5-YEAR REVIEW
Bakersfield cactus (*Opuntia treleasei* = *Opuntia basilaris* var. *treleasei*)

GENERAL INFORMATION

Species: Bakersfield cactus (*Opuntia treleasei* = *Opuntia basilaris* var. *treleasei*)
Date listed: July 19, 1990
Federal Register (FR) citation(s): 55 FR 29361 (Service 1990)
Classification: Endangered

State Listing:
The Bakersfield cactus was listed by the State of California as endangered in 1990.

BACKGROUND

Species overview:
Bakersfield cactus is a low-growing perennial succulent with green, fleshy, flattened stems, or pads, in the cactus family (Cactaceae). A single plant may consist of hundreds of pads that originate both at ground level and from the tips of other pads, resulting in sprawling and dense colonies. The pads are typically 7 to 10 centimeters wide by 12 to 18 centimeters long (3 to 4 inches (in) wide by 5 to 7 in long) and vary in shape from rounded, heart-shaped, or diamond-shaped to nearly cylindrical. The showy magenta flowers appear March through April and may produce fruits the size and shape of small eggs that contain grayish-white seeds. Bakersfield cactus is restricted to Kern County, California, and typically occurs in sandy to sandy-loam soils with some gravel, cobbles, or boulders on flood plains, ridges, bluffs, and rolling hills. Habitat loss and modification due to conversion to agriculture, urban development, and oil, gas, and mining operations, and invasive plants pose the most significant threats to the species.

Bakersfield cactus is generally considered a variety of *Opuntia basilaris* (Service 1993, p. 49). However, there was no consensus among experts on taxonomy at the time of listing, so it was listed as a species (Service 1998, p. 29363). The Recovery Plan for Upland Species of the San Joaquin Valley (recovery plan) provides more details on taxonomic treatment over time (see Service 1998, p. 49). Bakersfield cactus is usually distinguished from other varieties of *O. basilaris* by the presence of both spines and barbed bristles in the eyespots of pads and fruits. Other differentiating features of Bakersfield cactus include the smooth pad surfaces (outside of eyespots), non-sunken eyespots, spines smaller than 7 millimeters (0.3 in), and longer leaves up to 5 millimeters (0.2 in) that occur only on young pads. However, morphology is highly variable and may not reliably distinguish Bakersfield cactus from other *O. basilaris* varieties (E. Cypher, Endangered Species Recovery Program (retired), *in litt*. 2025).

Most recent status review:
[Service] U.S. Fish and Wildlife Service. 2020. 5-Year Review: Bakersfield cactus (*Opuntia treleasei* = *Opuntia basilaris* ssp. *treleasei*). U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California. 5 pp.

We did not recommend a status change in the 2020 status review.

FR notice citation announcing this status review:
[Service] U.S. Fish and Wildlife Service. 2024. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 59 Pacific Southwest Species. Federal Register 89:83510–83514.

We received information from the Center for Natural Lands Management regarding Bakersfield cactus monitoring and threats at Sand Ridge Preserve and Caliente Preserve in response to the notice (D. L. Rogers, G. Warrick, and M. Labbé, Center for Natural Lands Management, *in litt*. 2025).

ASSESSMENT

Information acquired since the last status review:
This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Sacramento Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on October 16, 2024. We also contacted species experts and land managers, performed a literature search, reviewed permit reports submitted to the California Department of Fish and Wildlife (Department), reviewed information from our own files, and obtained data from an occurrence search of the California Natural Diversity Database (Diversity Database) maintained by the Department.

Additional information since the last status review about distribution is addressed in **Distribution and abundance**, and new information since the last status review about the threats of invasive plants, herbivory, and pesticides is addressed in **Threats**. **Conservation** summarizes several ongoing, successful efforts to augment native and introduced Bakersfield cactus populations through pad collection and translocation.

Distribution and abundance:
Historically, Bakersfield cactus was distributed in the low foothills northeast of Oildale and along the southeastern portion of the San Joaquin Valley floor to the low foothills of the Tehachapi Mountains south of Arvin in Kern County (Service 1990, p. 29363). In the late 1980s, its range was extended to the south when Bakersfield cactus was identified in several locations northwest of the community of Wheeler Ridge (Service 1998, p. 50). At the time of listing in 1990, Bakersfield cactus was documented in five general populations in Kern County: oilfields northeast of Oildale, Kern River Bluffs northeast of Bakersfield, bluffs and rolling hills west and north of Caliente Creek east of Bakersfield, Comanche Point on the Tejon Ranch southeast of Arvin, and northwest of Wheeler Ridge (Service 1990, p. 29364).

The 2011 status review defined distribution according to the Diversity Database, in which Bakersfield cactus was known from 38 occurrences. Of these, 29 occurrences were presumed extant, one was potentially extirpated, and eight were extirpated (Service 2011, p. 15). By the 2020 status review, 24 new occurrences had been added to the Diversity Database for a total of 62 occurrences (Diversity Database 2020, entire; Service 2020, p. 1). These occurrences are due to increased surveys and translocation efforts and do not change the overall distribution of Bakersfield cactus (Service 2020, p. 1). Seven other occurrence updates occurred between the 2011 and 2020 status reviews (Diversity Database 2010, entire; Diversity Database 2020, entire; see **Appendix** Table A). Two extirpated or possibly extirpated occurrences were updated to be

presumed extant. One extirpated occurrence was updated to be possibly extirpated, and four presumed extant occurrences were updated to be extirpated or possibly extirpated.

Overall, the current distribution of Bakersfield cactus is similar to as described in the 2020 status review, and no status changes have occurred in the Diversity Database. There are 62 total occurrences composed of nine extirpated, two possibly extirpated, and 51 presumed extant occurrences (Diversity Database 2025b, entire). Of the presumed extant occurrences, six are transplants outside of the species' native habitat or range (Diversity Database 2025b, pp. 63–68; see **Conservation**).

Data repositories such as iNaturalist, which relies on contributions from naturalists of varying levels of expertise, and Consortium of California Herbaria, which aggregates data from all California herbaria, contain records of Bakersfield cactus outside of the commonly accepted range described above (iNaturalist 2025, entire; Jepson Herbarium 2025, entire). According to these records, Bakersfield cactus was observed farther east into the Tehachapi Mountains and south into Los Padres National Forest as well as beyond Kern County. Similarly, observation forms submitted to the Diversity Database but not yet processed by the Department indicate a possible expansion of Bakersfield cactus range to higher elevations in the Tehachapi Mountains. It is uncertain whether these observations are valid as the observer may have misidentified the plant due to highly variable variety morphology or due to limited experience (Cypher *in litt*. 2025). Currently, we consider the range of Bakersfield cactus to be the same as historically described until further genetic and morphological studies confirm a range expansion (see **Recommendations for Future Actions**).

Abundance and population trends vary across the range of Bakersfield cactus. As Bakersfield cactus grows in sprawling, dense colonies, it is difficult to distinguish a single plant, which may consist of hundreds of pads (Service 1998, p. 49). Therefore, cactus populations are usually described by the number of clumps, or groups of pads that are rooted at the same point (Service 1998, p. 49). However, this guidance can be interpreted differently depending on the observer, and overlapping pads may obscure the ground in dense colonies (see **Recommendations for Future Actions**). Colonies can range from one clump to thousands (Diversity Database 2025b, entire). The most recently available abundance count for each Diversity Database occurrence is provided in **Appendix** Table A. It is difficult to determine population dynamics and trends due to several variables: irregular monitoring and opportunistic sightings rather than regular, systematic surveys; inconsistent survey methodology and definition of units such as "plant", "clump", or "colony"; limited visibility due to the variety's growing habit; limited access to the entirety or portion of an occurrence; and dense surrounding vegetation, such as nonnative bromes, that obscure the cacti (Cypher et al. 2011, pp. 12–13).

Threats:

At the time of listing, the primary threats to Bakersfield cactus were identified as land conversion for agriculture, oil and gas development, sand mining, and urbanization (Service 1990, p. 29364). Additional threats that contributed to the listing of the Bakersfield cactus as endangered include wildfire, off-road vehicle use, proposed flood control basins, telecommunication and electrical line construction, livestock grazing, a hydroelectric project, road widening, illegal dumping, nonnative grasses, and inadequacy of existing regulatory mechanisms (Service 1990, pp. 29364–29368). New threats identified in the recovery plan include loss of genetic diversity,

flooding, and air pollution (Service 1998, pp. 52–53). The 2011 status review provides an in-depth assessment of these threats and discussion of new threats of pollinator loss, elevated nitrogen deposition, climatic change, and dust (Service 2011, pp. 17–29, 25). The 2020 status review confirmed that the primary ongoing threats to Bakersfield cactus are habitat loss and fragmentation due to agricultural and urban development, oil, gas, and other mining exploration, invasion of nonnative grasses, off-road vehicle use, climate change, and extreme weather events (Service 2020, p. 2). These threats continue to impact the species, and new information is compiled below.

Invasive plants and herbivory

As discussed in the 2011 status review, invasive annual grasses are widespread in Kern County and are a threat to Bakersfield cactus (Service 2011, p. 25). Grasses compete with Bakersfield cactus for space and resources, especially soil moisture (Cypher and Fiehler 2006, p. 9). Invasive grasses also hinder the establishment of new cacti, contribute to increased fire frequency and intensity, harbor insects that may damage cacti through herbivory, and create a moist microclimate that may result in rotting of cactus pads (Service 2011, p. 25). Invasive grasses that impact Bakersfield cactus populations include wild oats (*Avena* spp.), bromes (*Bromus* spp.) and Saharan mustard (*Brassica tournefortii*) (Cypher et al. 2011, p. 15; Rogers, Warrick, and Labbé *in litt*. 2025, p. 4).

During the summer months of 2020 and 2021, The Wildlands Conservancy staff noticed herbivory of Bakersfield cactus colonies at Wind Wolves Preserve (Wind Wolves) during outbreaks of grasshoppers (*Melanoplus devastator* and *Dissosteira spurcata*) and katydids (Tettigoniidae family) (Wind Wolves 2025, p. 16). These colonies correspond to Diversity Database occurrences #44 and 75–80 (Diversity Database 2025a; Diversity Database 2025b, pp. 41, 63–80). Insect damage varied in intensity, with some cactus clumps dying soon after the outbreaks, while others declined in health over two to three years and eventually died (Wind Wolves 2025, p. 16). Staff observed that insect invasions were more intense in areas with more residual dried annual grasses, which supports the idea that invasive grasses can harbor insects that may damage cacti (Wind Wolves 2025, p. 17). Additionally, there appeared to be fewer insects and less severe damage to Bakersfield cactus in areas where livestock grazing had reduced grass density (Wind Wolves 2025, p. 17). Livestock grazing also reduces the biomass of grasses that compete with cactus colonies and reduces wildfire fuels (Cypher et al. 2011, p. 15). Therefore, appropriate levels of grazing seem to benefit Bakersfield cactus. However, intense grazing may result in trampling and other mechanical damage to Bakersfield cactus, so grazing should be properly implemented and monitored, and newly established cactus clumps can be protected with rocks, chicken wire, or rebar (Cypher et al. 2011, p. 16; Wind Wolves 2025, p. 11).

Pesticides

As discussed in our previous review, Bakersfield cactus may require pollinators to produce seeds (Service 2011, p. 14). The taxon's reproductive biology has not been thoroughly studied, and the primary reproductive mechanism appears to be vegetative, but several other *Opuntia* species require cross-pollination, including by bees, to set seeds (Cypher et al. 2015, p. 5; Grant and Grant 1979, pp. 322–324; Osborn, Kevan, and Lane 1986, pp. 90–92). Potential pollinators of Bakersfield cactus are *Diadasia rinconis*, a native miner bee that has been observed visiting Bakersfield cactus flowers, and potentially *Diadasia australis* ssp. *californica* (a miner bee) and

Anthophora fulvicauda (a digger bee), which occur in California and have been observed visiting *O. basilaris* var. *basilaris* (Grant and Grant 1979, p. 323). Pesticides affecting these pollinators can thus constitute a threat to Bakersfield cactus. The Environmental Protection Agency (Agency) released final biological evaluations assessing the effects of labeled uses of three neonicotinoid pesticides on listed species (Agency 2022a, entire; Agency 2022b, entire; Agency 2022c, entire). The Agency anticipates releasing amended proposed interim decisions, and a national consultation with the Agency is pending. We cannot speculate as to the outcome of the consultation and final rulemaking, but it could have bearing on Bakersfield cactus's conservation status if the cactus requires cross-pollination by bees.

Conservation:
Conservation activities for Bakersfield cactus include translocations and land protection, several of which are continuations of projects mentioned in the previous status review (see Service 2020, p. 4). Translocation projects were conducted at Wind Wolves, Frank and Joan Randall Tehachapi Preserve (Randall Preserve), and Panorama Vista Preserve and are described in detail below and summarized in Table 1. Additionally, occupied Bakersfield cactus habitat was secured and protected at Caliente Preserve.

Translocation: Wind Wolves Preserve
One of the largest populations of Bakersfield cactus, the Pleito Hills population (part of Diversity Database occurrence #44), occurs on Wind Wolves, which is managed by The Wildlands Conservancy (Wind Wolves 2025, p. 3). The Knob Fire in September 2011 caused damage to the entire Pleito Hills population, with an estimated 11% of cacti killed and 53% severely damaged (Wind Wolves 2025, p. 3). As discussed in the last status review, the initial damage and secondary impacts of rot on the cacti prompted Wind Wolves staff to augment the Pleito Hills population and to establish four new colonies on the preserve in 2012 (Wind Wolves 2025, pp. 3–5). These four introduction sites (and their respective Diversity Database occurrence numbers) are San Emigdio Creek (#76, 77, 79), Los Lobos Creek (#78), Muddy Creek (#80), and Salt Creek (#75) (Wind Wolves 2025, p. 5; Diversity Database 2025b, pp. 63–80).

Translocations occur by collecting a sustainable percentage of pads from the Pleito Hills population, placing the pads in containers while the cut site calluses over, then planting in the field where the pads can sprout new roots (Wind Wolves 2025, pp. 8–9). Improvements to the translocation method include planting pads in clusters of seven to mimic natural clumps and protecting clusters with large rocks (Wind Wolves 2025, p. 10). The Pleito Hills population has been augmented every year between 2012 and 2024, while the four introduction sites have been augmented every year except for one year (Wind Wolves 2025, p. 10). In total, 13,913 pads have been planted over 12 planting seasons among the five sites (Wind Wolves 2025, p. 10). Preserve staff also conduct routine monitoring of sites by randomly sampling a subset of clumps and recording total area of cluster, number of pads, and overall health (Wind Wolves 2025, p. 12). Overall, the translocations have been highly successful in increasing population size, with lowest to highest average mortality rates of 2% at Pleito Hills, 17% at Salt Creek, 18% at San Emigdio, 18% at Los Lobos, and 40% at Muddy Creek (Wind Wolves 2025, p. 16). Wind Wolves staff plan to continue active management and monitoring into the future (Wind Wolves 2025, p. 17).

Translocation: Frank and Joan Randall Tehachapi Preserve

In 2017, The Nature Conservancy (Conservancy) and California Native Plant Society (Plant Society) began a translocation project on the Tollhouse Ranch unit (Diversity Database occurrence #24) of the Randall Preserve, which is owned and managed by the Conservancy (Conservancy 2020, p. 1). In January, 125 pads were collected, propagated in pots for a year, then planted five miles southeast of the donor site at Tollhouse Ranch (Conservancy 2020, p. 1). The pads, marked with an identifying aluminum tag, were planted in a fenced pasture constructed to allow managed livestock grazing (Conservancy 2020, p. 2). Data collection and maintenance of the translocated cacti, including weeding and watering, occurred throughout 2018 and 2019 (Conservancy 2020, pp. 2–3). Although the pasture was not intentionally opened to grazing, cattle were able to make their way into the pasture; the cattle seemed to be attracted to the aluminum tags and pulled the tags up (Conservancy 2020, pp. 2–3). Approximately 10 cacti were trampled by cattle as a result (Conservancy 2020, p. 3). Despite challenges, by October 2019, most surviving cacti were classified as intermediate or good health, with more than half producing new pads and almost half having between six and 10 pads (Conservancy 2020, pp. 4–5).

In January 2022, the Conservancy and Plant Society began a second round of Bakersfield cactus translocations on Randall Preserve. Pads were collected from the Beard Ranch (Diversity Database occurrence #24) and Tollhouse Ranch units (Conservancy and Plant Society 2023, p. 1). The following month, all 93 pads were planted on Beard Ranch at two receiver sites, Caliente Creek and Tehachapi Creek (Conservancy and Plant Society 2023, p. 2). At both sites, the pads were planted in pastures constructed to allow managed livestock grazing; however, cattle grazing was not permitted within the pastures for a minimum of two years to allow the translocated pads to establish (Conservancy and Plant Society 2023, p. 2). Surveys were conducted in February and December 2022, finding that all translocated pads had survived and overall colony health marginally increased (Conservancy and Plant Society 2023, p. 4). Some pads grew flowers and up to seven new pads (Conservancy and Plant Society 2023, pp. 4–5).

Translocation: Panorama Vista Preserve

In February 2022, River Partners began augmenting the Bakersfield cactus population at Panorama Vista Preserve (Diversity Database occurrence #66), where they had been restoring habitat since 2009 (River Partners 2022, pp. 5, 10). Panorama Vista Preserve is owned and managed by Kern River Corridor Endowment and Holding Company, Incorporated. River Partners collected 70 pads from two sites at Panorama Bluffs and near the onsite nursery (River Partners 2022, p. 10). The pads were propagated in pots until December, then planted back at Panorama Bluffs in groups of seven to nine pads in an X-shaped formation (River Partners 2022, p. 12). The pads were monitored monthly, and the sites were maintained through weeding and mowing (River Partners 2024, p. 10). After two years, 60 of the 70 translocated pads had successfully established (River Partners 2024, p. 17). Of the 10 mortalities, seven occurred in 2023 and three occurred in 2024, indicating decreased mortality after the pads developed a strong root system and acclimatized in the first year (River Partners 2024, p. 17). The growth season of February to April 2024 was highly productive, resulting in an increase in average number of pads per cactus from 16 pads in January 2024 to 24 pads in December 2024 (River Partners 2024, p. 19). The cacti also began to flower in April 2024 (River Partners 2024, p. 17).

Table 1. Completed and ongoing Bakersfield cactus translocation and population augmentation projects summarized from Wind Wolves (2025, entire), Conservancy (2020, entire), Conservancy and Plant Society (2023, entire), River Partners (2022, entire), and River Partners (2024, entire). Donor site indicates the site from which pads were collected, and receiver site indicates the site to which propagated pads were planted.

Years	Preserve	Donor Site(s)	Receiver Site(s) (corresponding Diversity Database occurrences)	Total Pads Planted
2012–2024	Wind Wolves	Pleito Hills	Pleito Hills (#44)	3,203
2012–2024 except 2018	Wind Wolves	Pleito Hills	San Emigdio Creek (#76, 77, 79)	2,227
2012–2024 except 2018	Wind Wolves	Pleito Hills	Los Lobos Creek (#78)	3,033
2012–2024 except 2018	Wind Wolves	Pleito Hills	Muddy Creek (#80)	3,004
2012–2024 except 2019	Wind Wolves	Pleito Hills	Salt Creek (#75)	2,396
2017	Randall	Tollhouse Ranch	Tollhouse Ranch (#24) – five miles southeast of donor site	125
2022	Randall	Beard Ranch and Tollhouse Ranch	Beard Ranch (#24) – Caliente Creek and Tehachapi Creek	93
2022	Panorama Vista	Panorama Bluffs and near nursery	Panorama Bluffs (#66)	70

Land protection: Caliente Preserve

The Center for Natural Lands Management manages thousands of Bakersfield cactus clumps on Sand Ridge Preserve (Diversity Database occurrence #3), which they own in fee title (Cypher et al. 2011, p. 38; Rogers, Warrick, and Labbé *in litt*. 2025, p. 1). In 2024, the Center acquired the 70-acre Caliente Preserve through fee title, which protects hundreds of additional Bakersfield cactus clumps that are adjacent and to the south of Sand Ridge Preserve (Rogers, Warrick, and Labbé *in litt*. 2025, p. 3). Combined with the adjacent parcels of the Bakersfield Cactus Ecological Reserve owned by the Department, these two preserves protect one of the largest Bakersfield cactus populations in perpetuity, although additional funding is needed to manage threats such as off-road vehicle use (Rogers, Warrick, and Labbé *in litt*. 2025, p. 3).

Recovery criteria:

Recovery criteria for downlisting and delisting Bakersfield cactus are described in Service 1998 (pp. 181, 185–186). Downlisting criteria for Bakersfield cactus have not been met, thus delisting criteria are not assessed here. The recovery goal is to maintain self-sustaining populations in protected areas representative of the former geographic and topographic range of the taxon and in a variety of appropriate natural communities (Service 1998, pp. 53–54). Areas are considered secured and protected when they are (1) protected for open space purposes through fee title ownership or conservation easement and (2) secured from incompatible uses with Bakersfield cactus.

Occurrence information is cited from Diversity Database (2025a, entire) and land status information is cited from California Conservation Easement Database (2023, entire) and California Protected Areas Database (2023, entire). While Diversity Database geospatial data is not always suitable for calculating occupied area, all Bakersfield cactus occurrences are mapped to a specific area or a specific area bounded with an 80-meter radius, which represents a mapped area with a relatively high degree of certainty (Diversity Database 2025a, entire; K. Ferguson, Native Plant Program, *in litt*. 2024). We consider this accurate enough to calculate area for the purpose of assessing downlisting criteria, but the numbers are likely an overestimate.

Downlisting criteria

1) Secure and protect 95 percent of occupied habitat on public land from incompatible uses. In the recovery plan, public lands are defined as federal, state, and conservation lands (Service 1998, p. 225).
    a. 2011 status: Partially met. About 48 percent, or 104 acres, of occupied habitat protected and secured from incompatible uses with an unknown number of clumps. In the 2011 status review, public lands occupied by Bakersfield cactus included lands owned by the U.S. Forest Service, State of California (including California Department of Water Resources, California Department of Fish and Wildlife, and California Department of Transportation), and Kern County (Service 2011, p. 5). However, not all Kern County lands are considered conservation lands.
    b. 2025 status: Partially met. About 51 percent of currently occupied habitat is secured from incompatible uses. There are 273 acres of occupied habitat on public lands, including lands owned by the U.S. Forest Service, State of California, and Kern County. In this assessment, to align with the recovery plan, we only consider Kern County land parcels to be public/conservation lands if the parcels are included in the California Protected Areas Database (2023, entire). Of these, we consider 139 acres (51%) of occupied habitat in the Bakersfield Cactus Ecological Reserve (California Department of Fish and Wildlife land) and Hart Memorial Park (Kern County land) to be secured and protected from incompatible uses.
2) Secure and protect 75 percent of Bakersfield cactus clumps and 75 percent of occupied habitat in five recovery sites from incompatible uses. Table 2 includes more details on the recovery sites.
    a. 2011 status: Partially met. None of the recovery areas are 75 percent secured and protected. There are an unknown number of total clumps at all recovery sites.
    b. 2025 status: Partially met. None of the recovery areas are 75 percent secured and protected, but progress has been made since the 2011 status review. There are an unknown number of total clumps at all recovery sites.
3) Approve and implement management plan for all protected areas identified as important for continued survival.
    a. 2011 status: Not met. No recovery area has an approved and implemented management plan that includes the survival of Bakersfield cactus as an objective.
    b. 2025 status: Not met. Same as 2011 status.
4) Population monitoring in specific recovery areas shows stable or increasing populations at all protected sites for a 5-year period.
    a. 2011 status: Not met. The population status of Bakersfield cactus at most sites has not been monitored since 1989.

b. 2025 status: Not met. While Cypher et al. (2011, entire) conducted a thorough survey, surveys were not repeated to determined population trends over a five-year period. The populations that are augmented annually through translocation are the only confirmed increasing populations (see **Conservation**).

Table 2. Assessment of downlisting criteria (2) to secure and protect occupied Bakersfield cactus habitat in five recovery sites.

Recovery Site (corresponding presumed extant and possibly extirpated Diversity Database occurrences)	**2011 Status**	**2025 Status**
Caliente-Bena Hills (#22, 23, 24, 25, 26, 69, 70, 71)	No occupied habitat protected.	Approximately 15 percent (125 of 857 acres) is protected and secured on Beard Ranch and Tollhouse Ranch units of Randall Preserve, owned by the Conservancy.
Comanche Point (#21, 61, 62, 63)	No occupied habitat protected.	No occupied habitat (of 42 acres) is protected.
Kern Bluff (#10, 11, 15, 17)	Approximately 24 percent of occupied habitat protected.	Approximately 21 percent (45 of 210 acres) of occupied habitat is protected and secured on Kern River County Park, owned by Kern County, and Bakersfield Cactus Ecological Reserve, owned by the Department
Sand Ridge (#3)	Approximately 45 percent of occupied habitat protected.	Approximately 61 percent (244 of 399 acres) of occupied habitat is protected and secured on Sand Ridge Preserve and Caliente Preserve, owned by Center for Natural Lands Management, and Bakersfield Cactus Ecological Reserve, managed by the Department. Caliente Preserve was established in 2024, so the parcel is not yet included in California Protected Areas Database (2023). Rogers, Warrick, and Labbé *in litt*. (2025) states that Caliente Preserve is 70 acres (p. 3).
Wheeler Ridge (#36, 37, 44, 45, 49)	Approximately 24 percent of occupied habitat protected.	Approximately 27 percent (25 of 165 acres) of occupied habitat is protected and secured on Wind Wolves Preserve, owned by The Wildlands Conservancy.

Conclusion:
After reviewing the best available scientific information, we conclude that Bakersfield cactus still meets the Endangered Species Act definition of endangered, and we recommend no status change at this time. The evaluation of threats affecting Bakersfield cactus under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of Bakersfield cactus in our 2020 status review remains an accurate reflection of the taxon's current status.

RECOMMENDATIONS FOR FUTURE ACTIONS

Here we propose several management, conservation, and research recommendations which will aid in the recovery and conservation of Bakersfield cactus. Some of these recommendations have already been discussed in previous recovery documents (Service 1998, pp. 53–54; Service 2011, pp. 31–32; Service 2020, p. 4) and remain valid.

1. *Habitat acquisition, management, and site-specific restoration.* All native occurrences of Bakersfield cactus should be protected and secured through land acquisition, conservation easement, or other means. Additional suitable but unoccupied habitat should be protected and restored as future translocation sites. Adaptive and site-specific management of occurrences should be implemented under long-term management plans with a focus on maintaining suitable habitat conditions. Specifically, plans should address threats including competition from nonnative species, insect herbivory, trash dumping, and trampling by livestock, foot traffic, and off-highway vehicles.
2. *Determine distribution and population dynamics through regular monitoring.* Conduct range-wide status surveys at five-year intervals to quantify changes in Bakersfield cactus distribution and population trends. “Clumps”, which are groups of pads that are rooted at the same point, should be more precisely defined, such as by quantifying the area of the rooted point. Surveys should use Cypher et al. (2011, entire) methodology. Occurrences that have not been surveyed in the previous 10 years should be prioritized. Develop a plan to monitor abundance and population trends through regular surveying. Supplementary data may include habitat conditions, presence of invasive species and other threats, precipitation levels, temperature, and pollinator visitations.
3. *Conduct genetic and morphological studies to clarify taxonomy and range.* The genetic study conducted by Smith (2013, entire) should be repeated to clarify taxonomy, genetic partitioning within the metapopulation, and range. The study should include all known populations of Bakersfield cactus, *Opuntia* populations of intermediate morphology adjacent to the historical Bakersfield cactus range, and additional outgroups. In conjunction, a morphological study analogous to Zika and Wilson (2012, entire) should be conducted to determine whether physical characteristics can reliably distinguish Bakersfield cactus from other *Opuntia*. In addition to clarifying taxonomy and range, the genetic study results should be used to develop genetic management plans for each population, with a focus on populations that are actively augmented.
4. *Continue translocation and population augmentation efforts under a genetic management plan.* As translocation and augmentation efforts are all conducted through vegetative propagation of pads, a genetic management plan can help determine whether translocation should occur between genetically similar populations to avoid outbreeding depression or between dissimilar populations to increase diversity and representation. Extirpated occurrences should also be reintroduced. Additionally, an alternate translocation method through sexual propagation should be tested by collecting fruits, germinating mature seeds, caring for seedlings in a nursery, then planting at the translocation site when cacti are at a suitable size (Rogers, Warrick, and Labbé *in litt*. 2025, p. 4). This study can help determine whether seeds are viable and, if successful, would increase genetic diversity.

5. *Explore effectiveness of controlled burns and grazing on reducing invasive grasses*. Appropriately managed grazing seems effective at reducing invasive grasses in Bakersfield cactus habitat. Further study the intensity, frequency, and timing of grazing that would confer the most benefit to Bakersfield cactus while minimizing trampling by livestock. Controlled low- to moderate-intensity burns may be another solution to the threat of invasive grasses. Conduct a feasibility test to determine the appropriate intensity and magnitude of fire for grass control and monitor health of Bakersfield cactus for adverse impacts. Compare grazing and controlled burns in terms of effectiveness at reducing invasive grasses, minimal impacts to Bakersfield cactus, cost to implement, and impacts on overall habitat and co-occurring species.
6. *Clarify extent and population composition of recovery sites.* Increased survey and translocation efforts have resulted in a greater number of known populations since the Bakersfield cactus recovery sites were defined in the Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998, pp. 185–186). The boundaries of each recovery site should be clearly defined based on habitat surveys and aerial imagery to ensure that occurrences included in each recovery site appropriately represent a population. The recovery criteria should be reassessed based on this information.

Field Supervisor, Sacramento Fish and Wildlife Office

Approve MICHAEL FRIS Digitally signed by MICHAEL FRIS Date: 2025.04.14 11:32:34 -07'00' **Date** _____

LITERATURE CITED

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APPENDIX

Table A. Bakersfield cactus occurrences and survey data collected since the 2011 status review (Diversity Database 2025b, entire; Cypher et al. 2011, entire; Rogers, Warrick, and Labbé *in litt*. 2025, p. 3; Conservancy 2020, p. 3; Conservancy and Plant Society 2023, p. 4; River Partners 2024, p. 17). No occurrences have been verified in the Diversity Database since the 2020 status review, so the 2020 status is still current and applicable for 2025. Empty cells in the 2011 status column indicate that the occurrence was not yet discovered or recorded at the time of the 2011 status review.

Occurrence number	Status as of 2011 status review	Status as of 2020 status review (applicable to 2025)	Changes since 2011 status review, most recently surveyed abundance, and other comments
1	Extirpated	Presumed extant	Change in status; 20 clumps in 2011
2	Presumed extant	Presumed extant	100–150 clumps in 2010
3	Presumed extant	Presumed extant	At least 785–850 clumps on Caliente Preserve portion in 2024
4	Extirpated	Extirpated	Extirpated by agricultural use; no suitable habitat remains
7	Presumed extant	Presumed extant	100–300 clumps in northern colony in 2018; none observed in southern colony in 2010
8	Presumed extant	Presumed extant	15 clumps in 1989; aerial survey shows suitable habitat still existed in 2011
10	Presumed extant	Presumed extant	3 clumps in middle colony in 2006; 23 clumps in southern, northeastern, and northwestern colonies in 2010
11	Presumed extant	Presumed extant	10–20 clumps in 2010
13	Presumed extant	Extirpated	Change in status; no plants observed in 2010; likely extirpated by urbanization
15	Presumed extant	Presumed extant	250–500 clumps in northeastern colony in 2010; none observed in other colonies in 2010
16	Presumed extant	Presumed extant	40 clumps in eastern colony in 2010; 5–10 clumps in western colonies in 2011
17	Presumed extant	Presumed extant	18 clumps in northern colony in 2010; none observed in southern colony in 2010
18	Presumed extant	Presumed extant	2 clumps in 1986
19	Presumed extant	Presumed extant	3 clumps of 15–20 plants in 1982
20	Presumed extant	Presumed extant	75–100 clumps with several hundred plants in northern colony in 1982; 40–50 plants in southern colony in 2011

21	Presumed extant	Presumed extant	1 plant in 1987; none observed in 2011
22	Presumed extant	Presumed extant	50 plants in 1989; none observed in 2010
23	Presumed extant	Presumed extant	105 clumps in 2011
24	Presumed extant	Presumed extant	100–200 clumps in eastern colony in 2011; 8 clumps in western colony in 2015. Addition of 113 surviving clumps from 2017 translocation effort and 93 surviving clumps from 2022 translocation effort (see more information in **Conservation**), but it is unclear what the total abundance is.
25	Presumed extant	Presumed extant	300–400 clumps in northern colony in 2010; 100 clumps in southern colony in 2015
26	Extirpated	Possibly extirpated	Change in status as no plants were observed in 1989 but suitable habitat existed in 2011
27	Extirpated	Extirpated	No plants observed in 1989 and in 2010
28	Presumed extant	Presumed extant	200–250 plants in eastern colony in 2010; 1 plant in western colony in 2012; more than 50 plants in middle colony in 2013
30	Extirpated	Extirpated	No plants observed in 1989 and in 2010
32	Presumed extant	Presumed extant	100 clumps in western colony in 2010; 6 clumps in eastern colony in 2010
33	Extirpated	Extirpated	No plants observed in 1989 and in 2011
34	Extirpated	Extirpated	Likely extirpated before 1987
36	Presumed extant	Presumed extant	5,000 plants in 2011
37	Possibly extirpated	Presumed extant	Change in status; 75–100 plants in 2010
38	Presumed extant	Presumed extant	5 clumps in 2012
39	Extirpated	Extirpated	Suitable habitat no longer existed in 1989
42	Presumed extant	Extirpated	Change in status as suitable habitat appears to be extirpated by development based on 2012 aerial imagery
43	Presumed extant	Presumed extant	35 clumps in 1987; suitable habitat still existed in 2011
44	Presumed extant	Presumed extant	750–1,000 plants in 2011; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)

45	Presumed extant	Presumed extant	13 plants observed in southeastern colony in 2005; 500–1,000 plants in southwestern colony in 2010; 21 clumps in northern colony in 2010
46	Presumed extant	Extirpated	Change in status as site has been extirpated by development
49	Presumed extant	Possibly extirpated	Change in status as 1 clump was last seen in 1996, and no plants were observed in 2010 despite extensive searching
51	Presumed extant	Presumed extant	2 clumps in 2010
58		Presumed extant	168+ clumps in 2012
59		Presumed extant	2 clumps in 2011
60		Presumed extant	2 clumps in 2012
61		Presumed extant	3 plants in northwestern colony in 2011
62		Presumed extant	2 plants in eastern colony in 2011
63		Presumed extant	380+ clumps in 2012
64		Presumed extant	20 plants in 2010
65		Presumed extant	5 clumps in 2011
66		Presumed extant	150–200 clumps in 2011. Addition of 60 surviving clumps from 2022 translocation effort (see more information in **Conservation**), but it is unclear what the total abundance is.
67		Presumed extant	1 clump in 2011
68		Presumed extant	1 clump in 2010
69		Presumed extant	24 clumps in 2015
70		Presumed extant	1 plant in 2017
71		Presumed extant	1–2 plants in 2015
72		Presumed extant	3 plants in 2017
73		Presumed extant	1–12 plants in 2018
74		Presumed extant	2 clumps in 2014
75		Presumed extant	Transplants outside of native habitat/range; 563 plants in southwestern colony in 2017; 161 plants in northeastern colony in 2018; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)

76		Presumed extant	Transplants outside of native habitat/range; 186 plants in northern colony in 2017; 78 plants in southern colony in 2018; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)
77		Presumed extant	Transplants outside of native habitat/range; 234 plants in southern colony in 2017; 42 plants in northern colony in 2018; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)
78		Presumed extant	Transplants outside of native habitat/range; 606 plants in 2017; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)
79		Presumed extant	Transplants outside of native habitat/range; 130 plants in southwestern colony in 2017; 77 plants in northeastern colony in 2018; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)
80		Presumed extant	Transplants outside of native habitat/range; 655 plants in southern colony in 2017; 126 plants in northern colony in 2018; population supplemented every year between 2012 and 2024 (see more information in **Conservation**)
81		Presumed extant	4 plants in 2019