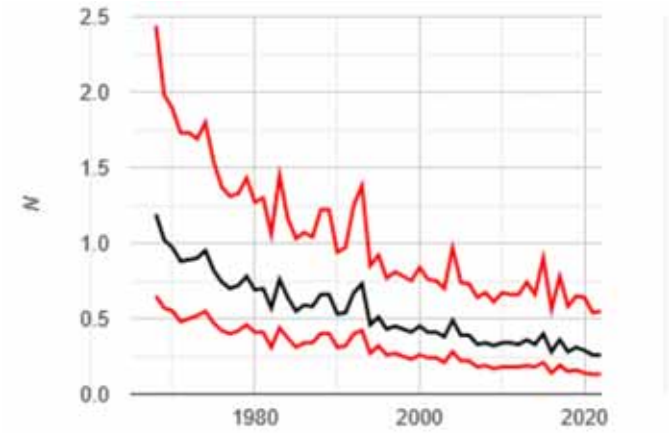

Figure 11. U.S. Breeding Bird Survey population trends for LeConte's thrasher, 1966-2022. As presented on the USGS BBS trends website[7] (USGS 2025a, p. 1).

Thrasher-specific working groups have discussed the limitations of using BBS data for thrashers, since the BBS survey protocols are not specifically designed for species like thrashers which have a low likelihood of being recorded with conventional point counts; and the timing of BBS survey periods can be mismatched with thrasher breeding phenology, as desert thrashers have usually started nesting long before the surveys begin (Ammon et al. 2020, p. 6, 7; Borgman et al. 2024, p. 4). Despite these limitations, survey-wide trends have enough power to predict large-scale population trends (Borgman et al. 2024, p. 4, 6), and as discussed previously, recent advances in community science data have estimated steeper declines for LeConte's thrasher than the BBS survey (Ibid, p. 3-4).

Due to low population size and steeply declining population trends, LeConte's thrasher has been classified by PIF as a 'Red Watch List' species (PIF 2025d), defined as species which are found to be "highly vulnerable and in urgent need of special attention" (Panjabi et al. 2024, p. 25). In collaboration with PIF, the Road to Recovery Initiative also establishes a list of 'Tipping Point' species (Road to Recovery 2024, p. 1): those which are urgently in need of "focused and immediate scientific actions" (Panjabi et al. 2024, p. 25) and "exhibit high vulnerability to extinction and worrisome population declines" (Road to Recovery 2024, p. 1). LeConte's thrasher is designated as a 'Red Alert Tipping Point' species (Ibid, p. 3), with the associated Red Alert designation signifying the highest degree of urgency in addressing these declines (Ibid, p. 1). In the recently released U.S. State of the Birds report, LeConte's thrasher is still identified as a Red Alert Tipping Point species (NABCI 2025, p. 14).

[7] BBS trendlines above based on survey-wide scale (U.S. and Canada combined) and core data (same as most recent Partners in Flight analyses for LeConte's thrasher) (Panjabi et al. 2024, p, 37; PIF 2025c,d).

The precarious status of LeConte's thrasher is also evident from the numerous state, federal, and international-level designations it possesses (Borgman et al. 2024, p. 1, 7). Declines in LeConte's thrasher populations are expected to continue, as habitat loss and fragmentation is expected to increase throughout the species' range due to multiple, severe threats (see Section 4). Given the species' perilously low population size, even small losses could be catastrophic.

Regional

As reported by BBS data, regional population trends for LeConte's thrasher from 1968-2022 are marked by significant declines in California (Borgman et al. 2024, p. 3, 6). PIF additionally reports major population declines in two BCRs—the Sonoran and Mojave Deserts and "Coastal California" (i.e. San Joaquin Valley)—placing the species in these regions under their 'Regional Importance Watch List' (PIF 2025c). Populations in both regions are classified as "Regional Concern," which underlines both the regular occurrence of the species and moderate to high regional threats (Panjabi et al. 2024, p. 27). The Sonoran and Mojave Deserts BCR is also given a "Regional Stewardship" designation, which PIF only assigns when the BCR is of high importance to a species and future conditions in the region are not expected to improve (Ibid, p. 27-28). Combined, the Sonoran and Mojave Deserts and Coastal California BCRs support 99% of LeConte's thrasher global breeding populations. PIF notes that in these regions, lack of action may put LeConte's thrasher at risk of extirpation (PIF 2025c).[8]

In California, the LeConte's thrasher population in the San Joaquin Valley has contracted due to habitat loss, fragmentation, and degradation. Grinnell and Miller (1944) described LeConte's thrasher as "fairly common under suitable conditions" in the San Joaquin Valley, which were localized and scattered over its general range, but as early as 1933 Grinnell (1933) noted declines in abundance and habitat quality. Habitat conversion for agriculture and livestock probably isolated the thrashers occupying the area north of Bakersfield during the early 20th century (CDFG 2008b). By 1970, the highest densities of LeConte's thrasher in the San Joaquin Valley were thought to occur in the Maricopa area of southwestern Kern County (Sheppard 1970), and later the McKittrick "triangle" area (J. Sheppard, pers. comm., 2025). Habitat loss and degradation restricted LeConte's thrasher to a small portion of its former range in the San Joaquin Valley by the late 1980s (Laudenslayer et al. 1992). For example, there were no known sightings east of Interstate 5 after the mid-1970s, though apparently suitable, albeit scarce and isolated, habitat

[8] Determined by action code of "IM" listed for both the Sonoran and Mojave Desert and Coastal California BCRs. See PIF's Avian Conservation Assessment Database Handbook (Panjabi et al. 2024) page 29 for description of IM (Immediate Management) action code.

remained there (CDFG 2008b). Sheppard's (1970, 1973) records from Bakersfield, Wasco, and the Panoche Hills were never repeated (CDFG 2008b). By 2008, LeConte's thrasher numbers in the San Joaquin Valley had declined greatly since 1944 and the range in the San Joaquin Valley has retracted substantially and became increasingly fragmented in remaining areas of occupancy (CDFG 2008b).

LeConte's thrasher has been extirpated from the Cuyama Valley in Santa Barbara, Ventura, and San Luis Obispo counties (CDFG 2008b). Since Sheppard (1973) first documented them in Cuyama Valley, much of the habitat was altered by overgrazing or converted to agriculture, and probably fewer than 10 pairs, possibly none, remained (CDFG 2008b). By the 1980s, thrashers were found in only a small area (approximately 8 km x 3 km) from the mouth of Ballinger Canyon north to Highway 166. Very little saltbush habitat remained, leaving only desert tea habitat for the thrashers to occupy (CDFG 2008b). The last recorded observation in the Cuyama Valley was at the mouth of Ballinger Canyon, Santa Barbara County, in August 1992 (CDFG 2008b). Several alluvial fans emanating from the southern Caliente Mountains appeared to have small amounts of suitable habitat, but only California thrashers (*Toxostoma redivivum*) had been detected consistently (CDFG 2008b).

LeConte's thrasher had been nearly extirpated from the Lost Hills, in Kern County, by 2008 (CDFG 2008b). A suitable habitat area extending north from Highway 46 for less than 10 km; 3 km at its widest, was bounded roughly by the California Aqueduct on the east and Lost Hills Road on the west; habitat patches here were small and highly fragmented by agriculture, oil development, and gypsum mining and probably supported fewer than 20 pairs of thrashers (CDFG 2008b).

LeConte's thrasher has been extirpated from the Kettleman Hills, in Fresno and Kings counties (CDFG 2008b). This northernmost island of habitat (approximately 8 km x 2 km) extended north from Highway 41 to the north edge of the hills just south of Jayne Road, bounded on the east by Interstate 5, on the west by the west edge of the hills just east of Highway 33 (CDFG 2008b). In the late 1960s, Sheppard (pers. comm.) estimated this population to be 200 pairs (CDFG 2008b). By 2008 this area was entirely surrounded by plowed ground, including the broad slopes immediately adjacent to the hills, and much of the Kettleman Hills accumulated a thick and tall mulch of non-native annual grasses that is generally avoided by these thrashers (CDFG 2008b). In 1996, an 8,000-ha fire destroyed most of the occupied thrasher habitat on the Middle Dome of the Kettleman Hills, leaving habitat on only about half of the North Dome, from about Skyline Boulevard (Highway 269) north to the end of the hills, and frequent fires over subsequent years greatly reduced suitable thrasher habitat in the Kettleman Hills (CDFG 2008b). Damming of many

drainages, for transporting and separating oil in the 20th century, and road construction, for oil exploration and production, halted the natural hydrologic processes that benefit saltbush establishment and provide good foraging substrates (CDFG 2008b). In 1998, an optimistic estimate was probably fewer than 20 thrasher pairs in this area (USFWS 1998). The last known LeConte's thrasher pair in the Kettleman Hills was observed in 1999, a single individual was observed in 2000, and none were observed in 2001, 2002, or 2004-2006 in the Kettleman Hills (CDFG 2008b).

Re-surveys (annually from 1989-1995, intermittently to 2002) failed to detect LeConte's thrasher in historically occupied Poso Creek north of Bakersfield or in isolated patches of saltbush along Interstate 5 from Stockdale Avenue north to Twisselman Road, Kern County (surveyed intermittently from 1989 to 2002) (CDFG 2008b). Likewise, the species was not detected in areas that appear suitable (surveyed intermittently 1989 to 2002), including Panoche Hills, Panoche/Silver Creeks, Tumey Hills, Warthan Creek, Los Gatos Creek, Guijarral Hills, and Skunk Hollow north of Coalinga, Fresno County; Antelope Hills and Sunflower Valley, Kings County; alluvial fans on the south side of Caliente Mountain and portions of Carrizo Plain (including the margins of Soda Lake), San Luis Obispo County; and Santa Barbara Canyon and the Cuyama River, Santa Barbara County (CDFG 2008b).

LeConte's thrasher populations in the Coachella Valley, CA have likely been completely extirpated. LeConte's thrashers were historically reported to be abundant in Coachella Valley prior to 1940, however, surveys in 2004 and 2005 found few individuals in the area (Borgman et al. 2024, p. 36) and subsequent focused surveys of 40 plots across the valley in 2019 yielded no thrasher detections (Hargrove et al. 2019, p. 1).

4. THREATS

Habitat loss, degradation, and land conversion are major threats to the persistence of both Bendire's and LeConte's thrasher (Rosenberg et al. 2016, p. 6; BirdLife International 2020, p. 7; Borgman et al. 2024, p. 33; NatureServe Explorer 2025, p. 3). Flat, desert habitats preferred by Bendire's and LeConte's thrasher are also desired for anthropogenic uses including housing, industrial, infrastructure, and energy development, as well as off-highway vehicle use, military activities, and agricultural expansion (Borgman et al. 2024, p. 33, 34). Over the last 50 years, these land uses along with livestock grazing, military activities and mining have resulted in habitat loss, range reduction, population decline, and extirpation of thrasher populations within historical strongholds, and continue to threaten the survival of both thrasher species. In addition, invasive plant species, altered wildfire regimes, and droughts are continuing to detrimentally modify and reduce habitat for both

thrashers (Desmond and Bear Sutton 2017, p. 3; NatureServe Explorer 2025, p. 3; Rosenberg et al. 2016, p. 6).

4.1 Sprawl Development

Sprawl development has been identified as a significant and immediate threat to both Bendire's thrasher and LeConte's thrasher (GBBO 2010, p. Spp-65-4; Ammon et al. 2020, p. 59; Birdlife International 2020, p. 7; Borgman et al. 2024, p. 35-36). Development results in direct habitat loss and also isolates small, fragmented habitats into disconnected patches that are unable to support thrashers (Fletcher 2009, p. 32; Borgman et al. 2024, p. 33), as demonstrated by the extirpated populations of both Bendire's and LeConte's thrashers near urban centers (Shuford and Gardali 2008, p. 314; Salas 2021, p. 15, 16; BirdLife International 2020, p. 4; Borgman et al. 2024, p. 35-36). Increased habitat fragmentation will likely continue the extirpation of both thrashers from historic territories, as Bendire's do not occupy urban or suburban areas where native and/or suitable habitat is not present or nearby (Borgman et al. 2024, p. 36). Although LeConte's thrasher has been noted to nest near houses or ranchettes when suitable habitat and adequate shelter is adjacent, this thrasher is extremely sensitive to human disturbance and sprawl development due to large minimum patch size requirements, weak dispersal abilities, and low population density (Fletcher 2009, p. 32; Borgman et al. 2024, p. 36). In addition to land clearing, sprawl development directly threatens both thrashers by contributing to increased collision risk (from vehicles, wire fences, roadways, etc.), increased predation, and reduced food availability (Ibid).

Sprawl developments are likely to continue to encroach on habitat for both Bendire's and LeConte's thrashers, since much of the development in the Southwest and Southern California targets flat desert and semi-desert habitats which the thrasher is known to occupy (Borgman et al. 2024, p. 35). The southwestern United States is the fastest-growing region in the nation, with urban land cover in the region projected to increase substantially with population growth, with estimates of about 9.3 million acres to be reached in 2050, compared to a 4.1-million-acre footprint in 2010 (Borgman et al. 2024, p. 35 and references cited therein). The current small sizes of both the Bendire's and LeConte's thrasher populations further increases both species' vulnerability to habitat loss, degradation and fragmentation (Ammon et al. 2020, p. 59; USFWS 2023a, p. 46917).

Bendire's

Sprawl development has been identified as a significant and immediate threat to Bendire's thrasher (GBBO 2010, p. Spp-65-4; Ammon et al. 2020, p. 59; Birdlife International 2020, p. 7; Borgman et al. 2024, p. 36). Historical and current Bendire's thrasher distributions are known to overlap considerably with fast-growing urban centers in California in the Sonoran and Mojave Deserts (Borgman et al. 2024, p. 35).

Rapid sprawl development is occurring in the Bendire's thrasher range in California in parts of the western Mojave Desert, especially the Morongo, Coachella, Lucerne and Apple Valleys (Shuford and Gardali 2008, p. 314; Borgman et al. 2024, p. 35). Sprawl growth in the Mojave is expected to double by 2050, paired with a substantial increase in commercial, industrial, and suburban development (EPA 2016, p. 47, 48). Both sides of the California-Mexico border, which stretches across the thrasher's range, has also seen increased population growth especially on the Sonoran border. Both sides of the border have permanent and temporary development relating to warehouses, exports, and other border-related activities, further fragmenting habitats in the region (USFWS 2023a, p. 46918). permanent and temporary development relating to warehouses, exports, and other border-related activities, further fragmenting thrasher habitats in the region (USFWS 2023a, p. 46918).

LeConte's

Sprawl development has been identified as a significant and immediate threat to LeConte's thrasher (Borgman et al. 2024, p. 35). Already, the consequences of expanded development have likely caused extirpation of historical strongholds of LeConte's thrasher (BirdLife International, p. 4; Borgman et al. 2024, p. 35-36). For LeConte's thrasher, these threats from development have been most notable in California in Riverside County, Coachella Valley, and Victorville (Borgman et al. 2024, p. 36).

The southwestern U.S. is the fastest-growing region in the nation and the current trend of rapid growth in the LeConte's thrasher range is expected to continue (Borgman et al. 2024, p. 35). Since 1973, developed land cover in the southwest has increased by 45%. Projections of the developed footprint of the southwest expect development to cover approximately 9.3 million acres by 2050, compared to a 4.1-million-acre footprint in 2010 (Ibid). Historic and current populations of LeConte's thrashers already overlap significantly with some of the fastest-growing population centers in the Sonoran and Mojave Deserts,

and much of the continued development expansion will likely encroach on thrasher habitat as local development targets flat desert land which the thrasher is known to occupy.

The substantial development in Southern California has already been detrimental to LeConte's thrasher populations. LeConte's thrashers were once a common presence in Coachella Valley (Hargrove et al. 2019, p. 1), with the population in the area described as a historical "stronghold" for the species (Borgman et al. 2024, p. 36). Within the valley, LeConte's thrashers were historically collected in the Palm Springs area more than anywhere else in their range (Hargrove et al. 2019, p. 24-25). Since the 1950s, however, the human population in Palm Springs has been steadily increasing, with a current annual growth rate of 0.41% (World Population Review 2025a, p. 2). Development in Coachella Valley has replaced open desert shrubland with housing and agriculture (Borgman et al. 2024, p. 36), and recent economic reports show that the human population in Coachella Valley has increased by approximately 25% from 2004 to 2024 (CVEP 2024, p. 16). Due to a combination of drought and development, surveys in 2019 for LeConte's thrasher noted that the density of cholla, an important plant used for nesting and shelter, had greatly decreased in Coachella Valley (Hargrove et al. 2019, p. 25). See Figure 12. As the thrasher was found in surrounding areas, but not in Coachella Valley, it is highly likely the rapid development and consequential decline of nesting substrate helped cause the local extirpation of the species (Ibid, p. 1, 30).

Other Californian population centers near LeConte's thrasher habitats are on similar paths of growth. For example, Apple Valley, an adjoining town to Victorville in San Bernardino County, states they have an 80-acre industrial site "slated as a major logistics and manufacturing hub and…primed for explosive growth" (Town of Apple Valley 2025, p. 1). San Bernardino County is geographically the largest county in the U.S., and from 2017 to 2022, both the population and GDP growth rates outpaced the entire state of California (San Bernardino County CEDS 2024, p. 3, 6, 13). Nearby Riverside County, where Joshua Tree National Park and known LeConte's thrasher populations are located (Hargrove et al. 2019, p. 24), is the 10th most populated county in the U.S. (CVEP 2024, p. 13). Riverside County had a population increase of 0.84% between 2022 and 2023 (Data USA 2025) and a growth rate of 0.72% from 2024 to 2025. Riverside County's estimated 2025 population is 2,528,844, a 2.1% increase from 2024 (Riverside University 2024). Collectively, the Riverside-San Bernardino-Ontario Metropolitan Statistical Area is the largest in the U.S. by area, and the 12th largest in the nation by population at approximately 4.6 million residents (Ibid). Development closely follows population growth, as seen in the high conversion of farm and ranchlands to high-density residential developments and industrial sites in California and across the U.S. (see Section V.A.3 on Agricultural Development) (Freedgood

et al. 2020, p. 26). For the California portions of the Sonoran and Mojave Deserts, the proliferation of commercial development centers such as data and shopping centers, factories, and indoor cannabis farms is expected in addition to housing (Borgman et al. 2024, p. 35), further impacting LeConte's thrasher habitat.

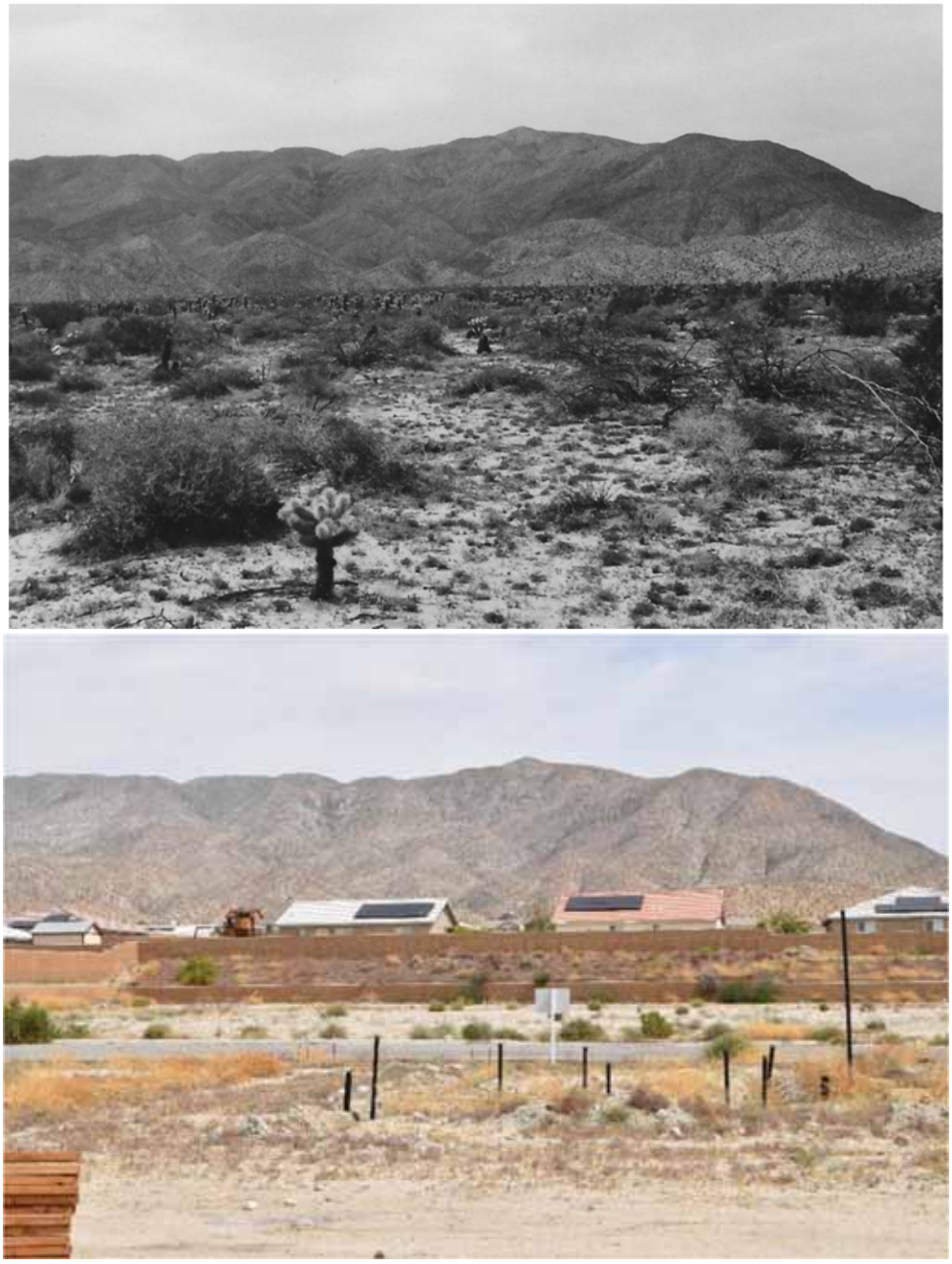

Figure 12. Former LeConte's thrasher habitat in Desert Hot Springs, Coachella Valley, CA. Top photo taken in 1970. Note the lack of cholla and other shrubs in bottom photo from 2019 (Hargrove et al. 2019).

4.2 Infrastructure

Development and expansion of infrastructure, namely roads and wire fences, result from many threats to Bendire's and LeConte's thrasher, including housing development and agricultural expansion, solar and mining development, and off-road vehicle use. Roads, railways, wire fences, and other infrastructure are relatively narrow corridors of disturbance in a local area but can stretch for thousands of miles and severely fragment habitat (Lovich and Bainbridge 1999, p. 313). Establishment of such infrastructure can negatively impact thrasher populations. The establishment of roads associated with any type of human land-use not only severely fragments thrasher habitat but also increases the risk of fatal vehicle collisions (Borgman et al. 2024, p. 44). The severity of impacts from increased road infrastructure is highly dependent on the size and route, however larger developments such as major highways are likely to be more detrimental to thrashers (Borgman et al. 2024, p. 44).

In the Mojave, infrastructure construction has been noted to destroy soil and plant cover, and the repeated maintenance to detrimentally slow native flora recovery (Lovich and Bainbridge 1999, p. 313). The community composition of the plants near established infrastructure is also affected, as invasive annual species often colonize the newly disturbed land before native species are reestablished (Ibid, p. 314). Most notably, roads heavily facilitate the dispersal of invasive seeds into desert regions, acting as one of the primary pathways for non-native plant invasions (Brooks and Berry 2006, p. 117). Roads facilitate the spread of invasive plant species such as buffelgrass (*Cenchrus ciliaris*) (Innes 2022, p. 12, 29, 60), which severely degrade thrasher habitat by crowding out native flora and intensifying wildfires. A study of access roads to powerlines even noted a decrease in arthropod density due to changes in plant community composition. Another study noted that near paved roads, increased water runoff contributed to denser and larger plants directly along roadsides, which in turn attracted more herbaceous insects (Lovich and Bainbridge 1999, p. 314 and references cited therein). As LeConte's thrashers need dense vegetation for nesting and sufficient arthropod prey to fulfill food and water necessities (see Section 2 on natural history), they may be attracted to such roadside areas which would greatly increase their risk of fatal vehicle collisions (Borgman et al. 2024, p. 30, 44).

Predators such as the common raven (*Corvus corax*) are positively associated in occurrence with transmission lines and roads, as the increased structure provides both nest sites and hunting perches, posing increased risk to thrashers (Lovich and Bainbridge 1999, p. 313; Borgman et al. 2024, p. 41).

LeConte's thrashers are not highly tolerant of high-density development, and thus more heavily impacted than other thrashers by road and utility corridor expansion (Borgman et al. 2024, p. 44).

4.3 Agricultural Development

Agricultural conversion from desert habitat to croplands has caused extensive habitat loss for both thrashers, resulting in detrimental population declines and even localized extirpation of the species (Borgman et al. 2024, p. 38, 39). Agricultural development reduces foraging resources for thrashers (Borgman et al. 2024). Like residential development, agricultural development and cropland conversion in the inland southwest often occur in flat, sparsely vegetated desert habitats that both thrashers commonly occupy (Ibid, p. 38). Since 1973, agricultural landcover has increased across California, often in the form of crops such as nuts, vineyards, alfalfa, and cannabis (Ibid, p. 35, 38). Although agricultural landcover throughout the range of both thrashers has decreased since 2000, that is mostly because of conversion to high and medium intensities of sprawl development (Freedgood et al. 2020, p. 4, 26; Hunter et al. 2022, p. 21, 23), continuing the fragmentation and decline of thrasher habitat as discussed previously.

Although habitat fragmentation and loss are some of the most detrimental impacts of agricultural expansion for thrashers, threats from pesticides can also negatively impact thrasher populations and their food sources (Borgman et al. 2024, p. 39). In North America, a review of 122 studies on bird declines determined that insectivorous and shrubland avian species with habitat near agriculture were most harmed by pesticides (Stanton et al. 2017, p. 250). Other studies on birds have found that toxicity from direct pesticide exposure and/or ingestion can result in severe loss of body mass, inabilities to thermoregulate, and impairment of normal reproduction, among other sublethal effects, as well as death (Fry 1995, p. 168; Stanton et al. 2017; p. 249). Previous pesticide use may have affected reproduction in some LeConte's thrasher populations (Sheppard 1996, as cited in NatureServe Explorer 2025, p. 3). As Bendire's thrashers are known to occupy edge habitat on agricultural and rangelands, the use of pesticides for weed and insect reduction is likely to have direct and indirect effects on the species.

Neonicotinoid pesticide use has grown exponentially in the U.S. These insecticides not only persist longer in the environment than non-neonicotinoid pesticides but also have substantial negative impacts on non-target invertebrate and vertebrate species (Li et al. 2020, p. 1). For example, a study on neonicotinoid impacts on breeding birds found statistically significant declines in bird biodiversity over a period of just 6 years, especially

for insectivorous bird species (Ibid, p. 1, 5). Neonicotinoids are highly fatal to non-target insects such as beetles, butterfly and moth caterpillars, and other herbivorous larvae, and are likely to cause reductions in food availability for insectivorous birds such as thrashers (Goulson 2014, p. 295, 296). Most often, only 5% of the active insecticide ingredient in neonicotinoids is taken up by the target crop, while the rest is leached into the surrounding soil and groundwater to be taken up later by non-target edge vegetation. This later kills herbivorous insects which are exposed to insecticides through affected leaves and flowers (Ibid, p. 296). As LeConte's thrasher relies almost exclusively on insects and other prey to meet water needs (see section 2.3 on thrasher biology), any decrease in prey availability will have detrimental impacts on their survival.

Bendire's

Historical populations of Bendire's thrashers have already been eliminated in areas with extensive large-scale agriculture (England and Laudenslayer 1993, p. 10; GBBO 2010, p. Spp-65-4; BirdLife International 2020, p. 4). Currently, assessments of Bendire's thrasher on state, national, and global scales note agricultural development and expansion to be a threat to the species (Shuford and Gardali 2008, p. 314; GBBO 2010, p. Spp-65-4; Ammon et al. 2020, p. 59; BirdLife International 2020, p. 4; Borgman et al. 2024, p. 38).

LeConte's

LeConte's thrashers do not occur within farmed areas, nor do they occur in habitats immediately adjacent to heavy agricultural use (Borgman et al. 2024, p. 39). Within the LeConte's thrasher range in California, populations in the Coachella Valley, San Joaquin Valley, and Imperial Valley have lost large amounts of thrasher habitat due to agricultural expansion since the 1960s (Ibid, p. 39). For example, about 6.9 million acres in southern California and the San Joaquin Valley were non-grazed farmland in 2018[9], with most acreage located in the San Joaquin Valley (California Department of Conservation p. 82). The San Joaquin Valley not only produces over half of California's agricultural exports but also contains the top three agricultural counties in the U.S. (Fresno, Kern, and Tulare) (Escriva-Bou et al. 2023, p. 1). Crops, orchards, and vineyards produce the most revenue for the valley, and create a significant strain on the region's groundwater supply (Ibid, p. 1, 2).

[9] Non-grazing farmland acreage calculated from Table B-4 of the California Department of Conservation's Farmland Mapping and Monitoring Program most recent report (2016-2018), by subtracting 'Grazing Land' estimates from the 'Farmland Subtotal' for southern California and San Joaquin Valley counties.

LeConte's thrasher populations in the San Joaquin Valley have already seen extirpations due to the intensity of agriculture in the valley (Borgman et al. 2024, p. 39; NatureServe Explorer 2025, p. 3). In the San Joaquin Valley, habitat conversion to agriculture appears to be the single biggest factor in reducing the amount of habitat available to this species and in isolating currently occupied areas (Laudenslayer et al. 1992). LeConte's thrasher nesting no longer occurs in historically occupied areas such as Bakersfield, Wasco, and the Mettler/Grapevine area (Sheppard 1973), as most of the now agriculture-dominated San Joaquin Valley is unsuitable; and west of Interstate 5 the trend in habitat conversion accelerated since the completion of the California Aqueduct in 1973 (CDFG 2008b).

4.4 Livestock Grazing

Historic overstocking of livestock in the southwest has led to major landscape changes that are detrimental to both Bendire's and LeConte's thrashers, including changes in hydrology, soil compaction, proliferation of invasive annual plant species, increases in dense patches of woody shrubs and trees, loss of plant cover, and occasional direct mortality of bird nests from livestock (Fleischner 1994, p. 637; Lovich and Bainbridge 1999, p. 312; Borman 2005, p. 1659; Li et al. 2022, p. 4, 8; Borgman et al. 2024, p. 39-40).

Purposeful human introduction of non-native livestock forage plant species, such as buffelgrass (*Cenchrus ciliaris*), has additionally degraded and reduced the amount of suitable thrasher habitat. After its introduction, buffelgrass spread into remote and rugged terrain as cattle moved across the range, creating dense vegetation mats that reduce foraging opportunities for thrashers (Brenner and Kanda 2013, p. 187, 192; Borgman et al. 2024, p. 40, 47, 48). Habitat degradation from livestock grazing can have compounding effects on other threats to thrasher habitats, especially invasive plants. By increasing bare ground via trampling and soil nitrogen via excrement in high congregation areas, livestock further spread and establish non-native plants and invasive annual grasses, which are detrimental to native vegetation and drastically alter fire cycles (see section 4.9 on invasive plants) (Lovich and Bainbridge 1999, p. 313, 317; Hall et al. 2005, p. 4.23, 4.44; Wilkening et al. 2022, p. 225). Overgrazing by cattle during the summer months when shrubs are most vulnerable has been noted to convert important shrubland habitat into degraded non-native annual grasslands (Ammon et al. 2020, p. 58).

Congregations of livestock can also dramatically alter local ecosystems, regardless of the relative stocking density within the greater pasture. For example, cattle routinely congregate around watering sites, especially in water-scarce ecosystems such as the Sonoran and Mojave Deserts (Hall et al. 2005, p. 4.42-4.44). Multiple studies conducted on

cattle behavior and plant community composition noted a “sacrifice zone” in areas where cattle routinely loitered; defined as places where vegetation is almost entirely removed or severely altered. These zones can extend hundreds of meters away from the point source of congregation, creating large circles of reduced native plant species richness, cover, and structural diversity (Ibid, p. 4.42-4.45). While thrashers can have suitable habitat in grazed rangeland, the behavioral nature of cattle and creation of “sacrifice zones” leave patches of degraded habitat in otherwise suitable thrasher territories.

While livestock grazing on private and public lands is now more regulated by federal and state agencies, stocking rates can still be inappropriately high (Borgman et al. 2024, p. 39). Even after the establishment of the U.S. Bureau of Land Management (USBLM) in 1946 to manage grazing practices on public lands, the agency has been unable to fully cease the degradation of public ranges. A 1991 report of USBLM grazing programs in arid southwestern deserts determined that rangelands in these regions were actively being degraded by the grazing practices at that time (Hall et al. 2005, p. 1.2). This is especially the case on USBLM lands in the Mojave and Sonoran deserts.

Bendire’s

Grazing is a common land use where Bendire’s thrashers occur and occasionally can be correlated with thrasher presence (Ammon et al. 2020, p. 31; Borgman et al. 2024, p. 40). Bendire’s thrashers have commonly been detected at grazing infrastructure (e.g. stock tanks and corrals), potentially benefitted by increased structure, taller woody vegetation, reduced bunchgrass density, and/or increased foraging opportunities due to supplemental water sources and cow manure (Borgman et al. 2024, p. 40). However, despite these potential positive influences of livestock in Bendire’s thrasher habitat, improper grazing practices are, overall, highly detrimental to the species (England and Laudenslayer 1993, p. 10; BirdLife International 2020, p. 4; Borgman et al. 2024, p. 38). Overstocking (historic and current) has also encouraged shrub encroachment (Borgman et al. 2024, p. 39), degrading suitable habitat for Bendire’s thrasher, which does not occur in areas of dense shrub cover.

Information compiled by the Public Employees for Environmental Responsibility using USBLM grazing allotment Land Health Standards data determined that about 5.3 million acres of USBLM grazing allotments in the Southwest have failed to meet health standards due to improper livestock grazing and management (PEER 2025b). More than 117,000 acres of USBLM grazing allotments within Bendire’s thrasher range in California have failed to meet health standards due to livestock. See Figure 13. There are 39,535 additional acres of federal grazing allotments within Bendire’s thrasher range in California that are managed

by the Forest Service, however that agency does not provide an equivalent publicly available health evaluation (USFS 2025a, p. 1).

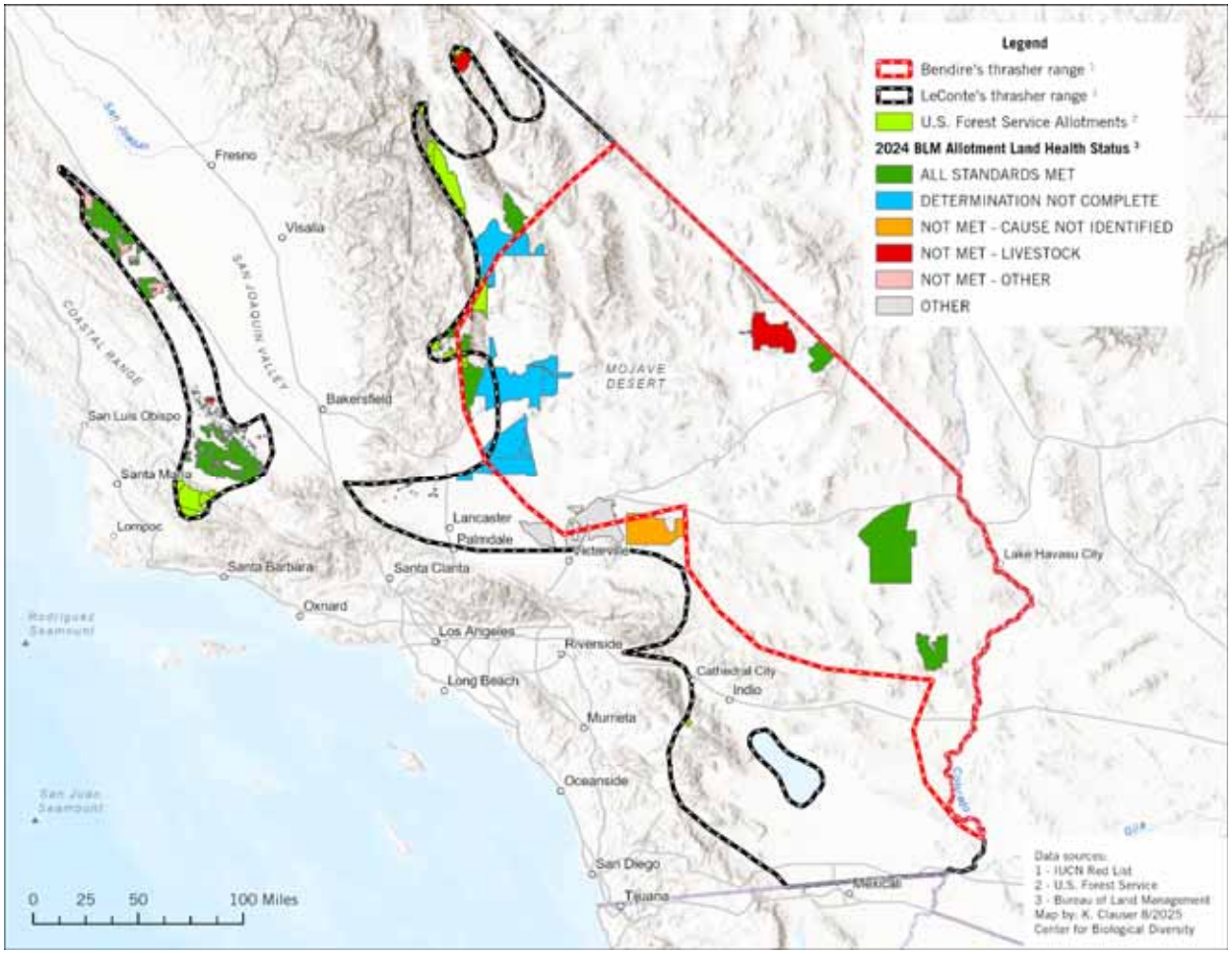

Figure 13. USBLM and U.S. Forest Service grazing allotments in California within Bendire's and LeConte's thrasher ranges. Data sources: IUCN Red List; U.S. Forest Service; U.S. Bureau of Land Management. Evaluation of compliance with health standards by PEER (2025).

LeConte's

While LeConte's thrashers have been reported to occur within public, private, and tribal lands frequently used for livestock grazing purposes, this is often within pastures managed by low-density cattle rotation (Borgman et al. 2024, p. 39). There is some evidence that low intensity grazing practices could have some positive benefits for thrashers, as livestock can thin out thick patches of grasses, aiding thrasher access to arthropod prey (Ibid, p. 40). However, the presence of livestock also degrades thrasher habitat, and in some cases, has even led to direct mortality of thrashers in nests (Ibid, p. 39). Proximity to livestock can even introduce parasites, as made evident by findings of Tungid/stick-tight fleas on an adult

LeConte's thrasher residing near a major highway often used to transport poultry (Sheppard 2020b, p. 3).

Examinations of LeConte's thrasher habitat have noted that livestock presence in an area is significantly correlated to a decreased probability of LeConte's thrasher occupancy (Ammon et al. 2020, p. 35). Out of 151 LeConte's thrasher survey sites spread across their U.S. range, only 8% of occupied plots had livestock present (Ibid, p. 31). The Desert Thrasher Working Group notes that improper grazing practices, namely overstocking of livestock, are highly detrimental to the species (Borgman et al. 2024, p. 38, 39). Summer-long grazing with relatively high densities of cattle, can convert shrubland to non-native annual grasslands, which has been the case in several large areas throughout the San Joaquin Valley and surrounding foothills (USFWS 1998). Severe damage to saltbush shrubs occurs from grazing during the late summer period, when few other plant species besides saltbush are green and palatable; stressed plants are conspicuously hedged and eventually become spindly sticks with few leaves, not the nearly hemispherical shape of vigorous plants (CDFG 2008b).

More than 11 million acres of USBLM lands in the Southwest within the range of LeConte's thrasher are within federal livestock grazing allotments (see Figure 13). In 2023, information compiled by Public Employees for Environmental Responsibility (PEER) using USBLM grazing allotment Land Health Standards data determined that approximately 3 million acres of those grazing allotments in the Southwest have failed to meet their land health standards due to improper livestock grazing and management (Nguyen 2024, p. 1; PEER 2025, p. 1). Throughout LeConte's thrashers' California range, more than 152,000 acres of USBLM grazing allotments have failed to meet health standards due to livestock impacts (Figure 13). There are nearly 266,000 additional acres of federal grazing allotments within LeConte's thrasher California range that are managed by the U.S. Forest Service. However, the agency does not provide an equivalent publicly available land health evaluation (USFS 2025a, p. 1).

4.5 Renewable Energy Production

In the southwestern U.S., renewable energy developments for solar and wind are becoming increasingly prevalent (Borgman et al. 2024, p. 40). Although renewable energy is urgently needed to address the climate emergency, large-scale projects are projected to significantly overlap with prime habitat for both Bendire's and LeConte's thrashers (Borgman et al. 2024, p. 41; DTWG 2024, p. 1).

The USBLM Solar PEIS identified 32 million acres of federal lands across 11 western states (including California, Nevada and Arizona) that are potentially available for solar project siting. Across California, Nevada and Arizona, almost 15 million acres of USBLM land are available for solar project applications through the USBLM Solar PEIS, but a fraction of those lands will be used for utility-scale solar energy generation over the next 20 years. The USBLM has prioritized around 870,000 of those western acres for solar energy development and estimates that about 700,000 acres throughout the West may be used for utility-scale solar energy generation over the next 20 years (USBLM 2024).

As of June 2024, a total of 46 solar projects have been permitted on USBLM land in Arizona, California, and Nevada (37 operational and 9 pending construction) through the USBLM's Solar Energy Development Programmatic Environmental Impact Statement (Solar PEIS) (USBLM 2024, p. 1-7). A large and recently developed USSE within the Bendire's thrasher range and in known LeConte's thrasher nesting habitat is the 2023 Oberon Renewable Energy Project in Riverside County, CA, close to Joshua Tree National Park (2,700 acres) (USBLM 2019a, p. 1-1, 3-65; USBLM 2024, p. 3-2; USGS 2025c, p. 4).

In California, the USBLM's Desert Renewable Energy Conservation Plan (DRECP) designates areas potentially suitable for solar development across seven California counties and 10.8 million acres in the Southern California desert (USBLM 2016). The DRECP identified more than 800,000 acres of land in Southern California potentially available for renewable energy; of those approximately 388,000 acres are in Development Focus Areas, which are areas with substantial energy generation potential, access to existing or planned transmission, and low resource conflicts and where permitting has been streamlined to incentivize utility-scale renewable energy generation. See Figure 14.

Development of solar and wind facilities require extensive landscape modification, such as vegetation removal, soil compaction, and land grading. Infrastructure including gen-tie lines (generation interconnect (gen-tie) line is a series of poles, wires, cables, anchors and foundations connecting nearby power generation sites and substations), fencing, roads, and electrified components further increase habitat fragmentation and degradation (Hernandez et al. 2014, p. 770; Borgman et al. 2024, p. 41). Most habitat fragmentation occurs with the development of utility-scale solar energy (USSE) facilities, which are frequently built on large swaths of flat and sparsely vegetated desert habitat (Borgman et al. 2024, p. 41). Relative to non-renewable energy sources, USSEs require a large amount of land to generate a single unit of electricity, estimated at about 15 km^2 per terawatt-hour (TWhr) (Karban et al. 2024, p. 1).

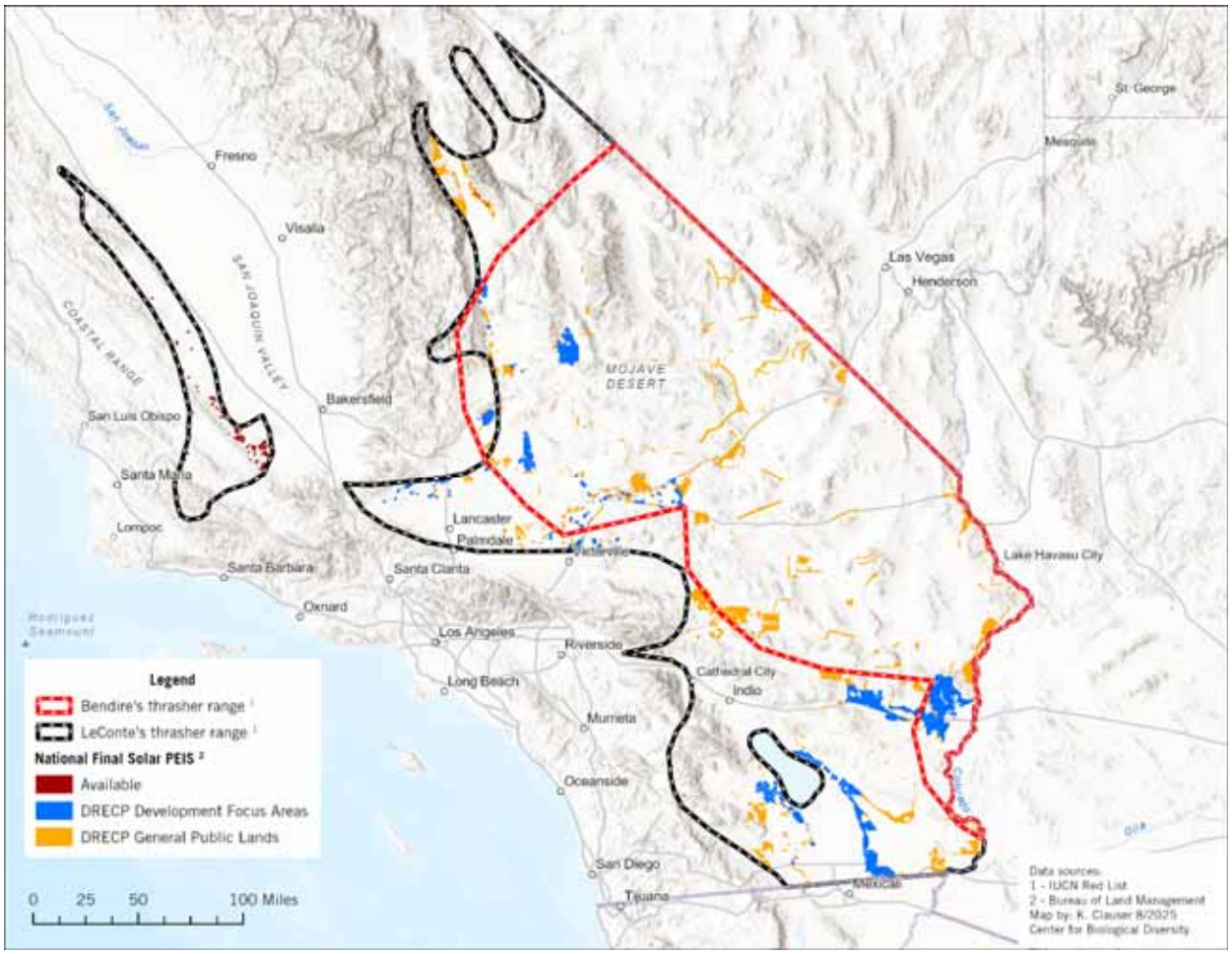

Figure 14: Lands available for solar development in California within Bendire's and LeConte's thrasher ranges. Data sources: IUCN Red List; USBLM Solar PEIS (USBLM 2024); DRECP (DRECP 2015a, p. 16).[10]

Environmental impacts occur at different rates and magnitudes throughout construction and operation of USSE facilities. In southwestern U.S. deserts, USSEs are often constructed by vegetation removal and soil surface grading ("blade and grade") or crushing vegetation with large vehicles ("drive and crush") (Karban et al. 2024, p. 2). Preliminary surveys during the recent development of the largest USSE in the United States —the Gemini Solar Project in Clark County, NV— determined native plant cover to decrease by 61-122% during construction (USGS 2025d, p. 1; USGS 2025e, p. 4). The heavy disturbance during installation, combined with increased microsites and moisture availability during operation, can also open up space for invasive flora to colonize and spread (Karban et al.

[10] USBLM Solar PEIS "Available" and "Avoidance" lands are open for solar development, however projects on "Avoidance" lands are only permitted if proven to not disturb "important functions" the areas serve (USBLM 2024, p. ES-10). DRECP "Development Focus Areas" are incentivized for solar projects, while "General Public Lands" are unallocated USBLM lands open for solar development but do not include incentives (DRECP 2015a, p. 16).

2024, p. 5). Habitat degradation of native vegetation and soils caused by the development of solar facilities has additionally shown to reduce the abundance, richness, and diversity of beetles, ants, and other invertebrates that make up a large portion of the Bendire's Thrasher diet (Karban et al. 2024, p. 6, 7).

Birds may also be attracted to the increased infrastructure provided by USSEs, which can raise mortality risk. Construction of roads and the ensuing traffic can further fragment remaining habitat and increase the risk of vehicle deaths (Hernandez et al. 2014, p. 769). Other risks come from direct collision impacts with panels, fencing, gen-tie and transmission lines, and the currently unknown consequences of increased artificial light at night (DTWG 2024, p. 1). A study at the Solar One facility in the Mojave Desert documented the death of 70 birds from 26 different species over 40 weeks due to collision with infrastructure and vision impairment from solar panel orientation (Hernandez et al. 2014, p. 769; Kibaara et al. 2019, p. 43).

Potential thrasher predators such as ravens are also associated in areas with increased energy infrastructure, further elevating the predation risk to nearby thrasher populations.

As ground-dwelling birds, thrashers are expected to have relatively low risk of lethal collision with wind turbines (Borgman et al. 2024, p. 40-43). Wind resources are limited within most of the Bendire's thrasher's range. However, wind turbines have been linked to increases in invasive plant species and a high likelihood of starting wildfires, which combined can quickly destroy large swaths of suitable LeConte's thrasher habitat. Wind facilities currently occur in the LeConte's thrasher range in Coachella Valley, CA (Borgman et al. 2024, p. 43).

Bendire's

In their Landbird Conservation Plan, Partners in Flight identified energy extraction as a major threat to Bendire's thrashers (Rosenburg et al. 2016, p. 6, 14). Solar facility development is expected to increase substantially within the Bendire's thrasher range as the southwestern United States is considered to have the best solar resources in the country (EIA 2019, p. 1; Borgman et al. 2024, p. 41). Among the 10 million acres in California now available for potential renewable energy development through the California Desert Renewable Energy Conservation Plan, approximately 8,500 km^2 (2.1 million acres) is high quality intact habitat for Bendire's thrasher, where development and fragmentation are currently low and native vegetation is abundant (DRECP 2013, p. 1; CBD 2025b, p. 2; DRECP 2025, p. 2).

LeConte's

Since LeConte's thrashers require large swaths of undisturbed habitat to meet their foraging and breeding needs, it is expected that the reduction and fragmentation of habitat caused by USSEs will have a great impact on the species (Borgman et al. 2024, p. 42).

4.6 Mining

A global study examining the potential for wildlife to be impacted by mining and extraction has determined that desert-dwelling birds have an increased likelihood of being threatened (Lamb et al. 2024, p. 3675). Mining is a potential cause of habitat loss for Bendire's thrasher and LeConte's thrasher and contributes to local habitat degradation (Lovich and Bainbridge 1999, p. 311, 314; Borgman et al. 2024, p. 43). Mining activity degrades and eliminates thrasher habitat by clearing desert vegetation that thrashers use for nesting habitat and cover, compacting or disturbing natural soil substrates into which thrashers probe for arthropods, and leaching toxic materials into thrasher habitats.

Construction of the mines and access roads, waste management and discharge, and utilization of mines all lead to biodiversity and habitat loss (Scanes 2018, p. 459; Sonter et al. 2018, p. 2). Direct impacts to local environments can also arise from the use of toxic, acidic chemicals during the extraction processes and through the spread of hazardous tailings, dust, and aerosols (Scanes 2018, p. 459, 460; Sonter et al. 2018, p. 2). Gold mining is particularly problematic, as waste products stored in retention ponds often leach high concentrations of cyanide, arsenic, and mercury into the surrounding environment and groundwater, thereby impacting local plants, invertebrates, and birds (Scanes 2018, p. 460). Mines can also continue to impact the local environment long after they are abandoned. Elevated concentrations of metals from tailings and increased amounts of sediment, brine, and other harmful substances can easily be washed into streams and groundwater and contaminate soil in the area (NPS 2020, p. 2-3). The swaths of disturbed land, soil contamination, and increased erosion further turns abandoned mines into pockets of barren, inhabitable land (Ibid).

In 2023, the USGS ranked California as the fourth highest state for non-fuel mineral production values (Marquis 2024, p. 3).

Mining and mineral extraction is projected to expand drastically in the rush to seek "greener" technology, most notably for lithium as the demand for electronic vehicles, solar

panels, and other lithium-ion battery technologies grows (Lamb et al. 2024, p. 3673; Flexer et al. 2018, p. 1189). Although lithium is a relatively abundant element, there are very few high-concentrated deposits that would allow for commercial extraction (Flexer et al. 2018, p. 1189).

Bendire's

There are hundreds of active mines within Bendire's thrasher range in California, extracting materials such as aggregates and crushed stone, cement, lithium, gypsum, metals, and oil (Borgman et al. 2024, p. 43; Marquis 2024, entire). Figure 15 shows active BLM mining plans and notices within and near the Bendire's thrasher range in California. Increased demand for renewable energy technologies will likely lead to increased mining in these areas and consequently thrasher habitat loss, even within protected areas (Sonter et al. 2020, p. 4, 6).

LeConte's

Within the LeConte's thrasher range in California, there are hundreds of active mines for materials such as aggregates and crushed stone, lithium, gypsum, borax, gold and other metals (Marquis 2024, entire). See Figure 15 for a map of California mining claims within LeConte's thrasher range.

One major lithium deposit is the geothermal brine of the Salton Sea in Southern California, located in the heart of the LeConte's thrasher range. Recently, the company Controlled Thermal Resources was given approval to proceed with the Hell's Kitchen Lithium and Power project, slated to be the first combined lithium extraction and geothermal power plant (Marquis 2024, p. 19; Brennan 2025, p. 2). Currently established geothermal plants around the Salton Sea are also exploring lithium carbonate production, and in 2024, the company that owns 10 out of the 11 plants signed a contract with a lithium production company to begin pilot extraction (Marquis 2024, p. 18-19).

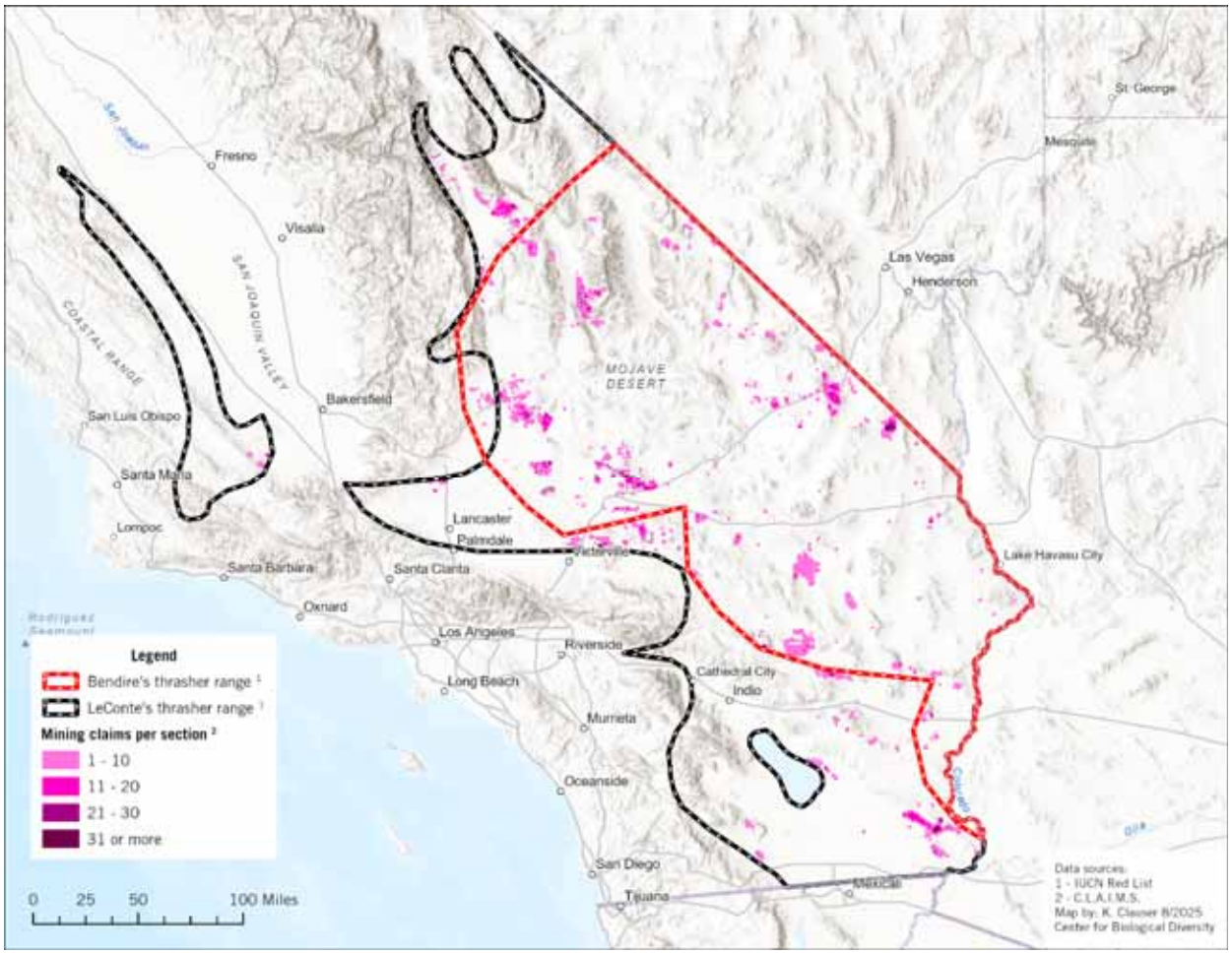

Figure 15: Density of mining claims within Bendire's and LeConte's thrasher California ranges. Data sources: IUCN Red List; eBird.org; Claims Location Array Interactive Map Service[11] (CLAIMS 2025).

Freshwater is necessary to extract concentrated lithium from brine. While geothermal plants may be able to recycle water in already extracted brine, high-quality water will have to be outsourced, especially if water needs exceed recycling capabilities (Dobson et al. 2023, p. 80-81). For lithium mining on the Salton Sea, the likely source of water is the Colorado River, a river already under severe stress from heavy anthropogenic use and the ongoing megadrought in the region (Hopkins 2018, p. 22, Dobson et al. 2023, p. 81). The water levels of the Salton Sea are maintained by inflows from agricultural irrigation runoff, but these have dramatically decreased due to regulations limiting agricultural and urban water withdrawal on the Colorado River. Since then, the Salton Sea has been steadily

[11] Fig. 13 made using CLAIMS ArcGIS webmap service (available at: https://experience.arcgis.com/experience/4a3b9406973e47d7aa5cf476500e7298/page/Page?views=Plans-%26-Notices; accessed March 2025), using "Plans & Notices" tab. See CLAIMS 2025 (*entire*) for information about CLAIMS and webmap data.

shrinking (Hopkins 2018, p. 8, 22-23). As more of the lakebed is exposed, the dried playa becomes a source of dust which can have severe impacts on air quality in the region. In 2018 it was projected that 100 square miles of lakebed would be exposed by 2030, resulting in the loss of wildlife habitat, death of nearby birds, and increases in airborne dust containing concentrated pollutants that can be detrimental to the health of humans, plants, and animals alike (Hopkins 2018, p. 23, 51; Dobson et al. 2023, p. 87).

While the companies exploring lithium mining on the Salton Sea have not formally outlined their extraction process, it is known they will use some application of direct lithium extraction, in which lithium is removed from solutions via adsorption or ion exchange (Dobson et al. 2023, p. 92, 157). While less water-intensive than other lithium extraction methods, it is estimated the increased demand would be similar to the amount of water needed to irrigate 14,000 acres (Ibid, p. 94). Waste precipitates are also created during the lithium purification process. Calcium is about 127 times more prevalent in brine than lithium, and the resulting solid waste from removal processes often ends up in landfills (Ibid, p. 155, 156). Currently, there are estimates that the Salton Sea could generate anywhere from 127,000 to 300,000 tons of marketable lithium carbonate per year but also produce approximately 7 tons of solid waste per ton of lithium carbonate equivalent (Ibid, p. 156, 158); this would result in approximately 889,000 to 2,100,000 tons of waste per year. Ultimately, further reduction of water levels from lithium mining is likely to exacerbate the already concerning declines of the Colorado River and Salton Sea, accelerating the degradation of nearby LeConte's thrasher habitat. Combined with the estimate of solid waste generation, approximately 10% of which is likely to be hazardous (Ibid, p. 158), it is clear this large scale of lithium mining will lead to ecological impacts in LeConte's thrashers' range.

4.7 Military Bases

While military bases can provide protection from other sources of disturbance by prohibiting public access, they can also degrade and fragment thrasher habitat through development, weapon testing, and heavy vehicle use (Lovich and Bainbridge 1999, p. 315). Even once military camps are abandoned, there are significant changes in vegetative structure due to soil compaction, removal of the top layer of soil, changes in soil texture, and altered drainage channel density (Lovich and Bainbridge 1999, p. 315; Ouren et al. 2007, p. 15). In the Mojave Desert, early estimates of vegetation degradation after military use have suggested that it could take between 1,500 and 3,000 years for vegetation structure to return to pre-military conditions (Lovich and Bainbridge 1999, p. 311). In the Bendire's and LeConte's thrasher ranges in California, the U.S. military extensively used the

Sonoran and Mojave deserts for World War II training operations, Desert Strike Operations in 1964, and Bold Eagle in 1976 (Lovich and Bainbridge 1999, p. 315; Abella 2010, p. 1249).

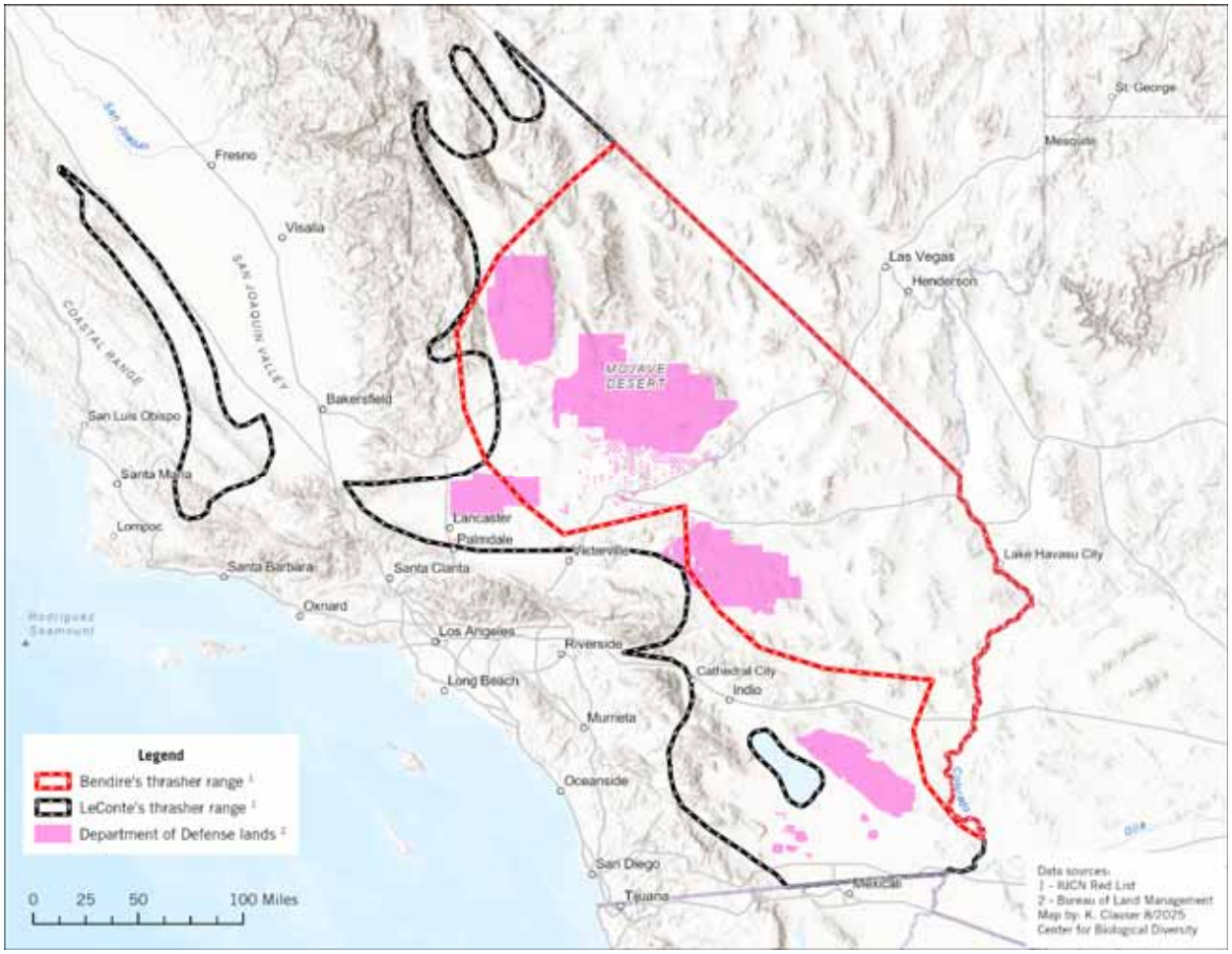

Figure 16: Active military installations and testing ranges within Bendire's and LeConte's thrasher California ranges. Data sources: IUCN Red List; USBLM.

There are 7 Department of Defense military installations located within the Bendire's and LeConte's thrasher ranges in California (Edwards Air Force Base, Fort Irwin, Naval Air Weapons Station China Lake, Holtville Carrier Landing Station, Marine Corps Air Ground Combat Center Twentynine Palms, Marine Corps Logistics Base Barstow, and Naval Air Facility El Centro). See Figure 16. In total, more than 3.5 million acres of Department of Defense lands are within the range of both desert thrashers in California. Some of that land is utilized as active military bases and testing ranges, such as Fort Irwin Warfare Training Center and Twentynine Palms Ground Combat Center (Governor's Military Council 2025). Military operations at Fort Irwin, Twenty-nine Palms Marine Corps Base, Edwards Air Force

Base, and China Lake Naval Weapons Center degrade or destroy Bendire's thrasher habitat (CDFG 2008a).

4.8 Off Highway Vehicle Use

Numerous studies have identified Off-highway vehicle (OHV) use as a potential threat to desert thrasher populations, largely due to habitat fragmentation and disturbance (Ammon et al. 2020, p. 30; BirdLife International 2020, p. 4; Borgman et al. 2024, p. 45). OHV use has the potential to impact thrasher populations through direct impacts to thrashers and habitat degradation (Borgman et al. 2024, p. 45). The networks of OHV roads and trails easily fragment habitats, leading to reduction of patch sizes and increased edge habitat (Ouren et al. 2007, p. 16). Native vegetation is removed during trail creation, and continued OHV use in habitats causes decreased size, abundance, cover, and growth rates of plants (Lovich and Bainbridge 1999, p. 316; Ouren et al. 2007, p. xii, 11, 24). The blanket of dust that accompanies OHVs in the desert also affects air and water quality, as well as inhibiting plant growth, size, and survivorship (Murray and Webb 2020, p. 6; Ouren et al. 2007, p. 26). Habitat is further degraded indirectly by OHVs via the spread and establishment of invasive plants. Invasive plant seeds can easily become stuck to vehicle wheels and be transported far distances (Ouren et al. 2007, p. 12; Abella 2010, p. 1270; Murray and Webb 2020, p. 6). Soil compaction and decreased water infiltration are also common from OHV use, causing increased soil erosion and decreased seedling survival in compacted areas (Lovich and Bainbridge 1999, p. 316; Abella 2010, p. 1270; Ouren et al. 2007, p. 6, 11; Murray and Webb 2020, p. 6).

Due to decreased water infiltration, surface water availability in OHV compacted areas increases, and excess water often runs off roads and trails into surrounding edge habitat (Ouren et al. 2007, p. 12; Borgman et al. 2024, p. 30). The increase of water availability can facilitate rapid germination and growth of invasive plant species, while the increased moisture along roads can benefit native and invasive plants alike, as multiple studies have reported increased vigor, structure, and cover of vegetation in roadside edge habitats. This can increase arthropod abundance in these areas, and consequently, predators (Ouren et al. 2007, p. 12-13). Ammon et al. (2020) determined that LeConte's thrasher occupation was correlated with areas with OHV disturbance (Ammon et al. 2020, p. 43); Borgman et al. (2024) hypothesized this may be due to the increased vegetation structure that could be attractive to the species for nesting opportunities (Borgman et al. 2024, p. 30). However, Ammon et al. (2020) also noted the correlation of OHV disturbance and LeConte's thrasher occupancy may be due to OHV paths coinciding with the low slopes and habitat often

selected by thrashers, rather than an indication of preference for OHV-disturbed areas (Ammon et al. 2020, p. 43).

Washes, streambeds, and other removed places are known to be popular OHV routes (Fletcher 2009, p. 31; Murray and Webb 2020, p. 6), and vehicle disturbance in these habitats can have detrimental impacts on nearby nesting birds. OHV activity increases light and noise disturbance and can elicit stress responses that affect breeding while also destroying nests and wildlife cover (Ouren et al. 2007, p. 16, 20). Noise emitted from OHVs occurs more frequently than any other high-intensity sound in the desert, reaching up to 110 decibels and causing hearing loss in certain animals (Lovich and Bainbridge 1999, p. 316; Ouren et al. 2007, p. 19). Birds can also be flushed off nests, which causes unnecessary energy expenditures (Ouren et al. 2007, p. 22). Moreover, thrashers are known to be weak flyers and prone to vehicle strikes (Hargrove et al. 2019, p. 30), and thus individuals attracted to roadside edge habitat are at higher risk of mortality.

OHV use is common in the majority of the southwestern U.S., but use and regulations vary (Borgman et al. 2024, p. 45). In California, existing roads and OHV routes are extensive (Borgman et al. 2024, p. 45), with minimal regulations for riding off-trail in designated trail-only areas and documented violations of specific restrictions established by governmental agencies with jurisdiction over public lands (California State Parks 2025, p. 2). Moreover, when illegal OHV use does occur, there is minimal law enforcement and repercussion (Borgman et al. 2024).

Impacts of OHV use, legal or illegal, are expected to be pronounced in areas where thrashers are known to occur. Known locations include Apple Valley, Barstow, and the Naval Petroleum Reserve #2 in California (Borgman et al. 2024, p. 45). OHV use is heavy along the California-Mexico border, stemming from a mixture of illegal borderland activity and related law enforcement/border patrol monitoring (Blackman and Diamond 2015, p. 29-30; Borgman et al. 2024, p. 45). Unfortunately, OHV use surrounding the international border is omnipresent and OHV use by Border Patrol is unregulated; consequently, damage to local vegetation and wildlife disturbances is likely to continue well into the future (Ibid).

4.9 Invasive Plants

Invasive plant species, especially grasses, are widely established throughout Southern California. Threats to desert thrashers due to invasive plants include increased risk of fire, reduced foraging opportunities, and for more severe invasions, the conversion of habitat to types unusable by thrashers (Borgman et al. 2024, p. 47).

Introduced grass species alter natural fire regimes by increasing the fuel load, intensity, and frequency of fires (D'Antonio and Vitousek 1992, p. 73; Lovich and Bainbridge 1999, p. 317; Brooks and Berry 2006, p. 110, 117; Barrows and Murphy-Mariscal 2012, p. 35). Many invasive grasses also exhibit rapid recovery after fire unlike native species, often establishing a grass/fire cycle (D'Antonio and Vitousek 1992, p. 73). Non-native plant species may also exhibit allelopathic effects wherein chemical interactions negatively affect native plant species (Lovich and Bainbridge 1999, p. 317).

The majority of the invasive plant species of concern for desert thrasher habitats are supported and spread by factors such as sprawl development and infrastructure, agricultural expansion, grazing, mining, energy development, OHV use, wildfires, drought, and climate change. For example, nitrogen deposition from air pollution and fertilizer leaching from croplands disproportionally benefits non-native plant species and increases abundance and biomass of invasives such as red brome (*Bromus rubens*) and *Schismus* spp. (Brooks 2003, p. 350; Allen et al. 2009, p. 2, 9, 11; Allen and Geiser 2011, p. 134; Bytnerowicz et al. 2015, p. 116-117). Destruction and degradation of natural habitat creates ideal conditions for invasive species to colonize (Lovich and Bainbridge 1999, p. 317; Brenner and Kanda 2013, p. 188, 192; Rogstad et al. 2015, p. 2).

Other passive anthropogenic land-use impacts can aid the proliferation of invasive species. For example, nitrogen deposition from urban air pollution and fertilizer leaching from croplands can disproportionally benefit non-native plant species (Brooks 2003, p. 345, 350; Allen et al. 2009, p. 2, 9, 11; Bytnerowicz et al. 2015, p. 116-117). In Southern California, air pollution has been noted to not only aid the growth and spread of invasive species, but also detrimentally impact native shrubs. For example, the oxidized and reduced forms of nitrogen in Los Angeles air pollution is moved inland via western winds, which later helps fertilize invasive plants in the western Mojave Desert (Allen et al. 2009, p. 3, 9). In Death Valley, elevated ozone levels were determined to cause severe declines in local saltbush (*Atriplex*) populations (Lovich and Bainbridge 1999, p. 318), a common plant association of LeConte's thrasher habitat and used often by the species as nesting substrate.

While the extent of the impact of invasive species on thrasher foraging and overall productivity is still unknown, LeConte's thrashers do not actively avoid habitat with invasive species (Borgman et al. 2024, p. 40). Examination of LeConte's thrasher habitat occupancy determined that 93% of thrasher-occupied habitat also had invasive annuals present (Ammon et al. 2020, p. 31). However, the study also determined that higher densities of

invasive plants reduced thrasher occupancy in those sites and stressed that correlation is not necessarily an indicator of habitat preference (Ibid, p. 35, 42, 43).

Many different invasive plant species have colonized desert thrasher habitats in Southern California and are continuing to spread. Throughout the Sonoran Basin and Range Ecoregion, buffelgrass (*Cenchrus ciliaris*) is a significant threat to native vegetation (Brenner and Kanda 2013, p. 188; USFWS 2023a, p. 46919; Saguaro National Park 2024, p. 1). Originally introduced to increase range productivity and forage production, buffelgrass spread quickly across the Southwest, often establishing dense grass patches in open spaces (USFWS 2023a, p. 46919). Between 1990 and 2000 there was an 82% increase in buffelgrass coverage in the Southwest, and now it commonly spreads without human cultivation (USFWS 2023a, p. 46919).

Within the Mojave Basin and Range Ecoregion, invasive species are limited in abundance yet represent a large proportion of the flora biomass. A study during a high rainfall year in the Mojave Desert determined that non-native annual species comprised 6% of the flora and 66% of the annual biomass in 1995, with those numbers increasing to 27% and 91%, respectively, in a low rainfall year in 1999 (Brooks and Berry 2006, p. 100, 108). The grasses red brome and *Schismus* spp., along with the common stork's bill (*Erodium cicutarium*) had comprised 99% of the alien biomass when the study was conducted in 1995 (Brooks and Berry 2006, p. 100).

In Southern California, the invasive species saltcedar (*Tamarix ramosissima*), Russian thistle (*Salsola iberica*), common stork's-bill (*Erodium cicutarium*), and grasses such as *Schismus* and *Bromus* species have colonized immense swaths of the desert (Lovich and Bainbridge 1999, p. 317). Sahara mustard (*Brassica tournefortii*) especially has been noted to spreading and degrading the Mojave and Sonoran deserts, classified as a "Most Invasive Wildland Pest Plants" in California (Frakes 2017, p. 4, 25; Villarreal et al. 2019, p. 14). Invasive mustards have been observed to aid degradation of LeConte's thrasher habitat in Coachella Valley, CA and contribute to the local extirpation of historical LeConte's thrasher populations. Surveys in the Coachella Valley noted severe cholla die-offs due to fires facilitated by the increases of invasive mustards and grasses in the region (Hargrove et al. 2019, p. 1, 25). In addition, multiple former LeConte's thrasher sites in the valley were noted to be "choked with mustard," reducing the amount of bare ground and open runways the thrasher needs for adequate arthropod foraging (Ibid, p. 30).

Ultimately, the expansion of non-native plant species can restrict desert thrashers to smaller sections of fragmented habitats and increase the risk of devastating fires, leaving

thrashers without adequate shelter and foraging resources, and increasing the mortality risk to entire populations.

4.10 Native Plant Harvesting

While confined to local areas, native plant harvesting has been flagged as a threat to Bendire's thrasher populations across its range (NatureServe Explorer 2025, p. 3). Concerning harvesting activities have been noted to occur in California due to the removals of Joshua trees, yuccas, and cholla cacti (England and Laudenslayer 1993, p. 9; Shuford and Gardali 2008, p. 314; Ammon et al. 2020, p. 58). California has specific laws and regulations regarding the removal of native plants and occasionally explicit legal protections for specific species, such as regulations to dissuade people from illegally harvesting cacti (Behme 2018, p. 1-3; CDFW 2025a, p. 1-4). However, these laws allow native plant harvesting in some capacity and may not deter harvesting enough, as cacti and succulents are known to be heavily threatened by overcollection for international horticulture and ornamental trade (Margulies et al. 2022, p. 3). Bendire's thrasher prefers heterogenous habitats at both territory and landscape level and is dependent on Joshua trees, yuccas, and other medium-sized cactus or shrubs for nesting structure, predator protection, foraging, and thermal cover (Fletcher et al. 2010, p. 27; Desmond and Bear Sutton 2017, p. 6, 17). Removal of these flora within Bendire's thrashers' range, legal or illegal, is likely to negatively impact populations by reducing important vegetative structures individuals depend on for fecundity and survival.

4.11 Disease and Predation

Disease

While neither the Cornell Lab Birds of the World account (Sheppard 2020b, p. 3) nor the Desert Thrasher Working Group (Borgman et al. 2024, entire) report disease to be a current threat to desert thrasher populations, there is potential for both species to be negatively impacted in the future. For example, the highly pathogenic avian influenza virus H5N1 was reported in wild birds in every U.S. state by January 2022, and as of May 2025, more than 13,000 cases in wild birds had been reported by the CDC (APHIS 2025, p. 2). Recent research has suggested that ingestion of infected tissue is a main cause for the spread of H5N1 in wild birds, especially scavengers such as corvids (Ringenberg et al. 2024, p. 2, 7). There is evidence that the flu may also be spread through shared resources such as water (Ringenberg et al. 2024, p. 2, 7). A recent study examining deceased wild birds determined songbirds to have low infection rates; however, the authors warned that as H5N1 continues

to spread in raptors and other birds, there could be detrimental consequences for already threatened and declining species (Ibid, p. 5, 7, 8). As corvids often increase in desert environments due to infrastructure, increased human encroachment and development may increase thrasher exposure to the deadly disease.

Additionally, corvids are highly susceptible to West Nile Virus, a mosquito-borne disease present across the continental United States (Cornell NYS Wildlife Health Program 2018, p. 1, 2). West Nile Virus has already been reported in a deceased LeConte's thrasher by the CDC (CDC 2017, p. 2), presenting additional cause for concern as West Nile Virus is predicted to become more frequent in western U.S. states due to climate change (King and Finch 2013, p. 6).

Predation

While not listed in most literature as a major threat, Bendire's thrasher nests and juveniles often fall prey to various predators. Studies in New Mexico specifically focused on fledgling and nest survival of Bendire's thrasher found that depredation was a major cause of nest failure (Salas 2021, p. 26, 33; Salas and Desmond 2019, p. 11), most commonly by Chihuahuan ravens (*Corvus cryptoleucus*) and coyotes (*Canis latrans*). A 2018 study found it difficult to assess Bendire's incubation and nestling period lengths because most were predated on before completion (Salas and Desmond 2019, p. 13). Estimates of Bendire's fledging survival were noted to be lower than other passerine species (Salas 2021, p. 74).

While not discussed as an individual threat, Borgman et al. (2024) note that individual LeConte's thrasher nests were most commonly lost due to predation. According to a study on LeConte's thrashers in Maricopa, CA, approximately 10% of eggs and 10% of fledglings were predated on (Sheppard 2020b, p. 3). The study notes that within the first two weeks, fledglings were lost to house cats (*Felis catus*), kit foxes (*Vulpes macrotis*), and unidentified snakes (Ibid). Other potential predators often found within LeConte's thrasher habitats include coyotes (*Canis latrans*), loggerhead shrikes (*Lanius ludovicianus*), and unspecified raptors and rodents (Blackman and Diamond 2015, p. 23-24).

Human development and other anthropogenic encroachment into thrasher habitat further increases the predation risk for desert thrashers. Predation by cats has been identified as a risk to both Bendire's and LeConte's thrasher by Borgman et al. (2024), as the number of outdoor cats increase as developed and agricultural areas encroach into thrasher habitat (Borgman et al. 2024, p. 35). A study on domestic cat predation in the U.S. estimated that cats kill 1.3 to 4.0 million birds annually, with approximately 70% of predation caused by

free-roaming and feral cats such those commonly found on farms and around barns (Loss et al. 2013, p. 2, 5).

Because urbanization provides supplemental sources of food and water, corvid and coyote populations are increasing in western and southwestern North America where these essential resources are already low (Bui et al. 2010, p. 66; USFWS 2016, p. 51354; Harju et al. 2018, p. 1, 2; Lombardi et al. 2017, p. 2; Benmazouz et al. 2021, p. 1). A study which surveyed for LeConte's thrashers across the Coachella Valley in California, noted that predatory common ravens (*Corvus corax*) were present at the majority of their study sites (Hargrove et al. 2019, p. 31). The authors also note ravens had increased well over their historic numbers for the region (Ibid). This is likely caused by anthropogenic disturbance, as Borgman et al. (2024) further note that raven occurrence is positively influenced by human infrastructure and edge habitats (Borgman et al. 2024, p. 41 and Coates et al. 2014 cited therein). Urban corvids have been reported to colonize into surrounding habitat and prey upon the nests of other birds (Bui et al. 2010, p. 66). Coyote populations have increased to levels not found in the wild (Bateman and Fleming 2012, p. 1). Ultimately, the additional stress of sprawl development and subsequent increased predators will only decrease the chance of survival for remaining thrasher populations.

4.12 Wildfires

Altered fire regimes has been identified as a significant threat to both Bendire's and LeConte's thrasher populations (GBBO 2010, p. Spp-65-4, 66-4; Ammon et al. 2020, p. 58, 59, 64; Borgman et al. 2024, p. 45). Historically, arid lands were not prone to wildfires due to extensive bare ground between shrubs that limited fuel availability and prevented fire from spreading rapidly across landscapes (Lovich and Bainbridge 1999, p. 318; Syphard et al. 2017, p. 1). Wildfires in the western U.S. are increasing in frequency and extent, exacerbated by a multitude of factors including human fire-suppression, human development, logging, drought, climate change, and introduction of invasive plants (Lovich and Bainbridge 1999, p. 318; Brooks and Berry 2006, p. 101; Tagestad et al. 2016, p. 394; Syphard et al. 2017, p. 1). Recent analyses of fire records in the Mojave and Sonoran Deserts found that powerlines, energy infrastructure, and urbanization were leading anthropogenic contributors to fires (Tagestad et al. 2016, p. 395; Syphard et al. 2017, p. 11). Most notably in the Sonoran Desert, large fires had a direct relationship to the proximity of human development, pointing to humans and related structures to be the cause of most ignitions in the region (Syphard et al. 2017, p. 11).

Across the west, and especially in the Mojave Desert, the proliferation of invasive annual grass species such as buffelgrass, *Bromus* spp., and *Schismus* spp. are of additional concern as they have increased the intensity and frequency of fire by providing a continuous source of fine fuel which can persist well into the dry summer months (Brooks and Matchett 2006, p. 149, 161; Vamstad and Rotenberry 2010, p. 1315; Jurand and Abella 2013, p. 157; Syphard et al. 2017, p. 11; Moloney et al. 2019, p. 3; USFWS 2023a, p. 46918). For example, desiccated upright *Bromus* stems can be found in habitats upwards of three years after senescence (Jurand and Abella 2013, p. 157). Buffelgrass is prevalent across the Sonoran Desert and creates dense mats of vegetation that outcompetes native plants and increases fire risk (Borgman et al. 2024, p. 40, 47). The increased cover of invasive grasses and fuel increases the chances of a fire igniting, facilitates rapid fire spread, creates hotter fires, and decreases recovery times between fire events (Brooks and Berry 2006, p. 117; Klinger and Brooks 2017, p. 1522; USFWS 2023a, p. 46918).

Fires have a direct relationship to the proximity of human development, and the combination of invasive species and infrastructure has been linked to multiple large fires. For example, examinations of wind turbines and related infrastructure in the Mojave have seen increases of invasive plant species around the development sites (Villarreal et al. 2019, p. 13). High invasive plant cover near turbines is an extreme fire risk, as turbines are a known source of ignition and caused at least two fires in 2012 alone, one of which was in the Coachella Valley (Ibid, p. 14). Other infrastructure in California, combined with an over-abundance of nearby invasive plants, has resulted in deadly fires. Sparks from transmission lines have been linked to the 2017 Tubbs Fire and 2018 Camp Fire, both exacerbated by the fine fuels provided by invasive plants (Ibid).

Wildfire not only disturbs large swaths of native habitat but also increases the availability of soil nutrients and nitrogen after burning (Syphard et al. 2017, p. 2). Non-native plants, especially grasses, can respond more favorably to increased nitrogen than natives and thus become more established throughout a landscape. The establishment of invasive species increases the flammability of the landscape and likelihood of fire, and after burning, more disturbed habitat is created for invasive species to colonize (Syphard et al. 2017, p. 2; Ammon et al. 2020, p. 58). Systematic reviews of post-fire vegetation recovery in the Mojave and Sonoran Deserts have determined little re-establishment after 40 years, and some researchers suggest it could take over 65 years to see full vegetative recovery in heavily burned areas (Vamstad and Rotenberry 2010, p. 1315). Further habitat degradation via fire poses a high risk to both declining thrasher species.

The establishment of these destructive fire cycles is further amplified by climate-change caused extreme weather events (Gonzalez et al. 2018, p. 1104, 1115). Increases in above-average precipitation spurs the proliferation of non-native vegetation and consequently increases fine fuel loads (Brooks and Matchett, p. 149, 158; Syphard et al. 2017, p. 12). Longer and more extreme heat waves during the summer months and prolonged droughts thoroughly dry out the fine fuels, creating an easily combustible and quick burning fuel source (Borgman et al. 2024, p. 45-46). This combination has shown to be catastrophic for wildfire season in thrasher habitat, as seen in the 2023 York Fire which burned over 93,000 acres within the Mojave National Preserve (Figure 17) (Borgman et al. 2024, p. 46).

Figure 17: Image of burned Joshua Trees after the 2023 York Fire in the Mojave National Preserve, California. Photo: REUTERS / Jorge Garcia (Garcia 2023, p. 2).

Bendire's

Wildfires are a major threat to the persistence of Joshua trees (*Yucca brevifolia*; *Y. jaegeriana*), one of the plant types that Bendire's thrasher relies on extensively for nesting and survival (DeFalco et al. 2010, p. 246; Barrows and Murphy-Mariscal 2012, p. 35; Ammon et al. 2020, p. 28). Joshua trees have high post-fire mortality rates, exhibiting steep

declines in survivorship one to two years after a fire (DeFalco et al. 2010, p. 246, 247). For example, after the lightning-caused Dome Fire in 2020 burned almost 45,000 acres of Joshua tree habitat in August of 2020, studies conducted one to three years post-fire determined 93% of Joshua trees had died (Borgman et al. 2024, p. 46). If found near previously burned habitat, Bendire's thrashers rarely occupied areas within the fire perimeter, suggesting an almost complete erasure of suitable thrasher habitat after significant burns (Ibid and references cited therein). Reestablishment of Joshua trees, columnar cacti, and other large native vegetation in widespread burned areas is extremely slow. Recovery takes several decades for the vegetation to be tall enough to create suitable nesting habitat for Bendire's thrashers, even with human help (Abella 2010, p. 1273; USFWS 2023a, p. 46918; Borgman et al. 2024, p. 46).

LeConte's

Wildfire is a major threat to native plants in LeConte's thrasher habitat (Zouhar 2023, p. 17; Ammon et al. 2020, p. 58). Vegetation typical of hotter and drier ecosystems, such as those which LeConte's thrashers often occupy, are known to have less resilience to fire than other desert environments (Chambers et al. 2019, p. 12). Consequently, there is higher potential for the establishment of destructive invasive-fire cycles in these arid regions, especially in the scrub habitats of southern California and the Central Valley (Ibid, p. 14). In the Sonoran Desert, woody perennials and cacti populations can be detrimentally reduced by a single fire, while repeated fires can eliminate native species from a site entirely (Zouhar 2023, p. 51). For instance, examinations of pre- and post-fire vegetation in Arizona following severe burning observed losses of many cholla species, and in one location, 98% of cholla was determined to be dead post-fire (Ibid, p. 44, 51). It is expected that after severe fires, native perennials may take decades to reestablish (Ibid, p. 52). Invasive grasses and mustards have facilitated fire and subsequent cholla die-offs in the Coachella Valley, dramatically reducing the amount of nesting substrate in historical LeConte's thrasher habitats (Hargrove et al. 2019, p. 1, 25).

Fire poses a major threat to thrasher habitat in the San Joaquin Valley, since hot fire kills most of the saltbush plants and stored seeds in the soil (CDFG 2008b). Large areas of former thrasher habitat in the San Joaquin Valley have been converted from saltbush scrub to non-native annual grassland by fire (CDFG 2008b). By killing the saltbush, fires reduce the amount of nesting and foraging habitat and also fragment habitat blocks, possibly interfering with dispersal of young (CDFG 2008b). Postfire conditions often encourage a thick growth of non-native annuals, which reduces the disturbance caused by runoff necessary for seed germination and seedling establishment, increases the intensity and

frequency of future fires, and reduces the amount of available litter and bare ground needed for foraging (CDFG 2008b). Unlike saltbush, desert tea often stump-sprouts in response to fire, making habitat conversion less of a threat to thrashers in this community (CDFG 2008b). Desert tea, however, is relatively slow growing, and nest shrubs can be limited following a fire (CDFG 2008b).

4.13 Climate Change

Nearly one-quarter of threatened birds globally are estimated to have been negatively impacted by climate change, most commonly for species with low dispersal abilities and relatively high maximum temperatures in breeding areas (Pacifici et al. 2017, p. 2-3). Expectedly, the Desert Thrasher Working Group has underlined climate change as one of the top threats to desert thrashers (Borgman et al. 2024, p. 48).

Average temperatures in the Southwest have been increasing, and annual averages are projected to climb to historically unprecedented levels due to climate change (NECI 2025, p. 2). Average temperatures in California's southeast desert basin climate region (Climate Division 7) increased nearly 4 degrees F from 1900 to April 2025 (NCEI 2025, p. 2), which is experiencing a brutal, decades-long "megadrought." See Figure 18.

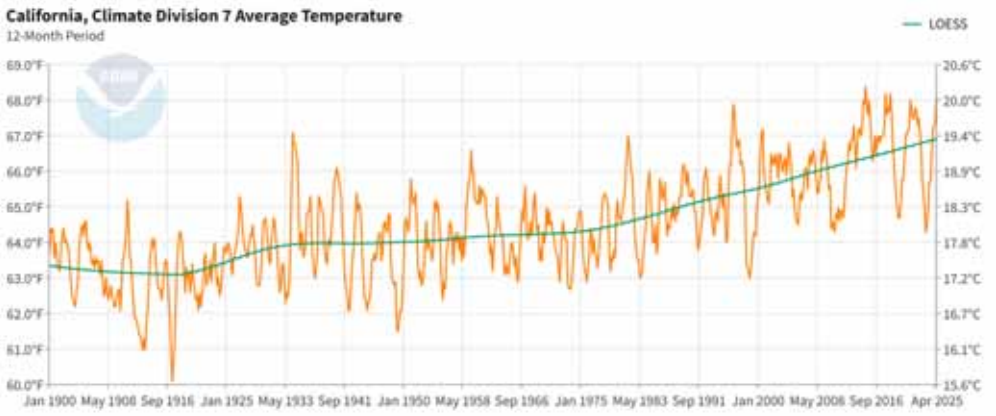

Figure 18: Average temperatures in California's southeast desert basin climate region from 1900 to April 2025 (NCEI 2025, p. 2).

Climate change is also increasing extreme weather events in the southwest, an area already considered one of the most climate-challenged regions in the U.S. (Gonzalez et al. 2018, p. 1104; Bear Sutton 2020, p. 41; USGCRP 2023, p. 2-12). Extreme heat waves and prolonged droughts are projected to occur with greater frequency and intensity over the

coming decades, and precipitation is expected to become more variable (Tagestad et al. 2016, p. 392; Gonzalez et al. 2018, p. 1104, 1108, 1143; Hopkins 2018, p. 7, 50). According to a recent study, 42% of the current southwest North American megadrought can be attributed to human-caused climate change (NOAA 2022, p. 1). In the western U.S., human-caused warming from 1979-2020 was responsible for nearly 68% of the increased aridity (USGCRP 2023, p. 2-20).

In the Southwest, the impacts of droughts are further amplified by the increasing variation of year-to-year winter precipitation, as vegetation growth is dependent on winter precipitation and ecosystems have experienced reoccurring whiplash between the "wettest" and "driest" winters on record over a period of 40 years (Tagestad et al. 2016, p. 396; NPS 2017b, p. 1). The increases in average temperatures, extreme heat waves, and prolonged droughts are projected to occur with greater frequency and intensity over the coming decades, and precipitation expected to become even more variable (Gonzalez et al. 2018, p. 1108, 1109, 1112; Hopkins 2018, p. 12).

Climate change is known to exacerbate many of the threats to thrashers discussed previously. For example, while disease is not a known threat to desert thrashers at this time, mosquito-borne diseases such as West Nile are expected to increase with climate change, especially in western states (King and Fitch 2013, p. 2, 3; Hopkins 2018, p. 51).

Most concerning are the compounding effects of climate change on fire. As droughts increase the chance of wildfire, and sporadic extreme precipitation events increase the abundance of invasive plant species, climate change feeds the destructive grass/fire cycle (Brooks and Matchett 2006, p. 160-162; Vamstad and Rotenberry 2010, p. 1309, 1315; Klinger and Brooks 2017, p. 1522; Moloney et al. 2019, p. 2; USFWS 2023a, p. 46918, 46922). Analyses of southwestern U.S. fires from 1984 to 2015 estimated that climate change doubled the amount of area burned (Gonzalez et al. 2018, p. 1104, 1105), made evident by highly destructive wildfires in California that have resulted in billions of dollars in damage in the desert thrasher ranges (Frankson et al. 2022c, p. 4; Runkle et al. 2022, p. 3). Climate change impacts on desert thrashers are expected to be significant (Ammon et al. 2020, p. 5; Borgman et al. 2024, p. 48).

Changes in average temperatures and precipitation due to climate change can severely affect survival and productivity of desert thrashers. Temperature and precipitation greatly influence breeding distribution, especially during the months preceding breeding (Bear Sutton 2020, p. 51; Salas 2021, p. 34). Increasing unpredictability of weather patterns in the southwest creates higher potential for mismatches in the phenology of resources and

environmental cues that are required for thrasher breeding to be successful (Salas 2021, p. 34). In years with low precipitation, thrashers have been observed to have significantly reduced fecundity and sometimes forego breeding altogether (Salas 2021, p. 32; Borgman et al. 2024, p. 48). With more droughts projected in the Southwest (USGCRP 2023, p. 2-12), thrasher reproduction is likely to decrease. Moreover, desert-adapted species are already enduring temperatures nearing their thermal limits, elevating risk of heat-related mortality (Borgman et al. 2024, p. 49). Rising temperatures place desert thrashers at higher risk for lethal dehydration and hyperthermia, as larger birds and those which obtain water through prey are less capable of meeting water needs associated with thermal homeostasis as the climate becomes hotter and drier (Borgman et al. 2024, p. 48).

Ecosystem-level changes caused by climate change will have severe effects on desert thrashers. Native arid land vegetation is projected to shift northward as temperatures increase, or more worryingly, completely disappear from the desert thrashers range. There is concern that these vegetation communities may not be able to adapt to the current pace of climate change (Borgman et al. 2024, p. 48). Climate change vulnerability and sensitivity assessments for vegetation communities in the Sonoran and Mojave Deserts determined multiple desert shrub communities to be highly vulnerable, and most desert shrub and dune communities to be highly sensitive to climate change (Comer et al. 2012, p. 26-27).

There is concern that climate change may severely impact LeConte's thrasher; due to their low dispersal ability the species has a higher potential to fail to adapt to the current pace of climate change and subsequent habitat alterations (Borgman et al. 2024, p. 48-49).
For Bendire's thrasher, Joshua tree communities are expected to either shift northward and/or disappear entirely from Bendire's thrashers' range in the southernmost regions (Cole et al. 2011, p. 148; Gonzalez et al. 2018, p. 1117; Borgman et al. 2024, p. 48). The Joshua tree range has already contracted due to climate change and the increased frequency and severity of fires (Barrows and Murphy-Mariscal 2012, p. 35; Cole et al. 2011, p. 143; Holmgren et al. 2010, p. 226; Sweet et al. 2019, p. 12, 13; Vamstad and Rotenberry 2010, p. 1309).

In addition, prolonged droughts and increased temperatures will reduce water availability, thus reducing vegetation growth and productivity and consequently impacting thrasher food and nesting sources (USFWS 2014, p. 51056; Borgman et al. 2024, p. 33, 48). This will likely be exacerbated by human activity, as decreased aquifers generally result in increased groundwater withdrawal and more requests for water-well construction permits, further reducing available water for native vegetation and wildlife (USFWS 2014, p. 51056; Gonzalez et al. 2018, p. 1112, 1114). Arthropod abundance is also greatly correlated to

precipitation, and increasing temperatures and droughts are likely to decrease prey abundance for desert thrashers (Bear Sutton 2020, p. 16, 51; Salas 2021, p. 34).

5. INADEQUACY OF EXISTING REGULATORY MECHANISMS

5.1 Federal Regulatory Mechanisms

Endangered Species Act Listings

Listing under the federal Endangered Species Act (ESA) for other species that overlap with desert thrashers in habitat and range could conceivably provide some protection to these thrasher species.

Sixteen federally ESA-listed species occur within Bendire's thrasher range in California. These include:
Mammals - Amargosa vole
Birds - least Bell's vireo, western snowy plover, southwestern willow flycatcher, western yellow-billed cuckoo, Yuma Ridgway's rail, Inyo California towhee
Reptiles & Amphibians - arroyo southwestern toad, desert tortoise
Fish - Mohave tui chub, bonytail, razorback sucker
Plants - spring-loving centaury, Amargosa niterwort, Ash Meadows gumplant, Lane Mountain milk-vetch

Forty-eight federally ESA-listed species occur within LeConte's thrasher range in California. These include:
Mammals - Amargosa vole, San Joaquin kit fox, giant kangaroo rat, Stephens' kangaroo rat, Tipton kangaroo rat, wolverine, peninsular bighorn sheep, Sierra Nevada bighorn sheep
Birds - least Bell's vireo, western snowy plover, southwestern willow flycatcher, western yellow-billed cuckoo, Yuma Ridgway's rail, Inyo California towhee, California condor
Reptiles and Amphibians - arroyo toad, desert tortoise, blunt-nosed leopard lizard, desert slender salamander, foothill yellow-legged frog (central coast DPS), California red-legged frog, Coachella Valley fringe-toed lizard
Fish - desert pupfish, Mohave tui chub, Owens pupfish, unarmored threespine stickleback, bonytail, razorback sucker
Invertebrates – Casey's June beetle, Kern primrose sphinx moth, longhorn fairy shrimp, vernal pool fairy shrimp
Plants – Amargosa niterwort, Ash Meadows daisy, Ash Meadows gumplant, California jewelflower, California Orcutt grass, Coachella Valley milk-vetch, Eureka Valley dune grass,

Kern mallow, Lane Mountain milk-vetch, Nevin's barberry, Parish's daisy, Peirson's milk-vetch, San Joaquin woollythreads, spreading navarretia, spring-loving centaury, triple-ribbed milk-vetch

The primary way in which desert thrashers could benefit from the ESA listing of these co-occurring species is through protection of nesting and foraging habitat shared with habitat for these species. Species listed under the ESA are required to have a "critical habitat" designation when "prudent and determinable." Federal agencies are in turn required to consult with the USFWS to avoid "destruction" or "adverse modification" of designated critical habitat (USFWS 2017, p. 1). Therefore, a critical habitat designation for ESA listed species could indirectly protect habitat for co-occurring non-listed species.

Nine ESA-listed species that occur within the California range of both Bendire's and LeConte's thrashers have designated critical habitat in California that could overlap: Amargosa niterwort, Amargosa vole, Ash Meadows gumplant, bonytail, desert tortoise, Inyo California towhee, Lane Mountain milk-vetch, razorback sucker, and Southwestern willow flycatcher. An additional 15 ESA-listed species that occur within the California range of LeConte's thrasher have designated critical habitat that could overlap: arroyo toad, California condor, California red-legged frog, Coachella Valley fringe-toed lizard, Coachella Valley milk-vetch, desert pupfish, foothill yellow-legged frog, least Bell's vireo, longhorn fairy shrimp, Pierson's milk-vetch, peninsular bighorn sheep, Quino checkerspot butterfly, Sierra Nevada bighorn sheep, vernal pool fairy shrimp, and western yellow-billed cuckoo.

However, almost all of these critical habitat areas are largely outside of areas with core desert thrasher populations. See Figure 19. The exceptions are the critical habitats for desert tortoise, Peninsular bighorn sheep and least Bell's vireo, which are in or near areas with core populations of LeConte's thrasher in California.

The critical habitat designation for the desert tortoise (*Gopherus morafkai*) in California overlaps with a high density of LeConte's thrashers near Lancaster and Palmdale (see Figure 19). Since desert tortoise critical habitat contains the primary constituent elements of desert scrub vegetation with gently sloping terrain (USFWS 1994a), habitats that are used by LeConte's thrashers, there could be some potential benefit conferred from the desert tortoise critical habitat designation. However, Mojave desert tortoise populations and density have continued to decline since the ESA listing, and most of the tortoise populations monitored within Tortoise Conservation Areas continued to decline (by 37%) between 2004 and 2014 (USFWS 2022), so any ancillary benefits to LeConte's thrasher are speculative.

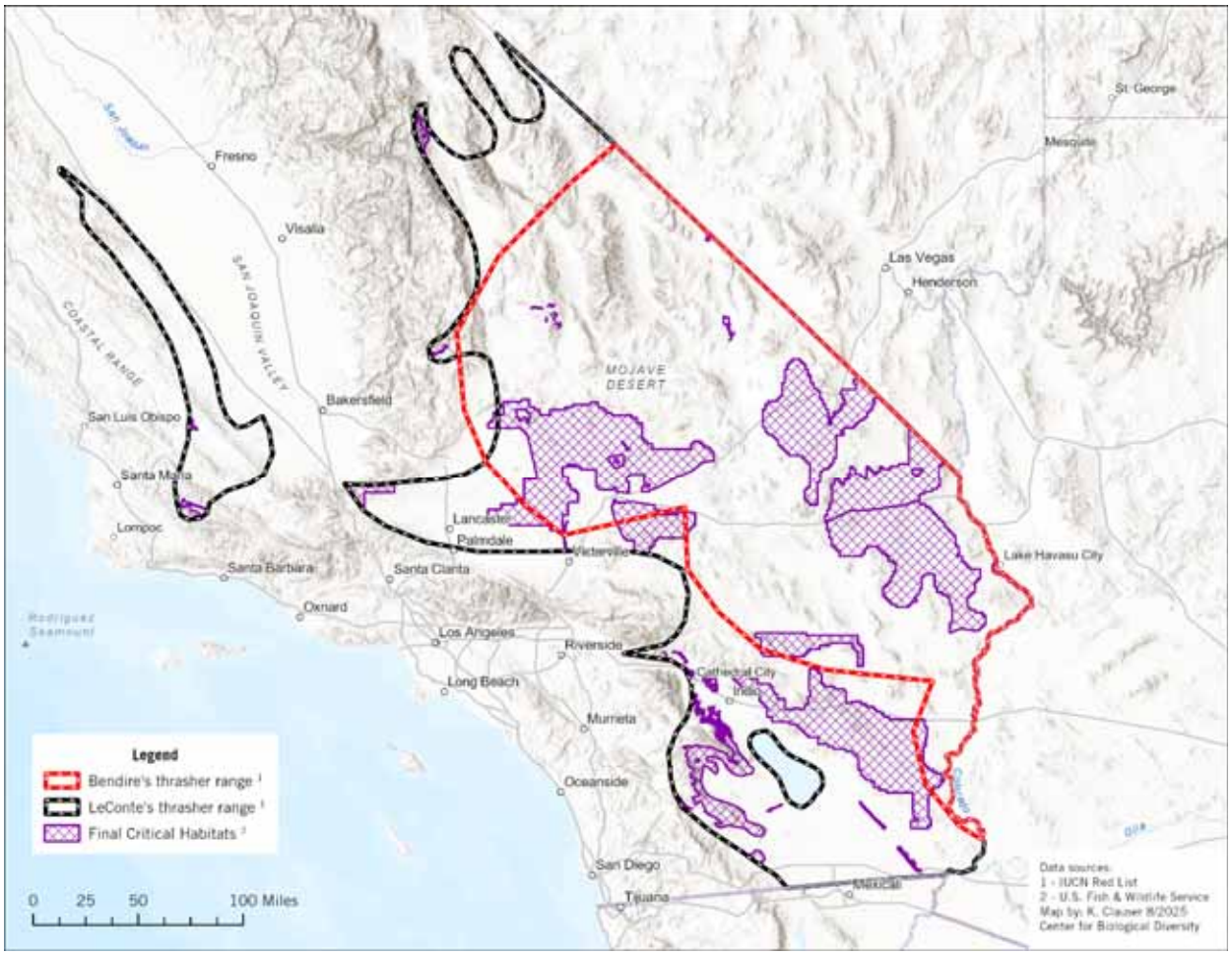

Figure 19. Designated critical habitats for ESA listed species within Bendire's and LeConte's thrasher ranges in California.

The designated critical habitats for the Peninsular bighorn sheep (*Ovis canadensis nelson*) and least Bell's vireo (*Vireo bellii pusillus*) overlap with a high density of LeConte's thrashers west of the Salton Sea (see Figure 19). However, the Peninsular bighorn sheep critical habitat primary constituent elements (USFWS 2009b) are generally steep, rugged, mountainous terrain (moderately steep to very steep open slopes, canyons, and washes in hot and dry desert regions where the land is rough and rocky, and sparsely vegetated), which does not overlap with the preferred habitat for LeConte's thrashers. The least Bell's vireo critical habitat primary constituent elements (USFWS 1994b) are riparian woodland vegetation and some associated upland habitats, which do not overlap with the preferred habitat for LeConte's thrashers.

Habitat Conservation Plans

The Habitat Conservation Plan (HCP) program, which is intended to allow development to the extent compatible with conservation, forces the USFWS to mediate conflicts between development and the conservation of endangered species. As originally enacted in 1973, the Endangered Species Act (ESA) flatly prohibited the "take," of endangered animal species. A 1982 amendment (Section 10) provided for exception to the take prohibition, authorizing the issuance of permits for the incidental take of listed species under certain circumstances. To obtain an incidental take permit, the applicant must submit an HCP. HCPs are supposed to allow development to proceed if plans specify with scientific credibility that the impacts of proposed habitat changes are minimized to the maximum extent practicable and/or mitigated. Permits are required only for the incidental take of federally listed species, but the wildlife agencies strongly encourage permittees to include state-listed, proposed, candidate, rare, and other species in their HCPs. Voluntary inclusion of unlisted species in HCPs provides more planning certainty to the permittee in case of future listing and can increase the biological value of the plan. Unlisted species are supposed to be "adequately covered" by an HCP, i.e., addressed as if they were listed under the ESA.

The HCP provisions of the ESA were intended to provide a net benefit to threatened and endangered species, in return for providing landowners with regulatory certainty and permits to impact or otherwise "take" listed species and their habitats. In theory, HCPs can help protect and restore habitat, including habitat for non-listed species covered under the plan. Unfortunately, some HCPs fail to live up to this promise and simply function as exemptions from the ESA's species and habitat protection policies. Arguably, a few HCPs make the best of difficult situations on private lands and may even help species' recovery to some extent. There is considerable reason to be skeptical of the ability of HCPs to protect populations and habitat for covered non-listed species such as desert thrashers, since HCPs are explicitly not required to benefit non-federally listed species. None of the California HCPs that cover desert thrashers have adequately monitored the effectiveness of mitigation measures in conserving thrashers and their habitat.

There are no HCPs in California that cover Bendire's thrasher other than the Town of Apple Valley HCP, which has not been finalized or implemented (USFWS 2025). LeConte's thrasher is included as a non-listed covered species for only three large, active HCPs in California: Coachella Valley, Kern Water Bank, and Nuevo-Torch (USFWS 2025c; CDFW 2023a, p. 7). Two HCPs that cover the LeConte's thrasher are very small (U.S. Borax at 3,465 acres, and Chevron Pipeline in Kern County at 25.5 acres); three other inactive HCPs where

LeConte's thrasher was a covered species were East San Diego County, ARCO Western Energy, and Town of Apple Valley. Protections provided through these HCPs are discussed briefly below.

Coachella Valley

The Coachella Valley Multi-Species HCP covers urban development on 1,206,578 acres and within 8 cities in the Coachella Valley in central Riverside County; it was approved 10/01/2008 for 75 years (CVCC 2007; USFWS 2025c). Implemented in 2008, the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (CVMSHCP) was established to provide "long-term conservation of ecological diversity in the Coachella Valley region" (CVCC 2025, p. 3), a known former stronghold of LeConte's thrasher populations. Through the CVMSHCP, LeConte's thrashers are supposed to benefit from approximately 133,000 acres of conserved habitat (CVMSHCP 2016, p. 9-172), where more than 70,000 acres outside of pre-existing conservation areas are supposed to be conserved for the species during the plan's 75-year term (CVMSHCP 2016, p. 9-173; CVCC 2025, p. 3). As of 2024, only 44% of the required LeConte's thrasher conservation lands have been conserved.

Lands within the Coachella HCP's Reserve System are held in public or private ownership and are managed for habitat conservation and open space values. Land acquired under complementary conservation is often transferred in fee to either a state or federal agency or to CVCC for long term management. Most of the conserved acreage to date has been committed by state and federal agencies, with much less protected by the HCP. As of 2024, permittees had conserved 18,577 acres (18%) of their conservation goal; state and federal conservation has reached 28,950 acres (73%) of their required contribution; and complementary conservation accounted for 57,213 acres (83%) of the anticipated acreage (CVCC 2024). Since 1996, 104,740 acres have been conserved under the CVMSHCP, with the assembly of the Reserve System just under 50% complete.

Smallwood (2023d, p. 26) reviewed the Coachella Valley HCP and its supporting documents to ascertain its performance standards and measurement of progress towards those standards but could not find biological performance standards such as minimum numbers of individuals to be achieved through conservation actions, or minimum productivity of each species, or even a minimum species richness as a community metric. It is unclear how HCP biological monitoring studies relate to HCP performance standards, and it is unclear if the HCP is conserving covered species (Smallwood 2023d, p. 26). The performance standards of the HCP appear focused on acreage conserved specific to the habitat needs of each covered species. Between 1996 and 2020, permittees contributed an

average 552 acres per year in exchange for an allowed authorized disturbance to 898 acres/year (22,420 acres total). It appeared to Smallwood (2023d, p. 26) that authorized take is being front-loaded while conserved acreage from permittee fees lags.

Kern Water Bank

The Kern Water Bank, a 32-square mile property in the southern San Joaquin Valley, was created to store water in artificial aquifers for later agricultural, municipal, and industrial use during times of shortage (KWBA 1997, p. S-1; KWBA 2019, p. 1-2). To obtain incidental take permits from the Service and management authorizations from the California Department of Fish and Game, Kern Water Bank was required to have a Habitat Conservation Plan/Natural Community Conservation Plan (hereafter HCP). The HCP covers most of the acreage of the Kern Water Bank, with the goal of restoring much of the area to historic intermittent wetland and rangeland habitat (KWBA 1997, p. S-1, I-1, II-1). The Kern Water Bank HCP covers water recharge and recovery activities on 1,900 acres in portions of Kern, Tulare, and Kings Counties; it was approved 10/02/1997 for 75 years (KWBA 1997; USFWS 2025c). Project impacts will result from grading, flooding, facilities construction, maintenance of levees and canals, and project related traffic.

The Kern Water Bank HCP mentions no specific protections or mitigations for LeConte's thrasher but claims benefits from habitat preserves (KWBA 1997). It is unclear what has or will be done to benefit LeConte's thrashers and the status of conservation banks. LeConte's thrasher is included as a Group 1 species of concern covered by the HCP (Ibid, p. III-2, III-3), and thus are supposed to be provided specific management by the Kern Water Bank for their benefit (Ibid, p. III-1). Of the 19,900 acres originally set aside for the project (Ibid, p. II-2), approximately 17,000 have been restored to intermittent wetlands and upland habitat (KWBA 2025, p. 2). However, at the time of the HCP finalization, there was no documented occurrence of LeConte's thrashers at the Kern Water Bank (KWBA 1997, p. III-2, III-3). Even after land restoration, the most recent bird surveys at the site still report no occupancy by LeConte's thrashers; instead, surveys have noted the presence of potential competitors of the thrasher species (KWBA 2019, p. 32).

Nuevo-Torch

The Nuevo-Torch HCP covers 21,800 acres for oil and gas production in Bakersfield, Kern County; it was approved 11/18/1999 for 30 years. The plan estimates 13% of this acreage (1,700 acres) will be "permanently disturbed" by oil and gas activities authorized by the plan. The HCP will preserve 839.9 acres of properties in the Lokern Natural Area, which contains suitable habitat for LeConte's thrasher, as compensation for permanent habitat disturbance (Nuevo-Torch 1999).

ARCO Western Energy

The ARCO Coles Levee (ARCO Western Energy) HCP covered 120,320 acres slated for oil and gas development in Kern County; it was approved 03/01/1996 for 30 years. It is unclear what impacts this project had on LeConte's thrashers; the permittee surrendered the permit prior to the expiration date (USFWS 2025c). The project had set up a Coles Levee Ecosystem Preserve, a 6,059-acre mitigation preserve in Kern County focused on monitoring of San Joaquin kit fox, kangaroo rats, listed plant species, and other federally listed species; in annual monitoring reports absolutely no information is provided about LeConte's thrashers (SVB 2015-2019).

San Diego

San Diego's North and East County Multiple Species Habitat Conservation Program was restarted in March of 2021, which superseded their 2019 plan (County of San Diego 2021, p. 1). For only the East County portion of the plan, specifically *T. lecontei lecontei* is listed as covered (Ibid, p. Exhibit D page 2 of 5). However, the plan is no longer in effect as of January 31st, 2025 (Ibid, p. 16), and a current agreement on the extension of the plan is not yet known.

Apple Valley

The Town of Apple Valley Multi-Species Conservation Plan could theoretically provide some protection for both thrasher species. In 2021, a Notice of Preparation was issued with the Town of Apple Valley as the CEQA lead and the U.S. Fish and Wildlife Service as the NEPA lead for environmental review (Town of Apple Valley 2021, p. 1). While this effort could theoretically provide some protection for 227,000 acres of potential desert thrasher habitat (CDFW 2023a, p. 2, 7; CDFW 2023b, p. 1), no draft EIR/EIS has been released, and the HCP is not finalized (USFWS 2025). Without the HCP in place, no conservation protections yet exist for thrasher populations in this area. This is especially of concern, as the town says that Apple Valley is "slated as a major logistics and manufacturing hub and is primed for explosive growth" (Town of Apple Valley 2025, p. 1).

National Parks

There are two National Parks, Joshua Tree and Death Valley, within the California ranges of both desert thrashers. These National Parks account for a small proportion of both thrashers' range in California and largely miss core populations. See Figure 20.

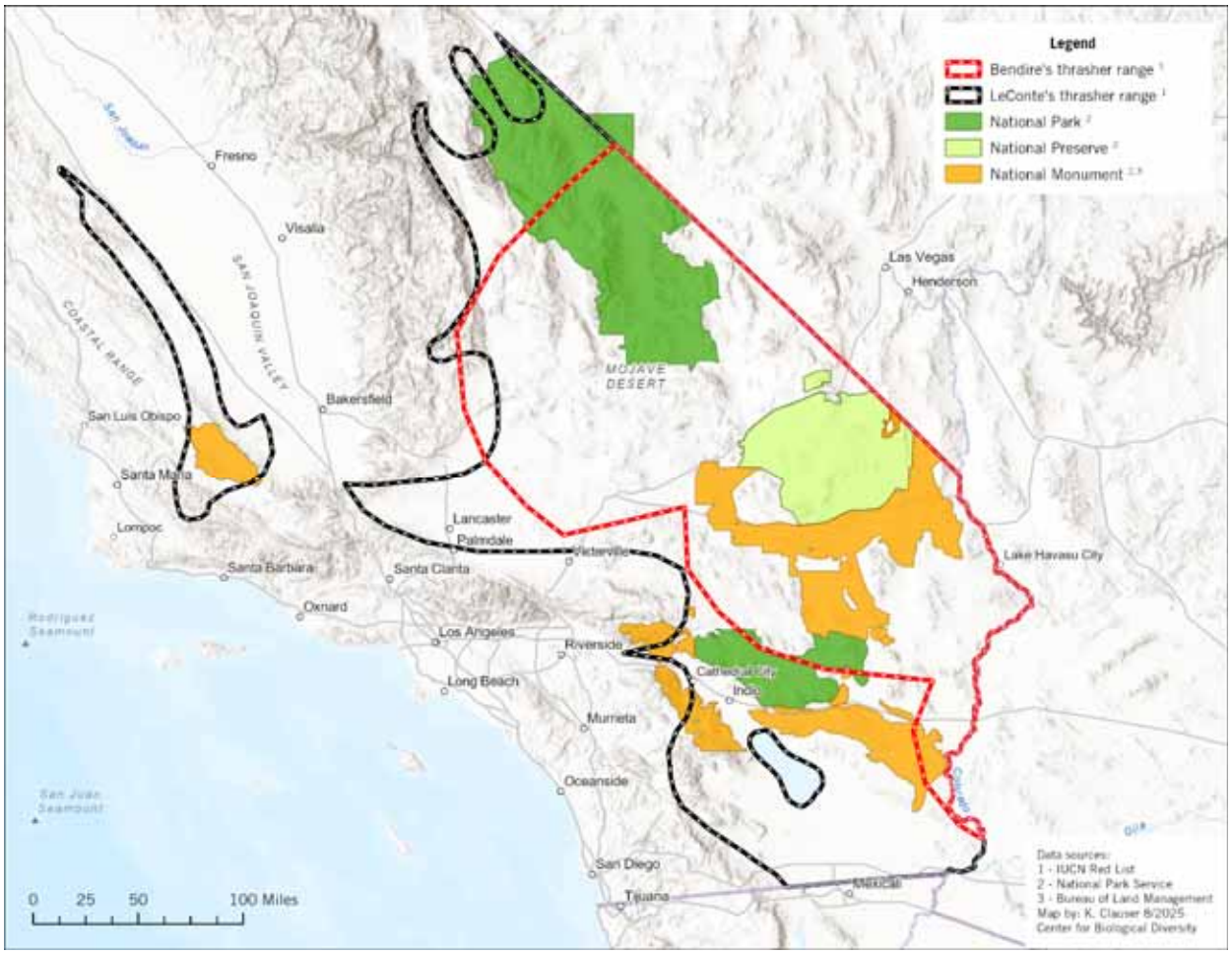

Figure 20. National Parks, National Preserves, and National Monuments within the California ranges of Bendire's and LeConte's thrashers. Data sources: IUCN Red List, NPS, USBLM.

National Parks conserve important natural and historic lands to leave them "unimpaired" now and in the future (NPS 2017, p. 1) and help to protect and restore at-risk species, including those listed under the ESA and Migratory Bird Treaty Act (MBTA) (NPS 2023, p. 1). Most National Parks are closed to hunting, mining, and "consumptive activities" (NPS 2015, p. 1), although some vehicle-use and pre-existing energy and mining developments are still allowed within some park boundaries (NPS 2017, p. 1; Joshua Tree National Park 2023, p. 1).

For example, within Joshua Tree National Park, CA in the range of both Bendire's thrasher and LeConte's thrasher, approximately 100 miles of backcountry roads are open to street-legal vehicles (Joshua Tree National Park 2023, p. 3-6). Death Valley National Park, which has populations of LeConte's thrashers (Borgman et al. 2024, p. 12), has been extensively mined since the 1880s, which included large-scale, high impact operations such as open-pit and strip mines (NPS 2023b, p. 2, 3). Despite Death Valley becoming a National Park in

1994, large-scale mining operations continued within park boundaries until 2005, leaving large, hard-to-restore scars upon the landscape (Ibid, p. 4).

In addition to National Parks, the NPS also manages National Preserves. National Preserves are similar to National Parks, however hunting and other harmful activities are still permitted within preserve boundaries (NPS 2015, p. 1). In California, Mojave National Preserve overlaps with dense populations of both Bendire's thrashers and LeConte's thrashers (NPS 2024, p. 2). See Figure 20. While off-highway vehicles are not allowed in Mojave National Preserve, street-legal vehicles are allowed, along with legacy mining practices (Mojave National Preserve 2025, p. 1). Approximately 350 active mining claims are currently estimated to be within the boundaries of the Mojave National Preserve (The Diggings 2025, p. 1), and according to a recent news article by National Parks Traveler, a company with rights to a mine within Mojave National Preserve has received approval from the USBLM to resume operations (Repanshek 2025, p. 3). It is also reported that $200,000 worth of damages to the preserve have been attributed to the mine (Ibid).

National Monuments

There are three National Monuments within the California range of both Bendire's and LeConte's thrashers, Castle Mountain NM, Mojave Trails NM, and Chuckwalla NM. There are three additional National Monuments within the California range of LeConte's thrasher (Carrizo Plain NM, Santa Rosa-San Jacinto Mountains NM, and Sand to Snow NM). See Figure 20. LeConte's thrasher is known to inhabit Carrizo Plain National Monument in California (Jongsomjit et al. 2014, p. 1). There have also been sightings of the species in the Chuckwalla Valley in California (Hargrove et al. 2019, p. 36), and it is likely LeConte's thrasher may have habitat in the newly created Chuckwalla National Monument in Riverside County, CA as well.

Monument boundaries and restrictions on land-use (e.g. grazing, OHV-use, mining, logging) can vary depending on the monument and the administration (Congressional Research Service 2024, p. 9-10). The Trump Administration is currently re-examining the size of National Monuments in order to "spur energy development on public lands" (Robbins 2025, p. 1). While specific monuments have not been named, newer monuments (such as California's Chuckwalla National Monument on the border of the Mojave and Sonoran Deserts) are assumed to be subjected to size reductions by the current administration in the near future (Hufham 2025, p. 1; Perez 2025, p. 2, 6). Furthermore, the strength of the regulations on mining and energy development provided by federal lands like National Monuments are currently in review per the Department of the Interior Order No. 3418,

which implements Executive Order 14154 “Unleashing American Energy” (USDOI 2025a, p. 1, 5, 6).

Since the establishment of the Antiquities Act in 1906, no President has abolished a National Monument (Congressional Research Service 2024, p. 3; 49 Op. O.L.C. 2025, p. 1). Moreover, historical and recent interpretation of the Act, largely based on a 1938 Attorney General opinion, was that National Monument designations were irrevocable (49 Op. O.L.C. 2025, p. 5; Perez 2025, p. 2), although the Act does not define or limit Presidential authority to create, modify, and abolish National Monuments on federal lands (Congressional Research Service 2024, p. 4). Recently, the Department of Justice has issued a new opinion on the Antiquities Act, explicitly stating that the Act permits the President to alter (including removing entirely) prior declarations of National Monuments, including by finding that the monuments “either never were or no longer are deserving of the Act’s protections” (49 Op. O.L.C. 2025, p. 50). A 2025 lawsuit filed by off-road vehicle and mining interests has challenged the designation of Chuckwalla National Monument.

Ultimately, the variability in regulations across monuments, along with current uncertainty in the future extent of these regulations and monument boundaries, cause National Monuments to be insufficient to rely on for long-term protection of desert thrasher habitat or populations.

USBLM Areas of Critical Environmental Concern

The U.S. Bureau of Land Management (USBLM) monitors and manages use within public lands that are determined to need special attention due to environmental degradation, termed Areas of Critical Environmental Concern (ACEC) (USBLM 2025b, p. 1, 3). However, land use regulations on ACEC are highly variable for each designation, and generally, the USBLM does not prohibit or heavily limit potentially destructive activities such grazing, OHV-use, and mining (BLM 2016, p. 12940; BLM 2025b, p. 2), which damage desert thrasher habitat.

USBLM Sensitive Species

Designation of USBLM sensitive species highlights listed species as those at risk of becoming ESA listed (USBLM 2025b, p. 1-2). USBLM policy requires the agency to collaborate with government agencies and other organizations to conserve designated sensitive species and ensure activities on USBLM lands do not contribute to the need for listing under the ESA (USBLM 2025b, p.4).

Bendire's thrasher is listed as USBLM "Bureau Sensitive" in California (BLM 2018, p. 1; BLM 2023a, p. 4; BLM 2025a, p. 3; CNDDB 2025, p. 77). As a "sensitive species" in California, Bendire's thrasher has been considered or mentioned in USBLM land use plans for projects, including the DRECP in California (DRECP 2015b, p. III.7-123). While such projects are required to implement mitigation measures for USBLM sensitive species if found in development sites, often mitigation efforts are highly generalized, and the available habitat of the sensitive species is still reduced during development (BLM 2019b, p. x; BLM 2023b, p. C-12 – C-14, I-31).

In California, the most recent USBLM Sensitive Species list (2019) lists *T. lecontei* as USBLM Sensitive, but the common name given is "San Joaquin LeConte's Thrasher" (USBLM 2019b, p. 2), i.e. subspecies *T. lecontei macmillanorum*. In contrast, other USBLM Sensitive animals on the 2019 list are specified at the subspecies level and the California Department of Fish and Wildlife's Special Animals List (2025) suggests the whole species is listed as USBLM sensitive (CNDDB 2025, p. 78). Therefore, it is likely the USBLM's specification for only the San Joaquin subspecies via common name is a misprint. This is relevant because the USBLM can disregard applying conservation or mitigation actions to "non-sensitive" species that may occur on USBLM-managed lands, such as state designated Species of Greatest Conservation Concern, if the USBLM director for a state does not assign them as USBLM Sensitive. If it is true that only the San Joaquin population of LeConte' thrasher is listed as USBLM Sensitive in California, this would have detrimental consequences for other numerous populations of LeConte's thrashers in the state.

While development projects on USBLM land are required to implement mitigation measures for USBLM sensitive species if found in development sites, often these mitigation measures are highly generalized and the available habitat for sensitive species can still be reduced during development (USBLM 2019a, p. x; USBLM 2023b, p. C-12 – C-14, I-31). Given the numerous active mining plans and solar development sites on USBLM lands in desert thrasher habitats in California, it is clear the designation has little regulatory power to protect desert thrashers and their habitat.

Forest Service Sensitive Species

Region-specific sensitive species lists are created for vulnerable and declining species on U.S. Forest Service lands, managed under the agency's Threatened, Endangered, and Sensitive Species (TES) program (USFS 2025b, p. 1). Similar to USBLM Sensitive Species, TES species in each USFS region are supposed to be provided management plans to work

towards the recovery and conservation of their populations and habitat (Ibid). The ranges in California for Bendire's thrasher and LeConte's thrasher extend into USFS Region 5, Pacific Southwest (USFS 2025c, p. 1-2). However, neither thrasher is listed as a sensitive species in the Southwestern region (USFS 2013a, p. 2-3; USFS 2013b, entire).

National Environmental Policy Act

The National Environmental Policy Act (NEPA) theoretically provided some protection for desert thrashers. For activities undertaken, authorized, or funded by federal agencies, NEPA requires that the potential impacts of projects on the human environment be analyzed prior to implementation (42 U.S.C 4371 et seq). If significant environmental effects are predicted to occur, federal agencies were previously required to propose mitigations that could offset those effects (40 CFR 1502; USFWS 2009, p. 16). However, a recent recission of 40 CFR 1500-1508 (and thus all CEQ NEPA implementing regulations) no longer requires agencies to propose such mitigations (CEQ 2025, p. 10611). Moreover, only projects with a federal nexus (i.e. federal funding, authorization, or permitting) fall under NEPA, and therefore actions taken by private landowners generally are not required to comply with this law (USFWS 2009, p. 16). In July 2025 the Trump administration revoked regulations governing environmental reviews under NEPA for numerous federal agencies, including the Department of Agriculture, Department of the Interior, Department of Energy, Department of Transportation and the Federal Energy Regulatory Commission (see CBD 2025b). The decision will prevent adequate environmental review and affect logging, mining, drilling and fracking for oil and gas, highway construction and many other projects on federal lands.

Migratory Bird Treaty Act

Desert thrashers theoretically receive some protection through the Migratory Bird Treaty Act (MBTA) 16 U.S.C. § 703 et seq. The MBTA prohibits direct actions to "pursue, hunt, take, capture, [or] kill" any migratory bird included in the terms of the treaties (16 U.S.C. § 703). The MBTA provides a legal basis for regulatory agencies such as CDFW and USFWS to make recommendations on CEQA related projects to conserve desert thrashers. However, regulatory agency recommendations on CEQA related projects are routinely ignored, as discussed below. The MBTA provides no authority for protection of habitat and food sources or requires designation of critical habitats (Ibid). As habitat loss is considered one of the greatest threats to desert thrashers, the MBTA is not sufficient in providing protection for the species. Petitioners are unaware of any enforcement of the MBTA for take of either Bendire's or LeConte's thrasher in California. Furthermore, the Trump administration

recently reinstated an interpretation of the MBTA statute that would eliminate any protection from indirect forms of take (USDOI 2025b, p. 1).

USFWS Birds of Conservation Concern List

The USFWS Birds of Conservation Concern (BCC) list, as mandated by the 1988 amendment to the Fish and Wildlife Conservation Act, compiles bird species likely to become candidates for listing under the ESA (USFWS 2021, p. 4). The BCC's main purpose is to stimulate and promote collaborative proactive conservation actions among federal, state, tribal, and private partners to ultimately avoid the need for additional ESA bird listings (Ibid). Both Bendire's thrasher and LeConte's thrasher have been listed as a Bird of Conservation Concern for each consecutive list update since 2002 (USFWS 2002, p. 73, 83, 98; USFWS 2008, p. 76, 86; USFWS 2021, p. 22, 29, 43). Despite repeated listings, both Bendire's thrasher and LeConte's thrasher populations have continued to decline, and federal and state actions towards desert thrashers since 2002 have largely been research-focused as opposed to active-conservation focused (Borgman et al. 2024, p. 1, 3, 59).

DOD Military Bases and Installations

For military installations, the Secretary of Defense pursuant to the Sikes Act (6 U.S.C. §§ 670a-670o) is required to "carry out a program for the conservation and rehabilitation of natural resources on lands used by the military," implemented by an Integrated Natural Resources Management Plan (INRMP) (USFWS 2015, p. 9, 11). However, INRMPs are not required on Department of Defense (DoD) lands where an "absence of significant natural resources" is determined (Ibid, p. 11). If an INRMP is deemed to be required, the plan must be developed in coordination with ESA listed species, the MBTA, and various national and/or regional migratory bird plans and lists such as USFWS Birds of Conservation Concern and the Partners in Flight Landbird Conservation Plan (Ibid, p. 13, 18, 19, 23-24). Actions taken by INRMPs must conserve and minimize stressors to migratory bird populations but are not required to have species-specific conservation actions for non-ESA-listed species (Ibid). Protection provided by bases with INRMPs only account for a relatively small portion of Bendire's and LeConte's thrasher ranges in California and thus do not have the potential to significantly curb ongoing population declines.

The DoD additionally has a Partners in Flight program (DoD PIF), consisting of natural resources personnel from nationwide military installations collaborating with partners across the American continent to conserve migratory and resident birds and associated habitats on DoD lands (DENIX 2022, p. 2, 3). The program also identifies "Mission

Sensitive" species, i.e. avian species occurring on DoD lands at risk of becoming listed under the ESA (DoD PIF 2021, p. 1). The current Mission Sensitive species list includes both Bendire's thrasher and LeConte's thrasher as 'Tier 2' species (Ibid, p. 2). Tier 2 Mission Sensitive species have been noted to be experiencing long-term declines but are not currently considered the highest priority by the DoD PIF. Therefore, desert thrashers on DoD lands are not provided 12-month status reviews, nor automatically afforded monitoring and management actions (Ibid).

The widespread and ongoing closure or realignment of military bases (USEPA 2025) and their subsequent conversion to commercial and residential development is a major threat that could reduce or extirpate desert thrasher populations in California (e.g., Burton and Williams 2001).

Conservation Stewardship Program

The Conservation Stewardship Program (CSP) is a voluntary program through the U.S. Department of Agriculture to help farmers and ranchers develop conservation plans that promote clean water and air, healthier soil, and better wildlife habitat, all while improving agricultural operations (NRCS 2025, p. 1, 2). While the program is available in California throughout both the Bendire's thrasher and LeConte's thrasher ranges, and landowners who participate in CSP may improve wildlife habitat conditions generally, this program does not guarantee that habitat will be suitable for desert thrasher use or aid survival of existing populations.

6.2 State Regulatory Mechanisms

Species of Special Concern

CA species of concern: Bendire's thrasher is designated as a "California Bird Species of Special Concern (SSC) (CDFG 2008a). LeConte's thrasher was formerly designated as a SSC statewide (Remsen 1978; CDFG 1992), but now only the San Joaquin population is designated (CDFG 2008b). The SSC designation is intended to result in special consideration by CDFW, land managers, and others, to focus research and management attention on the species. SSC are supposed to get this special consideration during preparation of CEQA documents, and in CDFW comments on CEQA documents with proposed conservation and mitigation measures. But as discussed in the section on CEQA below, the CEQA process has proven completely inadequate to protect desert thrashers or reverse their declines in California. The practical benefit of the SSC designation for the

desert thrashers has been minimal. Such status may call attention to the species and prompt more information to be collected about the loss of its habitat in Environmental Impact Reports and other documents, but it has not halted the habitat loss or other factors causing the declines of both desert thrasher species. SSC species do not benefit from the prohibitions against "take" that a federally or state listed species would get. The inadequacy of the SSC designation to protect desert thrashers is demonstrated by their current imperiled status in California.

State Wildlife Action Plan

The draft of California's State Wildlife Action Plans (SWAP) denotes both Bendire's thrasher and LeConte's thrasher as Species of Special Concern and also calls out Bendire's thrasher as "Climate Vulnerable" (CDFW 2025b, p. C-11). However, the SWAP is not a regulatory mechanism but qualifies species for State Wildlife Grants provided by USFWS, to address conservation needs such as research, surveys, and management for Species of Greatest Conservation Need (SCGN), the equivalent of Species of Special Concern. The statuses and designations in the SWAP provide no legal protection for desert thrashers. Generally, their purpose is to give attention to the species which require special management consideration, stimulate research, and ideally achieve conservation management plans and recovery of species to prevent listing of threatened/endangered on a state or federal level (USFWS 2020, p. 1, 4-5).

Natural Communities Conservation Planning

The state Natural Communities Conservation Planning Act (California Fish and Game Code §2800) was enacted in 1991, to provide for comprehensive, regional multi-species planning. The entirely voluntary NCCP program is intended to preserve blocks of contiguous habitat large enough to sustain viable populations of listed species and to prevent the need for additional listings, while still allowing for "compatible and appropriate" economic growth and development. As of 2025, there are 4 approved state NCCPs covering LeConte's thrasher: Coachella Valley MSHCP, Kern Water Bank HCP/NCCP, County of San Diego East County MSCP, and Town of Apple Valley MSHCP (CDFW 2025b). All of these NCCPs are joint HCP/NCCP plans and the conservation measures, effectiveness, and status of LeConte's thrasher covered by these plans are discussed above regarding federal HCPs.

California Environmental Quality Act

Non-federal development projects in the California range of Bendire's and LeConte's thrashers are regulated by the California Environmental Quality Act (CEQA; Public Resources Code 21000–21189), which declares legislative intent of the state to "develop and maintain a high-quality environment now and in the future" as well as "prevent the elimination of fish and wildlife species due to man's activities [and] insure that…populations do not drop below self-perpetuating levels" (CEQA Statute 2025 §§ 21001, p. 1). Through the act, public agencies in California are legally required to disclose and evaluate all environmental impacts of proposed projects and adapt alternative plans or mitigation measures that would "substantially lessen significant [adverse] environmental effects" where feasible (Ibid §§ 21002.1 & 21065-21068, p. 2, 7).

However, for Species of Special Concern like Bendire's and LeConte's thrashers, CEQA does not provide any specific legal protection aside from the requirement that projects triggering CEQA review must analyze the impacts of the proposed action on such species if it is determined to meet the criteria of sensitivity under Section 15380 as provided below (Ibid §§ 15065, 15380, p. 212, 340):

> "A species of animal or plant is:
> (1) "Endangered" when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors; or
> (2) "Rare" when either:
> (A) Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or
> (B) The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the Federal Endangered Species Act."

Theoretically, besides ensuring environmental protection through procedural and informational means, CEQA also has substantive mandates for environmental protection. The most important of these is the provision requiring public agencies to deny approval of a project with significant impacts when feasible alternatives or feasible mitigation measures can substantially lessen such effects. In practice, this mandate is rarely implemented by

lead agencies. Project proponents and approving agencies frequently dismiss alternatives that would protect wildlife as “infeasible.”

Once significant impacts are identified, the lead agency has the option to require mitigation for effects through changes in the project, claim a categorical exemption, or to decide that overriding considerations make mitigation infeasible. In the latter case, projects may be approved that cause significant environmental damage, such as destruction of sensitive species. Though state and federal wildlife agencies can weigh in, protection of non-listed species through CEQA is at the discretion of the lead agency involved. CEQA provides that when overriding social and economic considerations can be demonstrated, project proposals may go forward, even in cases where the continued existence of the species may be threatened, or where adverse impacts are not mitigated to the point of insignificance.

Even when a lead agency acknowledges that an effect is “significant,” CEQA allows a lead agency to adopt a “statement of overriding considerations” and approve a project if the agency finds that other factors outweigh the environmental costs of the project or that further mitigation is infeasible. (Cal. Code Regs., tit. 14, § 15093(b); Cal. Pub. Res. Code § 21081.) This means that even if a project may have a significant effect on a wildlife population, an agency could interpret CEQA as still allowing approval of the project.

While desert thrashers are likely to meet the sensitivity criteria under Section 15380, this would still have to be determined on a project-by-project basis. Currently, as we are not aware of any project that has found its impacts on either desert thrasher to be significant, CEQA has not resulted in many protections for the species within impacted habitat. Moreover, even if significant impacts to desert thrashers were found, under CEQA lead agencies are allowed to continue projects with adverse environmental impacts if all “feasible” mitigation measures have been adopted and it has been determined that social or economic factors outweigh environmental costs (Ibid §§ 15091, p. 229).

There are continuing legislative attempts to undermine CEQA and make it easier for developers to avoid or narrow environmental review for a host of projects. For example, S.B. 607, authored by Sen. Scott Wiener (D-San Francisco), would allow more projects to bypass or limit environmental review even if there is evidence that the project would have serious consequences. In June 2025, the state legislature passed and Governor Newsom signed sweeping rollbacks to CEQA that will exempt certain projects from environmental review and restrict legal challenges.

Finally, CEQA was never intended to be, nor does it function as a habitat protection mechanism. CEQA cannot be relied upon to consistently protect desert thrasher populations in California.

Desert Renewable Energy Conservation Plan

California's Desert Renewable Energy Conservation Plan (DRECP) was created in 2016 to designate appropriate areas for renewable energy projects on more than 22 million acres in the Mojave and Sonoran deserts of California. The DRECP identified areas for utility-scale solar energy (USSE) development with the least ecological impact and requires "covered species" and their habitats to be conserved elsewhere in the California deserts if disturbed (CBD 2025b, p. 1). The DRECP designates both Bendire's and LeConte's thrashers as covered "special-status" species (DRECP 2015, p. III.7-200; CBD 2025a, p. 2; DRECP 2025, p. 1, 2).

The DRECP's environmental protections were to be established in three ways: a federal "general conservation plan" under the federal ESA, a USBLM "land-use plan amendment" under the Federal Land Policy and Management Act, and providence-specific "natural communities conservation plans" (NCCPs) under the California Natural Communities Conservation Plan Act (CBD 2025b, p. 2). Through these federal and state conservation plans, approximately 10 million acres within the covered 22.5 million were to be protected from USSE development for the 25-year timespan of the DRCEP, which includes federally protected lands such as National Parks, National Wilderness Areas, and Areas of Critical Environmental Concern (DRECP 2016, p. 1-2; CBD 2025b, p. 2, 3).

As a covered species, Bendire's thrasher is provided with some conservation and management actions through the DRECP (DRECP 2015b, p. III.7-123). In 2013, the Conservation Biology Institute, in partnership with DRECP, determined about 2 million acres of high intact Bendire's thrasher habitat to be within the planning area. However, the final USBLM-only DRECP plan determined that less than half (only 785,000 acres) of that high quality thrasher habitat would be provided protection within the associated USBLM land-use plan amendment (DRECP 2015b, p. III.7-267). Under the DRECP, even if Bendire's thrashers are present at a proposed USSE site, development does not have to be halted and thus the plan does not completely avoid impacts of USSEs on affected thrasher populations (CBD 2025b, p. 2). Overall, the scope of DRECP protections fails to adequately protect Bendire's thrasher because it allows for habitat destruction, reducing the amount of habitat and birds within the DRECP boundaries.

The DRECP does not classify LeConte's thrasher as a "Focus and Planning species" - a species which USBLM and other federal and state energies are required to conserve and manage if covered by the DRECP (DRECP 2015, p. III.7-121 - III.7-123). Without classification as a focused species, LeConte's thrasher habitat is not required to be conserved elsewhere in the California deserts if habitat is destroyed during development (CBD 2025a, p. 2).

6.3 Non-Regulatory Planning

Desert Thrasher Working Group

Established in 2011, in partnership with multiple states in the U.S., Mexican federal and state agencies, and non-governmental organizations, the Desert Thrasher Working Group (DTWG) has conducted extensive surveys and research throughout the Bendire's and LeConte's thrasher ranges (Borderlands Avian Data Center 2025, p. 1-2). The working group has published a comprehensive conservation strategy and survey protocol for LeConte's and Bendire's thrashers (Borgman et al. 2024, entire), which have not been adopted by any regulatory agency. The DTWG published targeted conservation guidance for utility scale solar energy (USSE) developments (DTWG 2024, entire). The recently released State of the Birds Report states that the working groups' USSE report is "already being used by agencies to prevent further thrasher declines and reduce the need for regulatory measures and legal protections" (NABCI 2025, p. 7). However, no further information is provided, and ultimately, the DTWG guidance is voluntary.

Recommendations for Future Management

This petition has documented significant population declines for both LeConte's and Bendire's thrashers in California, as well as the failure of current management efforts to reverse this trend. The factors and threats causing desert thrasher declines can only be addressed by providing elevated legal protection to the species. State endangered or threatened status is essential for future management policy to fully address habitat loss and other factors reducing desert thrasher survivorship. Ultimately, the protection of desert thrashers in California hinges on strong habitat protection regulations. Actions and strategies are needed to arrest thrasher population declines, increase populations, address threats, and fill gaps in the knowledge of these enigmatic species.

The Center for Biological Diversity recommends as priority management actions:

1. **Protect Bendire's Thrasher and LeConte's Thrasher under CESA.** Listing under the California Endangered Species Act will allow CDFW to apply effective and meaningful protection measures for thrashers and their essential habitat during CEQA processes. Listing will also likely result in wider scale coverage of desert thrashers under regional conservation plans such as HCPs and NCCPs.
2. **Solar Project Guidelines.** Ensure all solar projects adhere to the Desert Thrasher Working Group Solar Recommendations (DTWG 2024), including preliminary site evaluation, avoidance and minimization measures, adequate field surveys, project design to avoid thrasher habitat and minimize impacts, and post-construction monitoring**.**

The Desert Thrasher Working Group (Borgman et al. 2024, pp. 51-59) recommends some additional conservation actions and strategies for desert thrashers:

1. **Compile Essential Thrasher Habitat Requirements.** Develop a better understanding of the components that define breeding and nonbreeding season habitat to predict where desert thrashers are likely to occur on the landscape. This will provide land managers with the tools they need to manage habitat, and to incorporate thrashers into planning for infrastructure and energy projects.
2. **Enhance Monitoring Efforts.** Desert thrashers are challenging to monitor due to low detectability, early and variable phenology, and limited baseline data regarding their distribution. The DTWG has developed monitoring protocols for several different goals, including area search survey protocol, discovery survey protocol, and clearance survey protocol. These protocols can be improved and refined as new

information becomes available. A range-wide monitoring plan should be established.

3. **Identify and Prioritize Research to Address Key Data Gaps.** Both desert thrasher species are relatively under-studied, resulting in significant knowledge gaps for key aspects of their life cycle and habitat relationships. The DTWG has identified priority research and monitoring needs, including: identifying habitat components at territory and nest scale; refining sampling protocols to account for low density occurrence and low detectability; increasing knowledge about breeding season distribution and non-breeding season movements; characterizing impacts of various disturbances (solar development, transmission lines, other infrastructure, livestock grazing, off-road vehicle use, invasive plant species) on thrashers; identifying areas of climate resiliency, where vegetation and habitat required by thrashers are likely to persist through predicted climatic changes; and developing "Best Management Practices" for thrasher habitat.
4. **Increase Funding for Research and Monitoring.** Conservation accomplishments follow funding. These poorly understood desert thrasher species still require more research and monitoring to complete understanding of population distributions, habitat needs, and other knowledge gaps, which were identified by the DTWG as a "high" threat.
5. **Identify Areas of Climate Resiliency.** Climate change impacts were rated as "very-high" threats to both Bendire's and LeConte's thrashers. Range shifts may be expected to occur over time for both species, as indicated by numerous climate models; both species may be expected to occur in areas further north than their ranges currently extend. Some extralimital records for both species indicate this may be starting to occur already. However, most climate models predict range shifts based on climatic conditions (temperature and precipitation), leaving uncertainty to how and if vegetation shifts will follow. Identifying areas of resiliency where vegetation species, structure, and food resources required by thrashers are likely to persist through predicted climatic changes can prioritize locations for desert thrasher conservation efforts.
6. **Develop Beneficial Management Practices for Thrasher Habitat.** Draft Beneficial Management Practices (BMPs) using increased understanding of thrasher biology and ecology, so that land managers, industry partners, and other stakeholders can incorporate BMPs when planning and working within occupied or suitable thrasher habitat to minimize negative impacts and provide benefits to thrashers and their habitats.

7. **Habitat Restoration Projects.** Identify, design, and implement successful habitat improvement or restoration projects. Abandoned farmland presents opportunities to reclaim previously converted native desert habitat.
8. **Encourage Stakeholders to Consider Thrashers in Planning and Increase Awareness.** Awareness is an important step for conservation and recovery; as habitat associations and requirements are better understood and BMPs are developed, the DTWG will be able to provide better information to partners to minimize negative impacts and promote beneficial practices.
9. **Strengthen Regulation and Enforcement for Off-Road Vehicles.** With increased prevalence of off-highway vehicle use by the public and Customs and Border Patrol, unregulated or poorly enforced vehicle use negatively impacts thrashers and their habitat. Strengthening regulations and enforcement will decrease thrasher habitat fragmentation and disturbance.

Individuals with Desert Thrasher Expertise Supporting Petitioned Action

Jay M. Sheppard, Western Field Ornithologists member and retired U.S. Fish and Wildlife Service biologist

K. Shawn Smallwood, Ph.D., Ecologist

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